Effectiveness of Cognitive Behaviour Therapy and Telecounselling for the Treatment of Psychological Problems Following Spinal Cord Injury

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B.A (Hons), M Psych (Clin)

This dissertation is submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in the Faculty of Health Sciences, School of Psychology, at the University of Adelaide

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Abstract

The immediate and permanent neurological changes associated with a spinal cord injury (SCI) have a profound impact on an individual's lifestyle. Faced with these changes and without the appropriate intervention, an injured person is at risk of developing psychological problems, particularly depression and anxiety. Moreover, there is evidence to suggest that some individuals require long-term psychological monitoring to prevent the development of further morbidity.

However, there remains a gap between current psychological practices in SCI rehabilitation and the evidence-base that informs these practices with adult clients. Specifically, evaluations of the efficacy of cognitive behavioural[1] therapy (CBT) and its contribution to improving emotional outcomes are limited. Additionally, research on the role of outreach mental health services for this population, particularly telephone-based counselling (telecounselling), is largely descriptive in nature. In order to ensure evidence-based psychological practice in a rehabilitation setting, it is therefore important to critically evaluate available interventions, such as CBT and telecounselling. The research presented in this thesis attempts to address some of these gaps in our knowledge base via four independent studies.

Before doing so, Chapters 1 and 2 provide a context to this research by reviewing the literature on psychological adjustment to disability. An approach to rehabilitation that acknowledges the psychosocial implications of SCI is outlined. Studies of the discipline-specific contribution of psychology to rehabilitation outcomes are then introduced,

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[1] Australian/UK English spelling is used throughout.

focussing on CBT and telecounselling as options for treating the psychological problems that are experienced by a sub-group of individuals with a SCI.

The impact of CBT on the psychological adjustment of adults with SCI is then examined in Chapter 3, which comprises a meta-analytic review of the available research (Study 1). Ten independent studies evaluating individual ($N_{\text{studies}} = 1$) or group-based CBT ($N_{\text{studies}} = 9$) among inpatient or outpatient samples ($N = 424$ participants), were identified from a comprehensive search of six electronic databases relevant to rehabilitation psychology. The combined findings of this meta-analysis indicated that CBT has immediate benefits, contributing to improved quality of life post-SCI. However, there is a need for further objectively derived data on individual-based CBT for this population, with research on this therapy format currently being very limited.

The application of individualised CBT in SCI rehabilitation is further explored in Chapter 4 (Study 2). This clinical research study used an independent-groups design with 25 participants. Eleven participants with high baseline levels of depression, anxiety or stress (based on the 21-item Depression, Anxiety and Stress Scales, DASS-21), were allocated to a CBT Treatment group. Their responses were compared to 13 participants who reported no psychopathology and received standard medical care and psychological monitoring. CBT participants demonstrated clinical improvements, with treatment, on the DASS-21 subscales. They also reported a significant increase in levels of depression once therapy was discontinued. Standard care participants reported no significant changes in mood during the study. However these results were not conclusive, given the study's small sample size and, consequently, it's limited power to detect statistically significant treatment effects. Furthermore the study was not randomised, making it difficult to generalise the findings to the larger population of adults with SCI in this inpatient setting.

The results of Studies 1 and 2 are consistent with current SCI research, which emphasises the continued mental health needs for a sub-group of individuals who experience prolonged psychological distress following their primary rehabilitation. Within this context, telecounselling offers both an accessible and affordable home-based treatment option for this client population. However the effectiveness of telecounselling, including the magnitude of treatment change, has not been objectively evaluated in the rehabilitation literature.

This issue is addressed in Study 3 (Chapter 5), which used meta-analytic techniques to quantitatively analyse the evidence on telecounselling for adults with an acquired physical disability. A range of diagnostic groups, including SCI, stroke, multiple sclerosis, amputation and severe burn injuries were examined as the research in this area is extremely limited. The literature search, in addition to email correspondence with colleagues from the American Psychological Association and Australian Psychological Society, identified eight eligible studies involving 658 participants. The combined results of these studies supported telecounselling as a service delivery approach, with individuals receiving this treatment reporting statistically significant improvements in specific psychosocial outcomes including coping skills, aspects of community integration, and depression. However, there were limited available data ($N_{\text{studies}} = 4$) on the longer-term effectiveness of telecounselling. Furthermore, the clinical feasibility of telecounselling could not be determined as cost analyses for the identified telecounselling programs were lacking.

The fourth and final study provides this cost-benefit detail in an examination of

telecounselling for adults residing in the community with SCI (Chapter 6). This study involved a total sample of 40 participants randomly allocated to telecounselling Treatment (*N* = 20) or standard care Control (*N* = 20) groups. Results showed a trend towards improvement across multiple outcome domains for telecounselling participants, including self-report measures of mood and coping. However, the ability to draw statistical conclusions was limited due to the sample size that could be recruited.

The clinical implications of the combined findings are summarised in Chapter 7. Importantly, the findings contribute to an improved understanding of psychological interventions that are appropriate to the practice of rehabilitation psychology. Specifically, there is a need to assess and manage individuals' levels of depression, anxiety and stress, using CBT, in the primary stages of SCI rehabilitation (Studies 1 and 2). There is also potential for telecounselling to broaden the SCI population's access to psychotherapy following discharge from inpatient rehabilitation (Studies 3 and 4). Moreover, telecounselling offers clinicians an opportunity to monitor the longer-term adjustment of individuals living with SCI in both an efficient and cost- effective manner. Further research examining the role of these psychological treatments in adult SCI rehabilitation is planned, to extend and validate these findings.

Declaration

I, Diana Dorstyn, certify that this work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

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List of Publications

Publications are listed in order of appearance in this dissertation

Dorstyn, D.S., Mathias, J.L., & Denson, L.A. (2011a). Efficacy of cognitive behaviour therapy for the management of psychological outcomes following spinal cord injury: A meta-analysis. *Journal of Health Psychology, 16*, 374-391. doi: 10.1177/ 1359105379063.

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Dorstyn, D.S., Mathias, J.L., & Denson, L.A. (2011b). Psychosocial outcomes of telephone-based counselling for adults with an acquired physical disability: A meta-analysis. *Rehabilitation Psychology, 56*, 1-14. doi: 10.1037/a0022249.

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Statements of the Contributions on Jointly Authored Papers

Chapter 3

Title: Efficacy of cognitive behaviour therapy for the management of psychological outcomes following spinal cord injury: A meta-analysis

Co-Authors: J.L., Mathias, L.A., Denson

Contributions: J.L. Mathias and I were responsible for the study inception. I was solely responsible for the study design, methodology (which included literature searches, data extraction, statistical analyses, data interpretation), and manuscript preparation. Both co-authors acted in a supervisory capacity during all stages of this research and manuscript preparation.

Chapter 4

Title: Psychological intervention during spinal rehabilitation: A preliminary study.

Co-Authors: J.L., Mathias, L.A., Denson

Contributions: Professor Tonge and Dr. Taleporos, Monash University, contributed to the study's inception. I was responsible for the final study design, participant recruitment, data collection, statistical analyses, data interpretation and manuscript preparation. Both co-authors acted in a supervisory capacity during all stages of this research and manuscript preparation.

Chapter 5

Title: Psychosocial outcomes of telephone-based counselling for adults with an acquired physical disability: A meta-analysis

Co-Authors: J.L., Mathias, L.A., Denson

Contributions: J.L. Mathias and I were responsible for the study inception. I was solely responsible for the study design, methodology (which included literature searches, data extraction, statistical analyses, data interpretation), and manuscript preparation. Both co-authors acted in a supervisory capacity during all stages of this research and manuscript preparation.

Chapter 6

Title: Effectiveness of telephone counselling in managing psychological outcomes after spinal cord injury: A preliminary study

Co-Authors: J.L., Mathias, L.A., Denson, M.T., Robertson

Contributions: I was responsible for the study inception and design, participant recruitment, data entry, statistical analyses, data interpretation and manuscript preparation. M.T. Robertson carried out all clinical assessments (i.e. undertaken at baseline, week 12 post-intervention and 3 month follow-up). J.L. Mathias and L. Denson acted in a supervisory capacity during all stages of this research and manuscript preparation.

The undersigned agree that the statements made regarding author contributions are accurate and true:

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Chapter 6

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Chapter 1: Psychosocial Impact of Spinal Cord Injury

Clinically significant levels of depression and/or anxiety are present in approximately 30% of adults with a newly acquired spinal cord injury, or SCI (Craig, Tran, & Middleton, 2009). Without the appropriate treatment, these psychological problems can impede an individual's functional progress during primary rehabilitation (Craig, et al., 2009; Kennedy, Lude, Elfstrom, & Smithson, 2011; Riggins, Kankipati, Oyster, & Cooper, 2011). Depression can also contribute to poor health outcomes once a person returns to living in the community, leading to greater rehospitalisation rates, a higher utilisation of health services, other psychiatric co-morbidities (e.g. substance abuse), poor compliance with health care regimes, and lowered quality of life (Krause & Saunders, 2011; Middleton, Lim, Taylor, Soden, & Rutowksi, 2004; Nicholson Perry, Nicholas, Middleton, & Siddall, 2009). These consequences, in turn, contribute to the economic and psychosocial burden of SCI.

The current chapter examines the psychosocial aspects of SCI, commencing with a discussion of the neurology and epidemiology of this chronic condition. Both the financial and psychosocial impact of SCI are then highlighted, followed by a discussion of rehabilitation and its role in SCI management. The prevailing models of disability are then outlined, with an emphasis on one of the main contemporary theoretical frameworks: namely the biopsychosocial model of functioning.

Spinal Cord Injury

SCI is defined as a neurological disorder, involving "an acute, traumatic lesion of neural elements in the spinal canal (spinal cord and cauda equina) resulting in temporary or permanent sensory deficit, motor deficit, or bladder/bowel dysfunction" (American Spinal Injury Association Neurological Standards Committee, 1994; Thurman, Burnett, Jeppson, Beaudoin, & Sniezek, 1994, p. 665). SCI is therefore described in terms of its anatomy.

For ease of classification, the spinal nerves are numbered in four groups, closely corresponding to the segments of the vertebrae encasing it: the cervical (C1-C8), thoracic (T1–T12), lumbar (L1-L5) and sacral (S1-S5) nerves (refer to Figure 1). Neurological damage to the cervical segments of the spinal cord results in weakness or sensory changes in the arms (or hands) and legs; a condition known as tetraplegia (or quadriplegia). Injury to the thoracic, lumbar or sacral segments causes a loss of motor and/or sensory function in the trunk, legs and feet; referred to as paraplegia. The extent of neurological damage from a SCI may be complete, involving no voluntary movement below the level of injury, including the sacral (anal) area, or incomplete, where there is some preservation of movement and/or sensation below the original injury, particularly anal sensation (Alexander et al., 2009; Waring et al., 2010).

SCI can be further classified according to causation. Traumatic injuries commonly result from motor vehicle accidents, falls, and sport or leisure activities, and are the leading cause of SCI (Ackery, Tator, & Krassioukov, 2004; DeVivo & Chen, 2011; Krassioukov, Furlan, & Fehlings, 2003; Norton, 2010). The non-traumatic causes of SCI include congenital and/or heritable disorders (e.g. spina bifida myelomeningocele), disease processes (e.g. infections, toxins), vascular malformations (e.g. aneurysms), post-operative causes, and neoplastic disorders (e.g. cancer metastasis to the spine).

NOTE:
This figure is included on page 3 of the print copy of
the thesis held in the University of Adelaide Library.

Figure 1: The spinal nerves and vertebrae. Retrieved 16 July 2012 from: http://www.dana.org/news/brainhealth/detail.aspx?id=9882

Neurology.

SCI commonly affects the musculoskeletal, gastro-intestinal, autonomic nervous and reproductive systems. Some of the main neurological changes to these systems include: paralysis, loss of physical sensation, incontinence, constipation, problems with thermal-regulation (including hyperthermia and hypothermia), sexual dysfunction, and complications with reproductive health (Sipski & Richards, 2006). Most of these problems occur immediately following an injury as a result of permanent damage to the spinal nerves. However, some motor and sensory changes may improve over time due to a combination of normal neurological recovery and acute medical interventions. The latter may include surgery to stabilise the spine and pharmacotherapy to reduce inflammation of the spinal cord (Burns & Ditunno, 2001; Sipski & Richards, 2006). As a general guide, incomplete SCIs and/or lesions that occur at lower segments of the spinal cord are associated with better recovery and functional abilities compared to complete SCIs, although the majority of injured individuals will sustain residual motor and/or sensory weakness (Burns & Ditunno, 2001).

SCI is also associated with significant medical morbidity. Co-morbid conditions, particularly orthopaedic fractures and brain injury (Macciocchi, Seel, Thompson, Byams, & Bowman, 2008; New & Jackson, 2010), commonly occur with traumatic SCIs. Additionally, high-cervical and complete injuries can make individuals susceptible to pulmonary infections, pneumonia, and respiratory failure which, in turn, can contribute to mortality, particularly in older patients with SCI (van den Berg, Castellote, de Pedro-Cuesta, & Mahillo-Fernandez, 2010).

In addition to these immediate changes, persons with SCI are at a high risk of developing secondary conditions post-injury. Common complications include: urological disorders, such as urinary tract infections, which occur in 80% of cases (Potter, 2006); skin ulcers and/or obesity as a result of reduced mobility; bone fractures as a result of ageing and osteoporosis; muscular skeletal problems, such as spasticity (where natural reflexes become tense and overactive); autonomic regulatory problems (i.e. dysreflexia -

chronically high blood pressure); and chronic neuropathic pain (Hitzig, Eng, Miller, & Sakakibara, 2010; Sipski & Richards, 2006).

Epidemiology.

Currently, there are approximately 11,900 people living with SCI in Australia, with an estimated 300 to 400 new cases occurring per year (Norton, 2010). The incidence of new cases of SCI in Australia is highest among young adult males, aged 15-24 years (DeVivo & Chen, 2011; Norton, 2010; O'Connor, 2002). Moreover, the majority (79%) of new injuries are due to traumatic causes, particularly transport accidents involving unprotected road users (i.e. pedestrians, motor cycle riders) and motor vehicle occupants; both of which commonly result in high-cervical lesions (Norton, 2010). Injuries sustained from leisure activities (e.g. diving) and falls also contribute to the rate of traumatic SCIs (Norton, 2010). Although comparisons with worldwide estimates are limited, due to inconsistencies in how SCI data are reported between different countries, the Australian data are consistent with international statistics, which indicate that SCI is a chronic condition with an early incidence (Ackery, et al., 2004; DeVivo & Chen, 2011; Polinder et al., 2007; Strauss, DeVivo, Paculdo, & Shavelle, 2006; Wyndaele & Wyndaele, 2006).

The incidence of SCI is relatively low in comparison to other chronic conditions, such as cardiovascular disease, cancer and mental illness (Begg, Vos, Barker, Stanley, & Lopez, 2008). However, SCI is considered to be a condition associated with significant ‘disease burden’ due to its chronicity and the fact that it primarily affects younger adults (Polinder, et al., 2007). The disease burden of SCI is further exacerbated by the complex economic needs of the prevalent population, as detailed over.

Economics.

The acute health care costs associated with SCI are considerable, with admissions to public hospitals in Australia equating to expenses that are 400% higher than non-SCI admissions. More specifically, every new injury equates to an average acute cost of \$54,000[2] (New & Jackson, 2010). This is often due to a lengthy initial hospital admission which includes, on average, 26 days in an acute care facility and 60 days in primary rehabilitation (Access Economics, 2009; Norton 2010). The main health care system in Australia that is responsible for these hospital and medical costs is Medicare; a tax subsidised service which is provided to all citizens (Duckett, 2007). Consequently, the public health system bears most of the expenses involved in the medical management of SCI.

In the longer-term, public health system expenditure for individuals living with SCI in Australia remains high - averaging \$201,145 for every case of paraplegia and \$297,453 for tetraplegia (Access Economics, 2009; O'Connor, 2002). These costs are substantial when compared to the medical management of other low incidence neurological disorders, such as multiple sclerosis or traumatic brain injury (Access Economics, 2009; New & Jackson, 2010), but are comparable to that of other developed countries, with SCI reportedly being one of the most costly medical conditions to treat (Ackery, et al., 2004; French et al., 2007).

In Australia, responsibility for the funding of individuals' lifestyle and accommodation needs following SCI is then shared between the Commonwealth (i.e. Department of Families, Housing, Community Services and Indigenous Affairs) and state

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[2] All costs are represented in Australian dollars.

governments (e.g. Disability Services SA). This includes the costs associated with equipment to assist with daily living and transportation, with up to 90% of this population requiring some form of mobility aid, such as a customised wheelchair (Biering-Sørensen, Hansen, & Biering-Sørensen, 2004). Aids to assist with daily activities are also frequently required (e.g. continence aids, pressure relieving mattress). Added to this are expenses associated with any structural modifications that are needed to accommodate these items in the home setting (e.g., installation of ramps in order to access a home, widening of doorways to accommodate a wheelchair; Access Economics, 2009).

In addition there are expenses associated with long-term paid support for individuals with SCI, which range between $66,669 and $343,526 per person in the first six years post-injury, depending on injury severity (Access Economics, 2009). This paid care may include attendant care, supported accommodation and/or respite care provided by a community or government agency (Access Economics, 2009). Moreover, research shows that the care needed by individuals with a SCI increases over time as a result of the medical complications that occur in persons ageing with a SCI (Charlifue, Jha, & Lammertse, 2010; Sipski & Richards, 2006).

If one considers the costs associated with the unpaid care provided by the caregivers (i.e. spouses, parents, siblings, children) of affected individuals, the total lifetime expenses, including lost earnings due to reduced employment and/or absenteeism by carers, are even greater (Access Economics, 2009). Out-of-pocket health care expenses, such as the purchase of pharmaceuticals, also need to be factored into the financial costs associated with SCI (Rowell & Connelly, 2008).

Psychosocial impact.

Community integration.

The permanent neurological changes that result from a SCI have a profound impact on an individual's vocational and financial security. Return-to-work rates are low, with estimates ranging between 11% and 54% (Krause, Terza, & Dismuke, 2010). Although this broad estimate may reflect variation in injury-related variables (e.g. time since SCI) and/or differing definitions of labour force participation, the SCI literature consistently highlights problems in returning to work or seeking new employment (Krause, Terza, & Dismuke, 2008). Of concern is the fact that individuals with SCI often have significant vocational potential, with up to 30% seeking further educational qualifications (Athanasou, Brown, & Murphy, 1996) and 57% recognising the need to improve their job skills post-injury (Archer, Castillo, MacKenzie, Bosse, & LEAP group, 2010).

The functional impairments that result from a SCI also invariably impact on levels of independence and, consequently, lifestyle. In their survey of 32 persons with a newly acquired injury, Vissers et al., (2008) reported problems with self-care as a barrier to involvement in recreational events, particularly for individuals with co-morbid health problems, such as neuropathic pain and incontinence. However, Whiteneck et al (2004) reported minimal or no post-SCI barriers to the community integration goals of a very large sample (*N* = 2,726). Importantly, there is longitudinal research to indicate that social outcomes can improve over time (DeVivo & Chen, 2011; Krause, 1998).

In addition, SCI poses a challenge to personal relationships, particularly given that up to 70% of injured individuals are dependent on family members to provide their personal care, including bowel and bladder management (Rowell & Connelly, 2008). For someone with tetraplegia, this personal assistance may involve up to 40 hours of care from a family member each week (Rowell & Connelly, 2008). This dependency has been linked to marital problems post-injury and poor mental health among caregivers (Elfstrom, Kreuter, Ryden, Persson, & Sullivan, 2002; Kalpakjian et al., 2011; Karana-Zebari, de Leon, & Kalpakjian, 2011; Robinson-Whelan & Rintala, 2003). However, there is also evidence that SCI can have a positive impact, including the formation of new friendships and opportunities to take on new life roles (McMillen & Loveland Cook, 2003; Nosek et al., 2004).

Variability in the social and interpersonal outcomes of people who have sustained a SCI may partly be explained by psychological factors; most notably, the mental health of the injured individual. For example, poorer community integration and a higher frequency of marital separation have been noted in samples with SCI and co-morbid depression (Arango-Lasprilla et al., 2009; Elliott & Shewchuck, 1995; Kalpakjian, et al., 2011; Kemp & Bateham, 2010). Conversely, positive relationships and life satisfaction have been reported in persons who report emotional well-being post-injury (Karana-Zebari, et al., 2011).

Depression.

The emotional impact of a new SCI can be overwhelming and lead to symptoms of depression. Negative body image and low self-esteem have been highlighted in personal accounts of peoples' experience with SCI (Lightpole, 1991; Taleporos & McCabe, 2002). Furthermore, up to 30% of individuals will develop a major depressive disorder, regardless of whether the SCI has a traumatic or non-traumatic cause (Migliorini, New, & Tonge, 2009). This is a very high rate, particularly compared to current estimates of clinical depression in the general community, which range from 5 to 10% worldwide (Australian Government Institute of Health and Welfare, 2010; Kessler, Chiu, Demler, Merikangas & Walters, 2005; Moussavi et al., 2007; World Health Organisation, 2008). Moreover, an estimated 15% of individuals report suicidal ideation (Fann et al., 2011). Also concerning is the finding that symptoms of depression among community-dwelling samples with SCI can become chronic (Fann, et al., 2011). This was highlighted in a longitudinal survey of 87 adults with SCI by Pollard and Kennedy (2007), who reported that 38% of their sample was depressed in the acute setting and that this distress persisted for 10 years post-injury.

The available data also indicate that depression post-SCI contributes to increased health costs for this population. For example, Malec and Neimeyer (1983) found that elevated levels of depression during primary rehabilitation impeded patients' ability to learn essential self-care behaviours (e.g. bladder management) and predicted extended rehabilitation re-admissions. Moreover, continued symptoms of depression can negatively impact on an individual's functional independence following inpatient rehabilitation (Kennedy, et al., 2011), including reduced physical activity (Tawashy, Eng, Lin, Tang, & Hung, 2009), an increased occurrence of pressure ulcers (Smith, Guihan, LaVela, & Garber, 2008) and increased levels of pain and fatigue (Nicholson Perry, et al., 2009; Tawashy, et al., 2009).

In addition, individuals who have an SCI with co-morbid depression use a disproportionately large amount of community-based health services, including additional paid personal care, with depressed persons reporting an increased need for assistance with daily tasks (Tate, Forchheimer, Maynard, & Dijkers, 1994). Mental health treatments including psychotropic medication, psychotherapy, and/or readmission to hospital are also greater for this subgroup (Fann, et al., 2011; Rossignol et al., 2011). Although evidence from Australia regarding the effect of psychopathology on health care utilisation following SCI is limited, psychiatric disorders have been identified as a key contributor to rehospitalisation in this population (Middleton, et al., 2004). Similarly, data from the United States indicate that up to 28% of hospital re-admissions among community samples with SCI are related to the treatment of clinical depression (Dryden et al., 2004)

These findings highlight the importance of accurately identifying those individuals who are at increased risk of developing adverse psychological outcomes following SCI, such as depression. However, the diagnosis of mood disorder in acutely-injured patients is complex. In an early paper, Gans (1981) reported a tendency to over-diagnose depression in the medical setting because the primary effects of physical illness (e.g. weight change, low energy, appetite change, sleep disturbance) can also be attributed to the psychomotor effects of a mood disorder. The research literature has also been criticised for its use of a diverse range of measures when diagnosing depression (Frank et al., 1992; Krause, Saunders, & Newman, 2010; Williams, Hitchcock, Cordes, Ramirez, & Pignone, 2002). Some of the strategies that have been proposed to improve the accuracy of diagnosing depression among individuals with SCI include the use of questionnaires that have been validated with medical populations, in addition to supplementing self-report measures with diagnostic evaluations to ensure that all psychological and physical symptoms are considered, regardless of aetiology (Craig, et al., 2009; Dawson, Shamley, & Jamous, 2008; Kalpakjian, Bombardier, Schomer, Brown, & Johnson, 2009).

Anxiety and post-traumatic stress.

The physical and personal changes following SCI may trigger cognitive and behavioural symptoms of anxiety, such as intense and excessive worrying, catastrophic thinking, a perceived lack of control and increased irritability (Hirsh, Bockow, & Jensen, 2011; Lohne, 2009). Clinically significant levels of anxiety are estimated to affect up to 30% of this population (Craig, et al., 2009) and have been shown to steadily increase during the acute stages of SCI rehabilitation, reportedly peaking prior to an individual's discharge home (Kennedy & Rogers, 2000). Although there is some evidence that this anxiety tends to decrease over time (Craig, 2008), Pollard and Kennedy (2007) have demonstrated that individuals may continue to report distress at six to eight years post-injury.

Symptoms of post-traumatic stress disorder (PTSD), including hyper-arousal (e.g. anger), cognitive intrusion (e.g. recurring and distressing memories of the event) and avoidance (e.g. avoiding thoughts, activities or feelings about the event), have also been reported in samples with traumatic SCI (Krause, Saunders, et al., 2010). This rate is comparable to the prevalence of PTSD in other groups that have sustained traumatic injuries, including individuals with a limb amputation (Melcer, Walker, Galarneau, Belnap, & Konoske, 2010) and those with severe burn injuries (Palmu, Suominen, Vuola, & Isometsa, 2011).

However, estimates of PTSD following SCI are conflicting, varying between 7% and 60%. The discrepancy in these estimates may, in part, be due to differences in the samples under investigation - including veterans and civilians with SCI (Krause, Saunders, et al., 2010). Additionally, the SCI samples often include individuals with co-morbid cognitive problems (e.g., traumatic brain injury), which can compromise clinical assessment of PTSD (Krause, Saunders, et al., 2010).

Of concern is research indicating that chronic anxiety is significantly correlated with poor health outcomes following SCI, including increased alcohol use (Saunders & Krause, 2010), depression (Kennedy & Rogers, 2000), and chronic pain (Nicholson Perry, et al., 2009). Highly anxious individuals are also at an increased risk of early mortality following SCI, even after adjusting for potential confounding variables, such as injury severity and age (Krause, Carter, Zhai, & Reed, 2009; Krause & Saunders, 2010). These findings highlight the need for both the accurate assessment and diagnosis of anxiety disorders early after SCI, so that preventive measures, including psychological treatments, can be implemented in the acute post-injury period before anxiety symptoms become chronic and negatively impact on the adjustment process (Kennedy, 2008).

Taken together, these findings highlight the psychosocial burden of SCI. In order to prevent and manage these psychosocial issues effectively in rehabilitation, a model of functioning is therefore required, which acknowledges SCI as a multi-faceted condition that not only impacts on a range of behaviours (i.e. communication, personal care and mobility) but involves a complex process of adjustment, which is itself determined by many physical and psychosocial variables. Such a model may assist in identifying how psychological services should be integrated into the management of SCI.

Rehabilitation and Psychological Adjustment to SCI

Historically, rehabilitation has been regarded as an isolated phase of treatment that is designed to reduce the physical and functional impairments that are caused by an illness or injury (Wade, 1992). This term has now evolved to include a continuum of services that aim “to restore function and/or to maximise remaining function to bring about the highest possible level of independence, physically, psychologically, socially and economically” (World Health Organisation, 2004, p. 49). In this context, rehabilitation involves both physical recovery and psychological adjustment.

Although psychological adjustment is thought to be a discrete stage in the psychosocial adaptation process to SCI, the terms ‘adjustment’ and ‘adaptation’ are often used synonymously in the rehabilitation literature (Livneh & Antonak, 1997). In keeping with the World Health Organisation’s (2004) concept of rehabilitation as a process of enablement, psychological adjustment to SCI is hereafter regarded as an adaptive response, whereby an individual modifies their behaviour, thinking and personal circumstances in order to maximise their quality of life, post-injury (Middleton & Craig, 2008).

The process of coping and adjustment to disability has received significant attention in the empirical literature. A variety of conceptual models have been developed to help explain the concept of disability and functioning – namely the medical, social and biopsychosocial models. Each model has merit in terms of highlighting the complex relationship between SCI and its physical and emotional consequences. The advantages and disadvantages of each model will be explored in order to highlight the multi-faceted and dynamic nature of adjustment to SCI.

Models of Disability and Psychological Adjustment

Medical model.

The medical, or biomedical model, is one of the earliest models of illness and disability. Developed in the 18th century, this model proposed that the structural and functional losses that resulted from a traumatic condition, such as SCI (e.g., sensory weakness, reduction in movement), inevitably resulted in emotional and interpersonal difficulties for the individual (Engel, 1977; Hubbard, 2004). Furthermore, the medical model assumed that the grief associated with a SCI involved a predictable time course, with a clear onset and a series of distinct emotional states or stages that are experienced in an expected pattern (Kubler-Ross, 2008; Livneh & Sherwood, 1991; Webb, 1992). These stages included shock, denial, anger, depression and acceptance, with a gradual progression from one stage to another. Accordingly, distress resolved over time as the individual ‘works through’ and confronts the reality of their loss (Kubler-Ross, 2008; Webb, 1992; Wortman & Silver, 1989).

These proposed ‘stage theories’ are still prevalent in the grief literature, with over 40 models in existence (Livneh, 1986). However, the number, sequencing and duration of stages required for the adjustment process is wide-ranging (Parker, Schaller, & Hansmann, 2003). Moreover, it is argued that the grief associated with SCI is not defined by a single incident but, rather, is a lifelong process involving recurrent crises as an individual makes the transition to living with a chronic condition (Webb, 1992).

According to the medical model, poor health outcomes, such as depression, are an expected consequence of SCI. Indeed, there is some evidence that biochemical and metabolic changes are involved in the aetiology of depression, with psychological and/or physical trauma thought to compromise a person's immune system, making them susceptible to depression (Beem et al., 1999; Friedland & McColl, 1992; Gaab, Sonderegger, Scherrer, & Ehlert, 2006; Segerstrom & Miller, 2004). However, as previously discussed, not all individuals with SCI develop psychological difficulties - with an estimated 70% reporting positive mental health and well-being (Craig, et al., 2009; Quale & Schanke, 2010). Furthermore, it is difficult to determine the extent to which a mood disorder is directly related to the physiological impact of SCI, given that the traumatic nature of some injuries (e.g. motor vehicle accident) may itself be a risk factor for developing depression (Kennedy & Duff, 2001; Middleton & Craig, 2008).

The evidence to implicate other biological factors, such as injury severity, in the psychological adjustment to SCI, is also conflicting. For example, there is research to suggest that the severity of a SCI is not a significant risk factor for depression (Kishi, 2001; Manns & Chad, 2001; Saadat et al., 2010) and, paradoxically, Elfstrom et al., (2002) reported that participants with less neurological disability experienced a greater sense of helplessness. This finding suggests that the 'hidden disabilities' associated with SCI, particularly bowel, bladder and sexual dysfunction, may significantly affect an individual's psychosocial adjustment (Elfstrom, et al., 2002).

The medical model has also been criticised for its focus on biologically-based treatments (Mathew, Ravichandran, May, & Morsley, 2001). For example, using this model, clinical depression would be managed by pharmacological methods rather than psychosocial interventions. Although this approach is often necessary in the acute setting, where life-threatening injuries require medical treatment, it is considered less appropriate in the rehabilitation environment, which necessarily focuses on retraining skills (Barclay, 2002; Wade & de Jong, 2000; Whalley Hammell, 2007). It is also been argued that the medical model considers the individual patient to be a passive recipient of care who is not actively involved in decisions about their treatment program (Engel, 1977). This subsequently results in a reductionist approach, in which patient care is depersonalised (Engel, 1977).

Social model.

Another major criticism of the medical model is that it failed to consider the impact of a person's social and environmental resources (e.g. family support, community services) in the process of coping with a medical condition, such as SCI. The social model of disability, which can be traced to the civil rights movements of the 1960s, was developed to address this criticism. This model treats disability as a social phenomenon that is influenced by societal attitudes and governmental policies (Oliver, 1990).

There is evidence to support the usefulness of a social model within a SCI context. For example, social support has consistently been shown to predict well-being in samples with chronic SCI (Livneh & Antonak, 1991; Muller, Peter, Cieza, & Geyh, 2012; Taleporos & McCabe, 2002). Other social factors, such as socio-economic status and gender, are also known to influence the pace and course of adjustment to SCI, with research demonstrating that education level significantly correlates with vocational adjustment (Krause, Terza, et al., 2010; Murphy, Brown, Athanasou, Foreman, & Young, 1997; Ramakrishnan, Mazlan, Julia, & Abdul Latif, 2011; Sipski & Richards, 2006) and that women with SCI are more susceptible to post-traumatic stress and depression (Kennedy & Evans, 2001; White, Driver, & Warren, 2010).

Similarly, environmental barriers to vocational achievements have been identified, particularly problems with physical access to worksites and/or transport (Lidal, Huynh, & Biering-Sørensen, 2007; Lysack, Lomanecky, Kabel, Cross, & Neufeld, 2007). Other social barriers to community integration post-SCI include perceived and/or actual negative attitudes towards individuals with a physical disability (Archer, et al., 2010; Lysack, et al., 2007; Pelletier, Rogers, & Thurer, 1985; Taleporos & McCabe, 2002).

According to the social model, different types of support - emotional (e.g. empathy, care from family and friends), instrumental (e.g. practical assistance in the form of time or money), and/or informational (e.g. advice, suggestions) - are all critical in the management of SCI (Chronister, 2009). This socially inclusive approach is supported by research that demonstrates the effectiveness of peer mentors in SCI rehabilitation (Jalovcic & Pentland, 2009; Lucke, Lucke, & Martinez, 2004) and the importance of involving clients in making choices and taking responsibility for the achievement of rehabilitation goals (Barclay, 2002; Playford, Siegert, Levack, & Freeman, 2009).

While the social model of disability has been credited with promoting consumer-focussed service planning and delivery (Bochel & Bochel, 1994; Taylor, 2005), it has also been criticised for providing an excessively narrow view of disability because adjustment to SCI is affected by a complex interplay between demographic, injury, social and psychological variables (Middleton & Craig, 2008; van Leeuwen et al., 2011).

Biopsychosocial model.

A more multi-factorial model, known as the biopsychosocial model, was first introduced by Nagi (1965) and subsequently developed by Engel (1977) in an attempt to overcome some of the limitations of the aforementioned medical and social models. Whereas the previous models viewed the psychological aspects of disability as irrelevant, the biopsychosocial model proposed that health outcomes are determined by a reciprocal relationship between biological, environmental and social variables, which additionally combine with a person's psychological reaction to their disability (e.g. depression).

The dynamic relationship between these variables is best illustrated in the World Health Organisation's International Classification of Functioning, Disability and Health, or ICF (2001). As seen in Figure 2, the focus of the ICF is on health and functioning, rather than disability (Masala & Petretto, 2008). Accordingly, the term *disability* has been reframed as *activity* (i.e. an individual with SCI may have difficulty in executing activities), and the word *participation* is used to describe the impact of a health condition (e.g. SCI) on one's involvement in community activities (i.e. vocational and leisure activities).

The biopsychosocial model provides a useful framework for research examining psychological adjustment to SCI. For example, Middleton and Craig (2008) describe the interplay between medical (e.g. neurogenic bladder) and contextual (i.e. environmental) factors in their Model of SCI Adjustment (SCIAM). According to the SCIAM, coping with an injury is both an individualised and modifiable process. For example, one may initially report catastrophic thoughts in response to the significant physical and psychosocial losses associated with their SCI (e.g. "I can't cope"). This negative appraisal may trigger poor coping behaviours (e.g. withdrawal) and, subsequently, negative health outcomes (e.g. depression). However, as a person makes functional gains in his/her rehabilitation, there may be a reappraisal of the situation (e.g. "I can cope"), resulting in

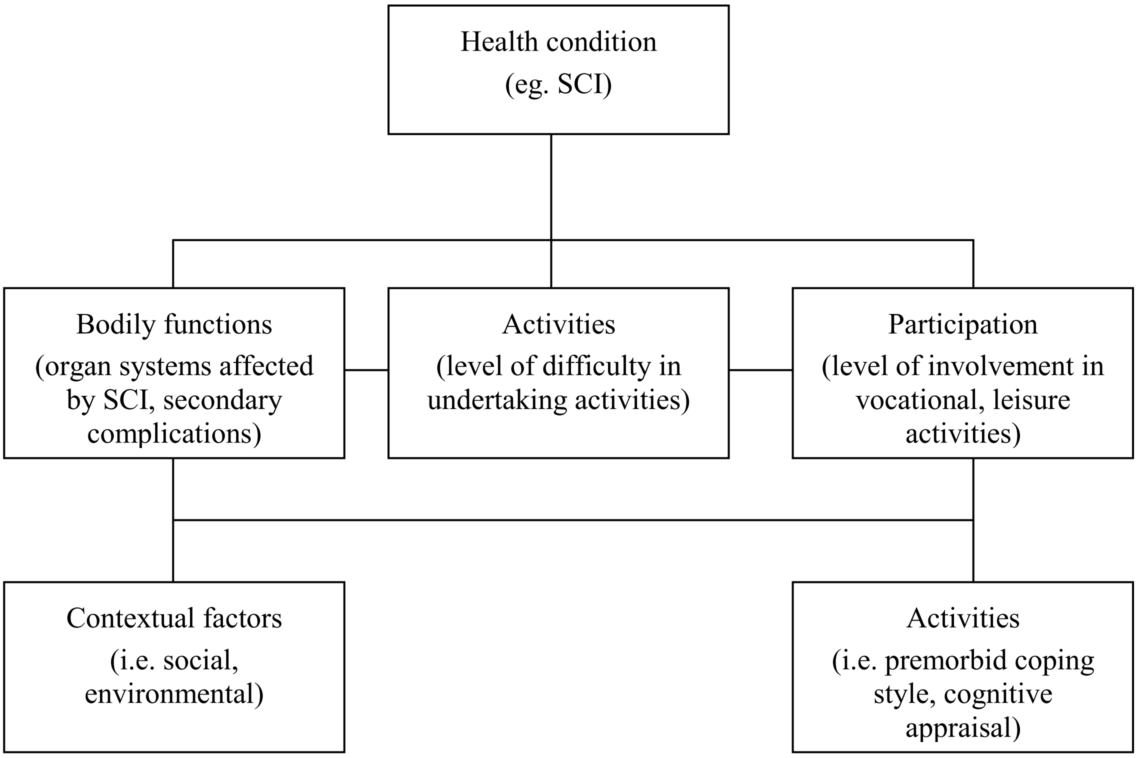

Figure 2: The International Classification of Functioning, Disability and Health (as it relates to spinal cord injury). Reproduced from World Health Organisation (2001) with permission. Retrieved 16 July 2012 from: http://www.who.int/classifications/icf /training/icfbeginnersguide.pdf

improved coping and health outcomes (Middleton & Craig, 2008).

The biopsychosocial model is also driving empirical research in SCI. This includes research on positive psychology; a branch of psychology that emphasises the importance of positive emotions and resilient personality traits in mitigating health outcomes. For example, Kortte, Gilbert, Gorman and Wegener (2010) reported that positive affect during inpatient SCI rehabilitation is dependent on self-appraisal, including perceived benefits from one’s injury and a sense of hope for the future. Similarly, research is increasingly demonstrating the relationship between positive adjustment to physical disability and the capacity to cope with stress and adversity (deRoon-Cassini, Mancini, Rusch, & Bonanno, 2010; McMillen & Loveland Cook, 2003; Quale & Schanke, 2010). This research is also supported by longitudinal data, indicating that pro-active coping strategies, including acceptance, reinterpretation of one's disability and religious faith, continue to facilitate adjustment to SCI up to 10 years post-injury (Kennedy, Lude, Elfstrom, & Smithson, 2012; Pollard & Kennedy, 2007).

Further empirical support for the biopsychosocial model is provided by outcome research that has examined the relationship between pre-morbid coping style, the development of psychological problems and functional independence after SCI. For example, people with chronic substance abuse have been found to be at a greater risk of sustaining subsequent injuries (e.g. fractures from falls), which may be severe enough to warrant rehospitalisation (Krause, 2004; Krause & Carter, 2009). Similarly, pre-injury alcohol problems have been shown to predict poorer functional progress during rehabilitation (Bombardier, Stroud, Esselman, & Rimmele, 2004). Psychological co-morbidities are, therefore, a significant predictor variable in the SCI adjustment process.

Treatment implications of the biopsychosocial model.

The biopsychosocial model has important treatment implications for SCI rehabilitation. Specifically, within this framework rehabilitation following a SCI is regarded as an educational process designed to enhance an individual's social and community integration skills, in addition to their functional independence (Barclay, 2002; Livneh, 1988, 1995; Middleton & Craig, 2008). Key rehabilitation goals are: (a) an accurate assessment of all relevant medical, psychosocial and environmental issues; (b) the development of realistic and flexible therapy goals in collaboration with the individual; (c) the provision of treatment and/or therapy; and (d) an evaluation of the effectiveness of these interventions (Duff, 2009; Jenkins, Patterson, & Szymanksi, 1998; Livneh, 1989; Middleton & Craig, 2008; Wade & de Jong, 2000).

From a biopsychosocial perspective, rehabilitation is also regarded as a lifelong learning process, as the person with SCI is continuously learning how to cope and adapt to their changing environment (Middleton & Craig, 2008). In terms of psychological interventions, the biopsychosocial model therefore recommends early assessment and rehabilitation to minimise psychological problems following SCI and, depending on the complexity of the psychological issues, medium to long-term interventions. Without such interventions, emotional problems may increase and, over time, become entrenched, which then places added pressure on health resources (Kendall & Buys, 1998; Middleton & Craig, 2008; Tate & Pledger, 2003). This approach therefore shifts the focus of rehabilitation from acute to longer-term psychological care (Middleton & Craig, 2008), consistent with the broad definition of rehabilitation proposed by the World Health Organisation (2004).

The need for SCI rehabilitation to involve a continuous sequence of biopsychosocial services is endorsed by a growing body of research that highlights the role of multidisciplinary teams in addressing the complex medical, social and psychological needs of individuals with SCI. This research indicates that teams consisting of rehabilitation physicians, nurses, psychologists, physiotherapists, occupational therapists, social workers, and other specialties are needed to address all aspects of the biopsychosocial model (Dorsett & Geraghty, 2008; Duff, 2009; Gatchel & Oordt, 2003; Inman, 1999; Mathew et al., 2001; New, 2006; World Health Organisation, 2011). Successful multidisciplinary applications of the biopsychosocial model in neurological rehabilitation include: individual goal-planning during inpatient rehabilitation (Duff, 2009; Playford, et al., 2009); pain management programs with community SCI groups (Nicholson Perry & Middleton, 2010; Norrbrink Budh, Kowalski, & Lundeberg, 2006); and self-management programs that are designed to target health and well-being following chronic disability (Stuifbergen, Harrison, Becker, & Carter, 2004; Stuifbergen, Seraphine, & Roberts, 2000).

Despite these apparent advantages, Sadler and Hulgus (1990) and McHugh (1992) have both argued that the biopsychosocial model is too broad in scope, thereby making it difficult to determine which specific factors are most important at any one point in time for a particular disorder – biological, personal or social. However, it has also been argued that this model encourages clinicians to undertake comprehensive assessments when seeking an explanation of an illness or disorder, including possible interactions between the individual, their personal attributes and their environment (Schwartz, 1992). Suls and Rothman (2004) therefore suggest that the biopsychosocial model should be considered a work-in-progress and that further research highlighting the model's application in clinical practice is needed to develop the model.

Summary

SCI is a low-incidence but high-cost disorder, both in terms of the direct costs involved in the acute and long-term medical care of SCI, and the indirect costs associated with reduced employment rates post-SCI (Access Economics, 2009). Added to this are the personal costs of SCI caused by the relatively high prevalence of depression and anxiety in acute and community settings (Craig, et al., 2009). Importantly, research suggests that psychological variables, including mood and coping style, contribute to how well a person adjusts to his/her injury (Kennedy, 2008). The critical role of psychological variables in an individual's psychosocial adjustment to disability is acknowledged in the biopsychosocial model; a model that is now considered to be the 'gold standard' for the delivery of rehabilitation services among this population (World Health Organisation, 2011). However, as will be discussed in Chapter 2, this model has not yet been widely adopted in Australian SCI rehabilitation settings. This is reflected in the amount of inpatient and community-based psychological services that are provided to this population on a national level. Although mental health resources are offered to persons with SCI in Australia, the literature suggests that additional support is needed.

Chapter 2: Psychological Interventions in Spinal Cord Injury Rehabilitation

Although the psychological impact of SCI is well documented, including the development of depression and anxiety, there is evidence that the mental health care needs of individuals with a physical disability are underserviced in Australia (Australian Psychological Society, 2005; Migliorini, Tonge & Taleporos, 2008; Milgrom, Walter & Green, 1994). Furthermore, despite the biopsychosocial model being embraced in the rehabilitation literature, the potential benefits of psychological interventions for treating the mental health issues of individuals with SCI remain relatively under-researched. Consequently, there continues to be a significant gap between existing research and the practice of psychology within SCI rehabilitation in Australia.

This chapter addresses these service delivery and research issues, commencing with a discussion of the challenges in applying a biopsychosocial approach to the rehabilitation setting. These challenges include limitations in the number of staff who are employed to provide psychological services, as well as the fact that a biomedical philosophy continues to prevail in the Australian public health sector. Options to improve rehabilitation psychology service delivery within this context are then examined, with a focus on the role of cognitive behaviour therapy (CBT) during inpatient SCI rehabilitation and the potential for telephone-based counselling (telecounselling) to provide a cost-effective method by which to extend these psychological services. The chapter concludes with a summary and statement of aims.

Challenges to a Biopsychosocial Approach in SCI Rehabilitation

Service resource issues.

Research has consistently shown that improvements are needed in the psychological services that are currently provided to individuals with SCI, with inpatient psychological services being very limited in Australia. For example, clinical psychology staffing levels are reportedly under-resourced by 50% in both public and private rehabilitation centres in the state of Victoria, compared to recommended staffing levels (Australian Psychological Society, 2005; Australasian Faculty of Rehabilitation Medicine and Royal Australasian College of Physicians, 2011). Locally, the South Australian Spinal Cord Injury Service employs two part-time clinical psychologists (equivalent to one full-time position) to service a 25 bed inpatient unit and state-wide outpatient clinic (outpatient database has approximately 1,900 individuals with a SCI or spinal disease). It has been suggested that limitations in the resourcing of services may, in part, reflect the fact that rehabilitation psychology is a relatively new profession in our national health sector (Australian Psychological Society, 2006; Kendall & Clapton, 2006).

Resource limitations necessarily impact on the ability to provide a biopsychosocial approach in daily clinical practice. Psychologists are forced to prioritise service provision to individuals with a newly acquired SCI and are rarely able to provide comprehensive assessments and interventions for problems that are known to interfere with rehabilitation, such as depression (Australian Psychological Society, 2005, 2006; Hepworth & Cushman, 2005). At the same time, there are increasing organisational pressures to provide psychological interventions that meet the complex needs of a growing number of consumers, with Australian data suggesting that there has been a progressive increase in the volume of rehabilitation admissions related to spinal cord dysfunction over the last 10 years (Kendall & Clapton, 2006; Simmonds & Stevermuer, 2007). Of concern, is the possibility that the limited provision of psychological services in the early stages after a SCI results in patients being discharged from hospital “quicker but sicker” (Australian Psychological Society, 2005, p.3).

This shortfall in service provision is not unique to Australia. In their survey of multidisciplinary services across five SCI rehabilitation units in the United States, Whiteneck et al., (2011) reported that the total amount of psychological treatment time received by each patient was very low, comprising only 6% of an individual’s multidisciplinary treatment program in comparison to 32% for physiotherapy, 29% for occupational therapy, 17% for nursing, and 10% for recreational interventions. Huston et al (2011) then examined the delivery of psychology-specific services across the same inpatient units and reported that only 52% of the 600 patients that had been seen by a psychologist had received a formal psychological assessment during their primary rehabilitation.

In addition, persons with SCI have, themselves, indicated that community-based mental health care services are limited in their availability. This was first highlighted in an early survey by Pelletier et al (1985) who reported that 80% of people with a physical disability perceived an unmet need for psychological interventions. More recently, a multi-centre survey conducted in the United Kingdom found that a range of psychosocial issues, particularly sexuality and chronic pain, were not being adequately managed after being discharged from hospital (Kennedy et al., 2010). Low treatment rates have also been highlighted in Fann et al’s (2011) longitudinal survey of community residents living with SCI in the United States (*N* = 947). In this study, only 22% of people with depression reported receiving some form of mental health treatment, including pharmacotherapy. In addition, only 6% of this sub-group accessed psychological interventions that met best practice standards, in terms of the frequency and duration of therapy recommended for the treatment of SCI-related depression (Consortium for Spinal Cord Medicine, 1998; Fann, et al., 2011). These results are concerning given the evidence provided earlier that the psychological effects of SCI have a broad impact on an individual's quality of life and that a continuum of psychology services, from injury onset throughout the lifespan, may be required for those individuals who report ongoing symptoms of clinical depression and/or anxiety (Migliorini, et al., 2008).

Treatment environment.

Another factor affecting the provision of psychological services in SCI rehabilitation is the prevailing treatment model. Although the biopsychosocial model is now recommended as a framework for rehabilitation service delivery (World Health Organisation, 2011), it has been noted that rehabilitation in Australia remains oriented toward the traditional biomedical model (Middleton & Craig, 2008). This is supported by qualitative research demonstrating that SCI rehabilitation often does not have a biopsychosocial focus, leading to a variety of problems for patients; such as feelings of being institutionalised, learned helplessness, perceived lack of autonomy and choice for the patient, and negative staff interactions (Barclay, 2002; Lightpole, 1991; Whalley Hammell, 2007). There is also evidence that these negative perceptions may increase over time, with individuals becoming increasingly withdrawn and not actively engaging in their rehabilitation, particularly if their hospitalisation is prolonged (Kennedy, Fisher, &

Pearson, 1988). These results highlight the importance of the rehabilitation environment to patient outcomes (Trieschmann, 1982).

In response to these challenges, a more flexible application of the biopsychosocial model to rehabilitation settings has been proposed. This includes an approach that focuses on the ‘person-environment fit’ and emphasises the need for congruence between the person and their treatment environment in order to optimise an individual’s rehabilitation potential (Lawton & Nahemow, 1973; Livneh, 1987, 2001; Rappaport, 1977). This is achieved by minimising physical barriers and providing supportive interventions to reinforce a person's existing skills and abilities (Rappaport, 1977). The concept of ‘person-environment fit’ is supported by SCI research, which highlights the contribution of environmental variables to successful rehabilitation outcomes, including the interpersonal skills of staff and the provision of individualised interventions that acknowledge patients' emotional and physical needs (Kempen, Sanderman, Scaf-Klomp, & Ormel, 2003; Kendall & Clapton, 2006; Nichols, 2003; Pain, Dunn, Anderson, Darrah, & Kratochvil, 1998; Whalley Hammell, 2007).

Another recommended biopsychosocial approach is known as ‘client-centred care’, which emphasises the importance of developing a therapeutic alliance (Mead & Bower, 2000; Playford, et al., 2009). SCI research supports this collaborative approach - with rehabilitation goals being more likely to be achieved when individuals are actively involved in decisions about their treatment program (Barclay, 2002; Middleton & Craig, 2008). Taken together, the concepts of ‘person-environment fit’ and ‘client-centred care’ have helped advance the biopsychosocial model from a largely theoretical model to one that is more readily applied to clinical practice.

Psychological Interventions Suited to SCI Rehabilitation

Cognitive behaviour therapy (CBT).

Inpatient psychological interventions for SCI are also constrained by the duration of hospital admissions, necessitating their delivery within a time-limited framework (Bisson, 2003; Thomas & Parker, 1992). Brief treatment methods have been adopted in SCI settings in response to this need: cognitive behaviour therapy (CBT) is one such intervention (Koss & Shiang, 1994; Reich & Neenan, 1986).

CBT has a very strong evidence-base, with its empirical foundations based in operant conditioning and cognitive therapy (Beck & Dozois, 2011). The aim of CBT is to improve an individual's psychological health by modifying maladaptive emotional, behavioural and cognitive responses (Elfstrom, 2009; Stewart, 1996; Sullivan, Feuerstein, Gatchel, Linton, & Pransky, 2005). For example, the CBT model conceptualises depression as being triggered by inaccurate assumptions or beliefs that an individual develops about themselves and/or the world through their life experiences (e.g. "I must do well at everything"). When these assumptions are violated, negative thoughts (e.g. "I am hopeless") may result which, in turn, can lead to behavioural (e.g. lowered activity levels), emotional (e.g. anxiety) and cognitive (e.g. poor concentration) symptoms. Over time, this cognitive-behavioural cycle can become entrenched, causing an individual significant distress and impairment in their social and occupational lives (Fennell, 1989). CBT is used to help a person learn to identify and reformulate this rigid thinking. This is achieved using a combination of strategies that focus on an individual's coping skills and abilities, including (but not limited to): self-monitoring feelings and thoughts, goal setting, problem-solving, mental imagery, and relaxation (Swett & Kaplan, 2004).

CBT follows a structured treatment plan, which involves: (a) undertaking a comprehensive psychological assessment via interview and self-report measures, (b) identifying the person's main concerns; (c) formulating explicit and collaborative treatment goals; and (d) presenting the treatment rationale, including information and education on how psychological factors, such as cognitive appraisal of a situation and coping style, can influence health (Elfstrom, 2009; Fennell, 1989; Whitfield & Williams, 2003). Subsequent therapy sessions involve setting a specific agenda at the beginning of each session, followed by a discussion of current issues and setting homework assignments for the following session.

Traditional CBT involves an acute phase of between 4 and 12 sessions that are initially held on a weekly basis, with the primary aim of symptom reduction, followed by a maintenance phase focussing on relapse prevention (American Psychiatric Association, 2006). The optimal duration of treatment is largely determined by an individual's clinical needs (Whitfield & Williams, 2003). For example, longer-term CBT is recommended for severely depressed patients because short-term therapy is considered insufficient for a long-standing psychiatric problem, such as major depression (Bisson, 2003; Driessen, Cuijpers, Hollon, & Dekker, 2010; Reich & Neenan, 1986). In this instance, a treatment program would involve a single course of continuous therapy over an extended period of months (Tolin, 2010; Vieta et al., 2009). In contrast, low-intensity or brief CBT, involving treatment delivered over several weeks is better suited to individuals with sub-threshold or mild depressive symptoms (Cape, Whittington, Buszewicz, Wallace, & Underwood, 2010; Reich & Neenan, 1986). The clinical setting often also determines treatment delivery, with brief CBT being more feasible in a structured and time-limited treatment environment, such as inpatient SCI rehabilitation.

In response to the different needs of patient and service providers, Whitfield and Williams (2003) have proposed a ‘stepped-care’ approach for CBT in order to allow greater flexibility in treatment delivery. Specifically, they advocate the use of short-term therapy (i.e. consultation and advice) as a first-line option to initially engage individuals, followed by targeted CBT for individuals who have a more complex clinical presentation, including those who have pre-existing psychological problems or who are experiencing persistent clinical distress (e.g. persons with chronic depression). This stepped-care model allows treatment to be better tailored to an individual’s needs, while delivering evidence-based mental health interventions. The literature supports this ‘triaged’ approach, based on research conducted with samples who have had traumatic brain injuries, SCIs, severe orthopaedic injuries and generalised anxiety disorder (Newman, 2000; Zatzick et al., 2001).

CBT can be adapted either to a group or individual setting, with both formats consistently demonstrating comparable treatment outcomes (Brown et al., 2011; Gerber et al., 2011; Robinson, Berman, & Neimeyer, 1990; Tolin, 2010). CBT programs also vary in their focus on behavioural or cognitive treatment methods, providing further flexibility. One variant of CBT is ‘motivational interviewing’, which aims to enhance an individual’s motivation by exploring and resolving their ambivalence toward behavioural changes (Rollnick, Miller, & Butler, 2008). Another recent variant is ‘mindfulness-based psychotherapy’, which is regarded as the ‘third generation’ of CBT as it represents a movement away from traditional behaviourism and cognitivism (Hayes & Smith, 2005). Mindfulness therapy uses meditation (‘mindfulness’) to help people learn a new way of relating to negative thoughts and feelings and, in turn, increase their ‘psychological flexibility’ (Hayes & Smith, 2005; Segal, Williams, & Teasdale, 2002). In contrast to traditional CBT, which focuses on challenging, changing or suppressing a negative automatic thought, mindfulness involves observing thoughts, images and feelings in an accepting way (Hayes & Smith, 2005).

A number of meta-analytic reviews have provided strong evidence for the efficacy of CBT and its variants. For example, traditional CBT has been shown to outperform other psychotherapeutic approaches among primary care patients, particularly in the management of anxiety and depressive disorders (Dobson, 1989; Hollon & Ponniah, 2011; Tolin, 2010; Whitfield & Williams, 2003). Similarly, motivational interviewing and mindfulness therapies have demonstrated efficacy in the treatment of alcohol abuse (Smedslund et al., 2011), smoking addiction (Hettema & Hendricks, 2011; Hofmann, Sawyer, & Fang, 2011), chronic pain (Bailey, Carleton, Vlaeyen, & Asmundson, 2010; McCracken, Vowles, & Eccleston, 2005), psychotic depression (Gaudiano, Miller, & Herbert, 2007), eating disorders (Kristeller & Wolever, 2011), and chronic physical illnesses (Prevedini, Presti, Rabitti, Miselli, & Moderato, 2011).

CBT in SCI rehabilitation.

CBT is notable for its focus on therapeutic goals that are designed to optimise a person’s physical recovery, psychological well-being and interpersonal relationships. These goals are congruent with the broader biopsychosocial goals of SCI rehabilitation. CBT is therefore considered to be appropriate for both the treatment of specific psychological disorders following SCI (e.g. depression, anxiety), and the interpersonal difficulties that are commonly encountered by individuals with a physical disability, including changes to family roles and relationships (Elfstrom, 2009; Nicholson Perry &

Craig, 2008).

For SCI rehabilitation, it has been recommended that CBT focus on: (a) establishing therapeutic rapport; (b) exploring an individual's coping ability, in addition to their beliefs about disability; and (c) examining alternative and proactive methods of coping with the demands of SCI (Elfstrom, 2009; Kennedy, 2008; White, 2001). Therefore, the focus of CBT is on learning SCI-specific coping strategies. This includes problem-focussed strategies, which are designed to manage a stressful stimulus, and emotion-focussed strategies that will assist in modifying an individual's emotional response to that stressor (Kennedy, 2008). Problem-focussed coping involves task- or situation-specific strategies that are designed to solve or manage a specific problem, such as gathering information, decision-making, and resolving conflict (Elfstrom, 2009). These strategies are typically used in situations that are perceived to be controllable (e.g. communication difficulties with rehabilitation staff). In contrast, emotion-focussed coping is recommended if a stressor is unmanageable or less controllable (e.g. neuropathic pain; Elfstrom, 2009).

Advantages and disadvantages of CBT in SCI rehabilitation.

Group vs. individual CBT

Although CBT has a strong empirical base, there is very limited research on its specific application to SCI rehabilitation. However, the available evidence is promising, with group-based CBT reportedly being efficacious. Group programs for the management of depression, anxiety and/or chronic pain have all demonstrated positive treatment effects in the short-term (Craig, 2008; Craig, Hancock, Chang, & Dickson, 1998; Craig, Hancock, Dickson, & Chang, 1997; Craig, Hancock, & Dickson, 1994; Duchnick, Letsch, & Curtiss, 2009; Kennedy, Duff, Evans, & Beedie, 2003; King & Kennedy, 1999). There are also data, albeit limited, to suggest that these benefits are maintained over time (Craig, 2008; Craig, Hancock, & Chang, 1994; Craig, et al., 1997; Craig, Hancock, & Dickson, 1994). Therefore, group-based CBT appears to contribute to positive psychological outcomes after SCI (Craig, 2008).

Group therapy is often advocated in SCI rehabilitation because it provides greater opportunities for peer support and social learning (Kennedy, 2008). Group interventions also address the need for time- and cost-efficient practice in the inpatient setting (Craig, 2008; Craig & Hancock, 1994; Huebner, 2004). However, a number of disadvantages to this form of service delivery have also been identified. For example, it may be difficult to establish groups of sufficient size during inpatient rehabilitation because physical therapy schedules often take precedence (Craig, 2008; Craig & Hancock, 1994). Furthermore, group heterogeneity influences the therapeutic process, with research suggesting that group members who have diverse characteristics, such as injury severity and personality traits, are less amenable to group than individual counselling (Huebner, 2004).

In addition, there is evidence that individuals may prefer, and be more accepting of, individual psychological interventions, particularly in the early stages after a SCI (Ayuso-Mateos et al., 2007; Rohrer et al., 1980; Schoenberg & Shiloh, 2002). This was highlighted by an early study of a psycho-educational group which found that newly injured patients were less likely to be open about their experience and their emotions, compared to those who had been injured for a longer period of time (Rohrer, et al., 1980). Consequently, it is thought that group CBT should augment, rather than replace, more comprehensive individualised psychological services for persons with SCI (Kennedy, 2008; Nicholson Perry & Craig, 2008; Thomas, Thoreson, Parker, & Butler, 1998)

Despite its distinct role, little is known about the efficacy of individual CBT when used with the SCI population. In one of the few available studies examining this therapy format, Kemp, Kahan, Krause, Adkins and Nava (2004) reported a reduction in the symptoms of depression for treated individuals, when compared to a control group who discontinued treatment. This positive finding suggests that the application of individual-based CBT following SCI is an area that warrants further investigation.

Challenges to outpatient-based CBT.

Consistent with the biopsychosocial approach to rehabilitation, standard CBT involves routinely following-up individuals in order to monitor their progress and prevent a relapse of symptoms. This follow-up is particularly important for individuals with SCI, as physical deterioration due to their chronic medical condition can occur over time (White, 2001). The research also suggests that when a person is discharged home, this may intensify their distress, as new apprehensions surface (O'Donnell, Creamer, Pattison, & Atkin, 2004). In some cases, there may even be a delayed onset of psychological problems following a traumatic injury, as individuals gradually begin to comprehend the permanency of their injury. This delayed response, which is estimated to range between 6 and 12 months post-injury, suggests the need for ongoing support when the person is no longer an inpatient (deRoon-Cassini, et al., 2010; O'Donnell, et al., 2004; Migliorini et al., 2008).

At present, however, current psychological outreach services for individuals with

SCI in Australia are extremely limited. This is partly due to the standard model of treatment for outpatient spinal care, which involves follow-up in metropolitan-based clinics in one of six state-wide public SCI rehabilitation units (New & Poulos, 2008). Consequently, specialist psychological support across Australia’s vast rural regions is not readily available. This makes it difficult for those individuals who are living in remote locations to receive necessary follow-up treatment (Booth & Kendall, 2007). Another service delivery issue for individuals with SCI is the inconvenience associated with attending clinic appointments, particularly for those individuals requiring customised transportation due to mobility restrictions (Booth & Kendall, 2007). Importantly, the need to improve access to, and equity of, community-based mental health treatments for people with SCI is acknowledged as a key service strategy in the state-wide rehabilitation plan developed by the South Australian Government (2009, 2012).

Limitations in the CBT and SCI literature.

Research on the use of group- and individual-based CBT with SCI samples has been criticised for its methodological quality. A key criticism is that CBT trials have commonly used small samples to determine the effectiveness of treatment. In this instance, the sample size limits the study’s statistical power and, consequently, the ability for researchers to draw conclusions about treatment efficacy (Elliott & Kennedy, 2004; Mehta et al., 2011). It has therefore been argued that rehabilitation research should routinely incorporate the calculation of effect sizes, using statistics such as Cohen’s *d*, to quantify the magnitude of a treatment effect independently of statistical significance and, in turn, determine the clinical effectiveness of an intervention such as CBT (Zakzanis, 2001). It has also been argued that studies with small samples still provide important information in relation to clinically significant improvements for the individual client, whilst maintaining internal validity, particularly if these studies focus their statistical analyses on within-group comparisons, as opposed to the randomised controlled trial which emphasises between-group comparisons (Schwartz, Trask, Shanmugham, & Townsend, 2004).

Systematic reviews of the SCI literature have also highlighted problems arising from a failure to report the presence of confounding variables. This includes variables that may negatively affect trial outcome, particularly the effects of a pre-existing psychiatric illness (Elliott & Kennedy, 2004; Mehta, et al., 2011; Tuszynski et al., 2007). Additionally, few SCI studies have specified whether or not clients are concurrently receiving pharmacotherapy (i.e. antidepressant medication), which is known to have a positive impact on the effectiveness of psychological interventions in SCI rehabilitation (Ayuso-Mateos et al., 2007; Consortium for Spinal Cord Medicine, 1998; Mehta, 2011).

Similarly, SCI trials that have not included control groups have been criticised for their design (Tuszynski, et al., 2007). A blinded randomised controlled design is therefore recommended as the gold standard for drawing causal inferences about CBT's efficacy (Elliott & Kennedy, 2004; Gerber, et al., 2011; Mehta, et al., 2011). However, there are practical and ethical problems with implementing randomisation procedures in rehabilitation and psychotherapy contexts. In particular, there is an ethical issue in withholding psychological treatment for control participants (Hammell, 2010; Kerstein, Ellis-Hill, McPherson, & Harrington, 2010; Schwartz, et al., 2004; Tate, Kalpakjian, & Kwon, 2008). As such, standard care or wait-list control groups have been recommended as alternative control groups in research that is designed to evaluate the effectiveness of psychotherapy when used in a clinical setting, such as SCI rehabilitation (Andrews, 1993; Schwartz, et al., 2004).

Telecounselling.

In response to the aforementioned service constraints, telecounselling - or the provision of health-information and counselling services by telephone - represents one cost-effective option for expanding both national and international outreach psychology services for individuals with a disability. Also referred to as ‘telehealth’ or ‘telepsychology’, telecounselling has the potential to improve the quality of, and access to, psychological care for those with SCI by offering an equitable and accessible health service, including consultation, monitoring and treatment (Brennan, Mawson & Brownsell, 2009; Campos, 2009; World Health Organisation, 2011). Telecounselling is therefore consistent with current theory on health care utilisation, particularly Andersen’s Behavioural Model which highlights the positive impact that improved system resources (i.e. service availability, accessibility), can have on the health care of a medical population (Andersen & Davidson, 1997; de Boer, Wijker, & de Haes, 1997).

First established in Australia in the 1950s, telecounselling was initially designed to provide crisis intervention for community-based mental health care (Hornblow, 1986). Although slow to develop, the last decade has seen a rapid development of this mode of service delivery in outreach primary health care settings. The main advantages of telecounselling include an increased access to specialised care, time efficiency and cost-effectiveness; making this an appealing approach to treatment for outpatient SCI rehabilitation (Bloemen-Vrencken, de Witte, & Post, 2005; Dellifrane & Dansky, 2008).

Telecounselling has been used as a preventative psychological intervention for other neurological disorders, having been successfully applied in health promotion programs for individuals with multiple sclerosis (Bombardier et al., 2008; Stuifbergen, Becker, Blozis, Timmerman, & Kullberg, 2003). This research has reported significant improvements in psychosocial outcomes following telecounselling, including better health-related quality of life and positive health behaviours, such as stress management, physical exercise and healthy eating (Bombardier et al., 2009; Grossman et al., 2010; Stuifbergen, et al., 2003). Similar benefits have been found for telecounselling programs targeted at individuals with stroke (Evans, Kleinman, Halar, & Herzer, 1985) and traumatic brain injury (Schopp, Johnstone, & Merrell, 2000). For example, Bell et al (2008) reported a reduction in post-traumatic stress symptoms for individuals who received scheduled telephone counselling, which was based on the principles of motivational interviewing, when compared to individuals who had accessed standard medical care following discharge from brain injury rehabilitation. Moreover, these results have been replicated in a large sample with severe traumatic brain injury and co-morbid depression (Bombardier, et al., 2009). Consequently, it is thought that telecounselling may help to prevent functional decline in the context of disability by promoting positive health behaviours (Stuifbergen, et al., 2003). However, these results are not conclusive, with recent studies failing to find significant treatment effects when telecounselling was used with groups that had a chronic illness and/or disability (Bell et al., 2011; Egner, Phillips, Vora, & Wiggers, 2003; Mohr, Carmody, Erickson, & Jin, 2011).

Telecounselling has also been utilised in longer-term psychotherapy for individuals who have been diagnosed with psychiatric disorders, including depression, anxiety, substance abuse and schizophrenia (Leach & Christensen, 2006; Mohr, Vella, Hart, Heckman, & Simon, 2008). For example, the benefits of supportive telecounselling in ameliorating an individual's sense of loneliness and depression are illustrated in Shepard's (1987) case scenario. Similarly, Mohr and colleagues undertook a series of studies that have highlighted the contribution of telecounselling to the management of clinical depression among persons with chronic multiple sclerosis (Beckner, Vella, Howard, & Mohr, 2007; Mohr et al., 2005; Mohr et al., 2000). In these studies, the telephone provided a valuable therapeutic option for those who would otherwise not have had access to such an intervention, either due to poor motivation or an inability to attend face-to-face sessions.

Treatment gains following telecounselling have been achieved using a variety of psychological therapies, such as CBT (Beckner, et al., 2007; Mohr, Hart, et al., 2005; Mohr, et al., 2000), motivational interviewing (Bell et al., 2005; Bombardier, et al., 2009), mindfulness therapy (Grossman, et al., 2010), and supportive counselling (Mohr, Burke, Beckner, & Merluzzi, 2005). In addition, both group- and individual-based telecounselling programs have proved to be efficacious (Egner, et al., 2003; Evans, Fox, Pritzl, & Halar, 1984; Evans, Smith, Werkhoven, Fox, & Pritzl, 1986; Jalovcic & Pentland, 2009; Mohr, et al., 2000). Furthermore, these treatments have been delivered by a variety of professionals, including psychologists, nurses, social workers, and peer counsellors with a disability (Evans, et al., 1986; Mohr, Hart, et al., 2005; Mohr, et al., 2000; Stuifbergen, et al., 2004). Thus, telecounselling extends the range of psychological interventions that are available to mental health practitioners (Kazdin & Blase, 2011).

Advantages and disadvantages of telecounselling.

Although limited, there is evidence to suggest that telecounselling has specific clinical advantages. For example, there is consistent evidence that telecounselling improves the quality of health care, particularly client satisfaction (Bloemen-Vrencken, et al., 2005; Leach & Christensen, 2006; Mohr, et al., 2008; Rogante, Grigioni, Cordella, & Giacomozzi, 2010). Moreover, there appears to be ‘good’ compliance with telephone-based treatment programs. For example, Mohr et al (2008) reported a mean attrition rate of 7.6% in their meta-analysis of telephone-based psychotherapies, which included CBT, and Simon, Ludman, Tutty, Operskalski and Von Korff (2004) reported a treatment participation rate of 97% for primary care patients receiving telephone therapy in addition to antidepressant medication. Although the effects of psychotropic medication in this latter study may have been a confounding variable that positively influenced the study’s outcomes, these attrition rates are considerably lower than those reported for face-to-face therapy – which have been estimated to be as high as 70% in outpatient samples with a mood disorder (Jaycox et al., 2003).

Telecounselling is also highly cost effective, with Bombardier et al (2008) reporting that a complete course of treatment, involving 2 hours of telecounselling, was equivalent to $137 per participant[3]. Similarly, Simon et al (2004) reported that their telecounselling intervention cost less than $45 per session. Telecounselling therefore offers an affordable service for individuals who may be financially disadvantaged and would otherwise not be able to afford this form of health care (World Health Organisation, 2011). The empirical and clinical significance of these findings would be enhanced by additional research examining some of the delivery-related outcomes of

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[3] All costs are represented in Australian dollars

telecounselling, particularly as formal cost analyses are lacking. These analyses should include the proportion of eligible participants who could be treated and the total amount of therapist contact time, per participant.

A number of disadvantages associated with telecounselling have also been identified. One consideration is the long-term sustainability of a telecounselling service, in terms of the time and staff resources needed to maintain this service and the costs associated with routinely upgrading information technology equipment (Campos, 2009). An additional organisational barrier to service delivery might include unreliable phone lines, particularly for countries or regions that lack adequate infrastructure (Miller, 2007).

There are also ethical issues associated with the use of telecounselling as a primary treatment option. One concern is that the psychological assessment and diagnosis of an individual’s psychosocial problems is limited in a telecounselling setting because a clinician must rely solely on verbal communication, unlike face-to-face therapy which provides additional non-verbal content to assist a clinical assessment, including a client’s capacity to communicate emotion (Haas & Benedict, 1996). The absence of non-verbal cues in telecounselling can therefore compromise the accuracy of a psychological assessment (Australian Government Department of Health and Ageing, 2002). There may also be problems in establishing therapeutic trust and rapport when telecounselling is the sole intervention (Shore, Savin, Novins, & Manson, 2006; Simms, Gibson, & O'Donnel, 2011).

Another ethical issue relates to the need to establish professional guidelines. This issue was identified in a survey relating to the training of therapists across the telecounselling sector in Australia (Australian Government Department of Health and

Ageing, 2002). In recognition of psychologists' role in the provision of counselling services by telephone, the Australian Psychological Society (2011) has established guidelines for the provision of technology-assisted psychological services. It has also recommended that critical reviews of the research are needed to improve the evidence-base for this treatment.

These ethical concerns may, in part, account for the low rate of technology use in current professional psychology practice (McMinn, Bearse, Heyne, Smithberger, & Erb, 2011; Simms, et al., 2011). Furthermore, recent research suggests that mental health practitioners lack confidence in their skills and knowledge relating to the use of these technologies – including telephone-based therapies (Kazdin & Blase, 2011; Simms, et al., 2011).

Telecounselling in SCI rehabilitation.

Despite an increase in evidence, the contribution of telephone-based counselling to emotional outcomes among individuals with SCI is difficult to determine from the available data. This is primarily because telecounselling trials with this population have incorporated different mediums of telecommunication (e.g. video-conferencing, internet-based training, telephone contact), different diagnostic groups (e.g. acquired SCI vs. congenital spinal disease), and diverse disciplines, including psychiatry (telepsychiatry), nursing (telenursing), and medicine (telemedicine). Treatment programs have therefore been developed for the monitoring and/or management of various clinical issues, including chronic wounds (Dobke, Bhavsar, Gosman, De Neve, & De Neve, 2008; Halstead et al., 2003; Young-Hughes & Simbarti, 2011), computer skills training (Gul et al., 2007; Houlihan, Dejoie, & Williams, 2007), family counselling (Elliott & Berry, 2009; Schulz et al., 2009), psycho-education (Lapierre, Coutu-Wakulczyk, Blackmer, & Dehoux, 2006; Phillips, Temkin, Vesmarovich, Burns, & Idleman, 1999), peer support (Jalovcic & Pentland, 2009), oral health care (Yuen & Pope, 2009), and post-SCI depression (Migliorini, Tonge, & Sinclair, 2011). Further research is therefore needed to determine the effectiveness of telecounselling for specific diagnostic groups, such as SCI.

Limitations in the telecounselling and SCI literature.

The research that has been conducted on telecounselling with SCI groups has been criticised for its limited quantitative evidence, with most of the data being descriptive in nature. For example, Mozer, Franklin and Rose (2008) provided a case study to outline the benefits of telephone therapy in managing post-traumatic stress symptoms for a veteran with SCI. In addition, the available, albeit limited, quantitative research has some methodological problems. Indeed some studies have lacked a control group, thereby limiting causal statements about the effectiveness of telecounselling. This includes the CBT-based program examined by Lucke, Lucke & Martinez (2004).

Additionally, the SCI telecounselling research has been criticised for its use of non-randomised designs and small samples (Glueckauf, 2002; Kairy, Lehoux, Vincent, & Visintin, 2009; Liss, Glueckauf, & Ecklund-Johnson, 2002). It has therefore been recommended that further telecounselling trials, particularly trials involving small samples, should randomise participants to an intervention, blind assessors to group assignment, and/or compute post-hoc or retrospective power analyses in order to determine a study's methodological rigour and critique the statistical methods used

(Abdul Latif, Daud Amadera, Pimentel, Pimentel, & Fregni, 2011; Tate, et al., 2008).

Summary

Rehabilitation research and theory has contributed to an increased understanding of some of the variables that are thought to impede or enable adjustment to SCI. Key variables implicated in the adjustment process include the physical impact of a SCI (Vissers, et al., 2008), the adequacy of social supports (Whalley Hammell, 2007), individual coping styles (Elfstrom, et al., 2002; Kennedy, 2008), and pre-morbid psychological functioning (Bombardier, et al., 2004; Krause, 2004). The complex relationship between these variables is best summarised in the biopsychosocial model of functioning, which emphasises the need for a multidisciplinary approach to health care in order to reduce the psychosocial impact of SCI (World Health Organisation, 2001). The biopsychosocial model also acknowledges the role of psychological interventions delivered in the acute stages of SCI management, in addition to a continuation of these services following primary rehabilitation (Middleton & Craig, 2008; Migliorini, et al., 2008). Consequently, the biopsychosocial model is recommended as a standard for service delivery in SCI rehabilitation (Mathew, et al., 2001; Middleton & Craig, 2008).

Despite evidence to support a biopsychosocial approach in SCI management, research suggests that there still exists an unmet need for high quality psychological care in Australian public health settings (Australian Psychological Society, 2006; Milgrom, Walter & Green, 1994). More inpatient and outreach psychological services are needed for individuals with SCI (Australian Psychological Society, 2006; Kendall & Clapton, 2006). The shortfall in the availability of services is largely influenced by problems arising from within the health system itself, including the continuing adherence to a predominantly biomedical approach to rehabilitation, combined with the constraints imposed by the need to implement psychological interventions within the time-limited framework of SCI rehabilitation (Middleton & Craig, 2008). In this context, both CBT and telecounselling present some therapeutic flexibility for rehabilitation psychologists. The short-term focus of CBT is congruent with the principles of inpatient SCI rehabilitation (White, 2001). Similarly, telecounselling provides one option for extending psychological care to individuals with SCI who are residing in the community, including those in remote and rural areas (Bloemen-Vrencken, et al., 2005).

However, a number of shortcomings are evident in the SCI and psychotherapy literature. Specifically, much of the evidence for CBT's efficacy in SCI rehabilitation is based on extrapolation from the literature concerning its use in the general adult population. Consequently, it is difficult to evaluate the effectiveness of CBT in SCI rehabilitation based on the limited research in this area. Similarly, telecounselling offers a potential home-based therapy for adults with SCI, yet lacks an empirical base. In addition, the available studies on CBT and telecounselling in SCI rehabilitation have some methodological shortcomings. More research on the application and evaluation of these treatments is therefore needed in order to improve the evidence-base for these psychological interventions when used in the context of SCI rehabilitation. With increasingly stringent requirements for both organisations and rehabilitation professionals within the national health sector to provide both efficient and effective services, these research issues are a priority.

Aims of the Current Research

As highlighted in this review, there remains a significant gap between current research, which demonstrates the importance of targeted psychological interventions to assist individuals to adjust to a SCI, and practice, which highlights the need for additional mental health services for this population (Australian Psychological Society, 2005; World Health Organisation, 2011). Furthermore, two psychological applications that are well suited to the goals of spinal rehabilitation, CBT and telecounselling, have been relatively under-researched resulting in a limited evidence and knowledge base. The four studies that follow were designed to assist in developing a more evidence-based approach to the provision of psychological services for people with SCI. The broad aim of this research was to examine the application of CBT in SCI rehabilitation (Studies 1 and 2) and the potential role of telecounselling for outpatient psychological care in this population (Studies 3 and 4).

The specific objectives of this research were to:

1. Evaluate the research evidence for the effectiveness of CBT for managing both the short and longer-term psychological outcomes (e.g. quality of life, depression, self-efficacy, coping) of adults with a SCI (Study 1, Chapter 3). This study involved a quantitative meta-analysis which was designed to integrate the findings from existing research on CBT for this population in a clear and objective manner. The specific aims were to: (a) measure the treatment gains that are associated with CBT in a patient group with SCI, and (b) examine some of the variables that may impact on treatment effects, such as time since injury and therapy format (i.e. group versus individual).

2. Examine the effectiveness of a CBT program, which was delivered on an individual basis to inpatients with SCI in order to improve their depression, anxiety and stress outcomes during primary rehabilitation (Study 2, Chapter 4). Two samples of adults with SCI, one referred for CBT (treatment group) and one that received standard medical care and psychological monitoring only (control group), were examined pre- and post-CBT, and three months after discharge from primary rehabilitation. It was predicted that, in accordance with the biopsychosocial model of rehabilitation, targeted CBT would improve the psychological outcomes of people who have sustained a SCI.

3. Evaluate the efficacy of telephone-based counselling for managing psychosocial outcomes (e.g., quality of life, depression, community integration) among adults with an acquired physical disability (Study 3, Chapter 5). This study used quantitative meta-analytic techniques to synthesise data from existing research on the treatment effects of telecounselling. A secondary aim was to examine the methodological characteristics of this literature – including the impact of sample size, attrition rates, therapy format (i.e. group vs. individual therapy) and duration, on the estimated treatment effects. Given the paucity of research in this area, a number of diagnostic groups were examined – this included adults with a SCI, stroke, limb amputation, multiple sclerosis, or severe burn injury. All diagnostic groups, however, shared a common trait in that each involved an acquired physical disability.

4. Examine the application of a telephone-administered psychological intervention on the psychosocial adjustment (e.g. mood, coping skills) of people with SCI who

were living in the community (Study 4, Chapter 6). The study involved a randomised controlled design with two independent samples (telecounselling Treatment and standard care Control). It was anticipated that telecounselling would provide an accessible and cost-effective service for individuals with SCI who were in the process of making the transition to community living. However, given the limited research in this area, it was not possible to predict the type and extent of any treatment gains that were likely.

Chapter 3: Study 1

Efficacy of cognitive behaviour therapy for the management of psychological outcomes following spinal cord injury: A meta-analysis.

This chapter consists of a published paper, however copyright restrictions prevent the reproduction of this paper in its published form. The details of this publication are:

> Dorstyn, D.S., Mathias, J.L., & Denson, L.A. (2011a). Efficacy of cognitive behaviour therapy for the management of psychological outcomes following spinal cord injury: A meta-analysis. *Journal of Health Psychology, 16,* 374-391. doi: 10.1177/ 1359105379063

Preface

The preceding chapter critically reviewed the evidence for psychological interventions in SCI rehabilitation. Cognitive behaviour therapy (CBT) was reported to be efficacious in managing depression and anxiety among adult populations, including individuals with SCI. However, despite qualitative reviews of CBT's specialised application among the SCI population being available, quantitative reviews of this evidence (i.e. meta-analyses) are lacking.

Given the emphasis on evidence-based practice in the field of health care, independent reviews of the available research are important. The following study therefore used meta-analytic techniques to integrate the findings from existing research that had evaluated the efficacy of CBT when used with SCI samples (Dorstyn, Mathias, & Denson, 2011a). The primary aim was to identify the characteristics of effective cognitive-behavioural treatments, such as the duration of therapy and therapy format (i.e. group- vs. individual-based CBT). This information could then be used to help design CBT programs that are optimally timed and adequately meet the emotional needs of injured individuals in primary SCI rehabilitation.

Efficacy of cognitive behaviour therapy for the management of psychological outcomes following spinal cord injury: A meta-analysis.

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Abstract

This meta-analysis evaluated the impact of cognitive behaviour therapy (CBT) on the psychological adjustment of adults with spinal cord injury (SCI). A comprehensive search of six electronic databases identified 10 studies (*N* = 424 participants) that met the inclusion criteria. Pre- and post-data for participants who received CBT were analysed. Large and significant group differences were noted for measures of assertiveness, coping, self-efficacy, depression and quality of life. These data suggest that CBT has a significant positive impact on short-term psychological outcomes following SCI. However further research is needed to establish the long-term benefits.

Keywords: cognitive behaviour therapy; efficacy; meta-analysis; spinal cord injuries.

The psychological impact of spinal cord injury (SCI) is well documented (see Craig, Tran & Middleton, 2009 for a recent review), with up to 30% of individuals with SCI reporting clinical levels of depression and anxiety, including post-traumatic stress, during the acute post-injury period (Migliorini, New & Tonge, 2009). Moreover, these symptoms can persist for up to 10 years after an injury (Pollard & Kennedy, 2007). This psychological distress significantly impacts on an individual's health outcomes, including social and functional independence (Bombardier, Richards, Krause, Tulsky & Tate, 2004; Raichle, Hanley, Jensen & Carndenas, 2007; Whalley Hammell, 2007), perceived quality of life (Nosek et al., 2004) and long-term health care costs (Dryden et al., 2004; French et al., 2007).

There is evidence that these SCI-related emotional outcomes are amenable to psychological interventions, particularly cognitive behaviour therapy (CBT). For example, depression and anxiety following SCI has been shown to improve following CBT, with the benefits being maintained over time (Elliott & Kennedy, 2004). Furthermore, CBT programs that incorporate social skills training (Dunn, Van Horn & Herman, 1981) and problem-solving techniques (Shanmugham, Elliott & Palmatier, 2004) have been successfully adapted to meet the specific needs of the SCI group. Similarly, psycho-educational interventions which focus on coping skills post-SCI have shown significant efficacy when delivered during inpatient rehabilitation (Duchnick, Letsch & Curtiss, 2009; Kennedy, Duff, Evans & Beedie, 2003).

CBT is considered to be a valuable treatment option following SCI but the provision and effectiveness of this therapy in medical settings is constrained by a number of factors. Identified barriers to effective service delivery in the inpatient setting include:

limitations in the availability of trained staff, often only allowing for a consultative service rather than one that provides more comprehensive assessments and interventions (Australian Psychological Society, 2005; Kendall & Clapton, 2006); psychotherapy being dependent on other aspects of an individual's medical care, particularly physical rehabilitation schedules (Craig & Hancock, 1994); interpersonal variables, such as motivation to engage in psychotherapy (Delsignore & Schnyder, 2007), misconceptions or social stigma associated with psychological treatment (Schoenberg & Shiloh, 2002), and pre-morbid psychological functioning (Kennedy et al., 2000); and SCI-specific variables, particularly time since injury (Kennedy, Taylor & Duff, 2005).

There are also differing opinions about some of the practical aspects of CBT in SCI rehabilitation. For example, the relative efficacy of group- versus individual-based therapy has been debated. Although group-based programs are advocated as a time-efficient and cost-effective inpatient therapy model (Craig, Hancock & Dickson, 1999; Kennedy et al., 2003), group homogeneity can influence the therapy process, with research suggesting that group members with common personality traits are more amenable to group-based work (Huebner, 2004). Studies also suggest that individuals prefer individual counselling when discussing emotive issues (Schoenberg & Shiloh, 2002). It follows that group CBT should be optional, augmenting rather than replacing individual CBT (Ehlers & Clark, 2003; Galvin & Godfrey, 2001). Yet despite the need for client-tailored interventions, where treatment is dependent on an individual's psychological problems and his/her response to treatment, few studies have evaluated the efficacy of individualised CBT within the SCI population.

A second important issue is the optimal timing of CBT after a SCI has occurred. Some research suggests that counselling that is supportive but less directive than CBT, is appropriate in the acute post-injury period because the psychological symptoms that become evident during hospitalisation may not yet have fully developed (O'Donnell, Creamer, Pattison & Atkin, 2004), or because the individual may be emotionally overwhelmed in the early stages of adjustment to disability (Ehlers & Clark, 2003). However there is also evidence that early targeted CBT has long-term benefits for those who are at risk of developing psychological problems following a traumatic injury (Bryant, Moulds & Nixon, 2003; O'Donnell, Bryant, Creamer & Carty, 2008). Similarly, while it has been suggested that treatment gains with individual-based CBT are maintained, at least in the short-term (Kemp, Kahan, Krause, Adkins & Nava, 2004), there are studies indicating that long-term interventions are required to meet the mental health needs of persons with SCI (Dryden et al., 2004; Migliorini, Tonge & Taleporos, 2008).

The practical constraints on service provision and differences in opinion regarding the optimal way to deliver CBT in SCI settings are, not surprisingly, also apparent in the research that has evaluated its efficacy in spinal rehabilitation. Added to this is heterogeneity in the SCI clinical population (Schwartz, Shanmugham, Trask & Townsend, 2004; Tuszynski et al., 2007) and differences in the tests that are used to measure changes in the emotional and physical functioning of individuals who have undergone CBT (Craig et al., 2009, Dawson, Shamley & Jamous, 2008; Kalpakijian, Bombardier, Schomer, Brown & Johnson, 2009; Steeves et al., 2007). In combination, these factors have made it difficult to evaluate the existing evidence in order to establish guidelines for best clinical practice. In their early meta-analytic review, McAweeney and McAweeney (1997) reported that although the benefits of psychosocial interventions following SCI were generally recognised, evaluations of its efficacy within this group were very limited. Similarly, in their systematic review of the CBT literature, Elliott and Kennedy (2004) concluded that the majority of research conducted with SCI groups was underpowered due to quasi-experimental designs.

In light of these issues, the current study undertook an objective and quantitative meta-analysis of existing research that has examined CBT in adults with a SCI. This methodology allows an evaluation of the magnitude of treatment effects, independent of the constraints imposed by small clinical samples on achieving statistical significance and is therefore well-suited to the research that has been conducted in SCI settings (Zakzanis, 2001). The primary aim of this review was to evaluate the evidence for the short- and long-term efficacy of CBT in SCI rehabilitation, with a particular emphasis on its contribution to post-injury emotional outcomes. A related aim was to examine the treatment and methodological variables that may impact on the outcome of clinical trials.

Method

Literature search and inclusion criteria

Six electronic databases relevant to rehabilitation psychology (PubMed, PsycINFO, Cochrane Library, Meditext, CINAHL and Scopus) were searched using a combination of the keywords presented in Table 1. This initial search was deliberately kept broad in order to ensure that all potentially relevant studies were captured. Additional studies were identified from a manual search of the reference lists of all retrieved studies and from requests for published data made through list serves for the

American Psychological Association's Division 22 (Rehabilitation Psychology) and the Australian Psychological Society's Rehabilitation Psychology Interest Group.

To be eligible for inclusion, studies had to meet the following criteria: (a) it was published in English between January 1980 and April 2010 (note: cognitive-behavioural approaches were first described in the rehabilitation literature in 1980; Swett & Kaplan, 2004); and (b) CBT was the primary intervention used alone or in combination with a control condition. Although randomised controlled trials are considered to be the gold standard of research, quasi-experimental designs are recognised as being relevant to clinical practice and were therefore included in this review (Schutz, Rivers & Ratusnik, 2008). For current purposes, CBT was defined as multimodal in nature combining cognitive and behavioural techniques (e.g. relaxation, cognitive restructuring; Swett & Kaplan, 2004). Thus, uni-modal psychological interventions with either cognitive or behavioural elements (e.g. biofeedback, drug therapies and physical therapies), were excluded. Additionally, (c) CBT had to be delivered on a face-to-face basis (i.e., not by telephone) by a trained health professional (e.g. psychologist, psychiatrist; Page, 1993). This excluded self-management and peer support programs. Participants also had to (d) be adults, aged 18 years and older with (e) a spinal cord injury. Given the very limited availability of psychotherapy outcome research among this population, it was decided that the primary diagnosis could be an acquired SCI or a congenital spinal condition.

Outcome measurement was another criterion, with studies requiring (f) standardised psychological assessments (e.g. depression, anxiety, coping) administered pre- and post-intervention, and (g) sufficient data to allow the calculation of Cohen's *d* effect sizes (Means and SDs, results of *t* tests or *F* tests from a one-way ANOVA).

Table 1: Keywords and boolean (logical) operators used in the database searches

	AND ⇨	AND ⇨	AND ⇨
OR	traumatic injury	ambulatory care facility	psychological therapy
⇩	physical injury	rehabilitation centre/center	psychological adjustment
	physical disability	hospitalised/ hospitalized patient	counselling/counseling
	spinal cord injury	hospital	psychotherapy
	spinal injury	treatment facility	psychological intervention
	paraplegia	inpatient	psychoeducation
	quadriplegia	outpatient	behaviour/behavior therapy
	tetraplegia		cognitive therapy
			cognitive-behaviour therapy
			cognitive-behavior therapy
			cognitive behaviour therapy
			cognitive behavior therapy
			group therapy
			family therapy
NOT	dementia	stroke	child*
	brain injury	adolesce*	

Search includes stated terms and derivatives, e.g. adolesce matches adolescence, adolescent, adolescents. Both plural and singular terms searched.

Authors were contacted to obtain statistical data, where this information was missing or incomplete, with three studies providing data in this manner (Kowalski & Lundeberg, 2006; Kemp et al., 2004; King & Kennedy, 1999). Importantly, none of the eligible studies was excluded due to insufficient data.

Of the 3,271 studies that were initially identified by the literature searches, 14 met all of the inclusion criteria (see Figure 1). Two studies by Kennedy (Kennedy et al., 2003, King & Kennedy, 1999) and four studies by Craig et al. (1997, 1998a, 1998b, 1999) used overlapping samples. The data from these studies were therefore combined and treated as two studies, to ensure that the data were independent (Lipsey & Wilson, 2001). One other study (Dunn et al., 1981) compared three different treatment conditions to one control group. Thus, in total, the data from 10 independent studies, investigating 12 CBT programs, were analysed.

Data collection and preparation

The data extracted from each study included: (a) sample demographics (e.g. mean age, gender); (b) injury variables (e.g. time since injury, SCI diagnosis); (c) treatment factors (e.g. treatment setting, therapy frequency); (d) therapist variables (e.g. therapist qualification or training); (e) methodological variables (e.g. source of participants, and whether the study design was randomised or quasi-experimental); and (f) outcome data (or pre- and post- treatment assessments of psychological functioning). To simplify data presentation and interpretation, outcome was classified into the following broad psychological domains: assertiveness, coping, self-efficacy, depression, quality of life, acceptance, anxiety, locus of control and self-esteem. These groupings did not impact on the findings because the data for the different measures in these domains were treated separately. An analysis of the relationship between CBT and its impact on functional independence was also originally planned however there were insufficient data, thereby precluding an analysis of this variable. Similarly, the small number of eligible studies precluded a quantitative analysis of the impact of methodological and treatment differences on the efficacy of CBT. Given the limited availability of data, all outcome measures were therefore examined, including those that were employed by single studies.

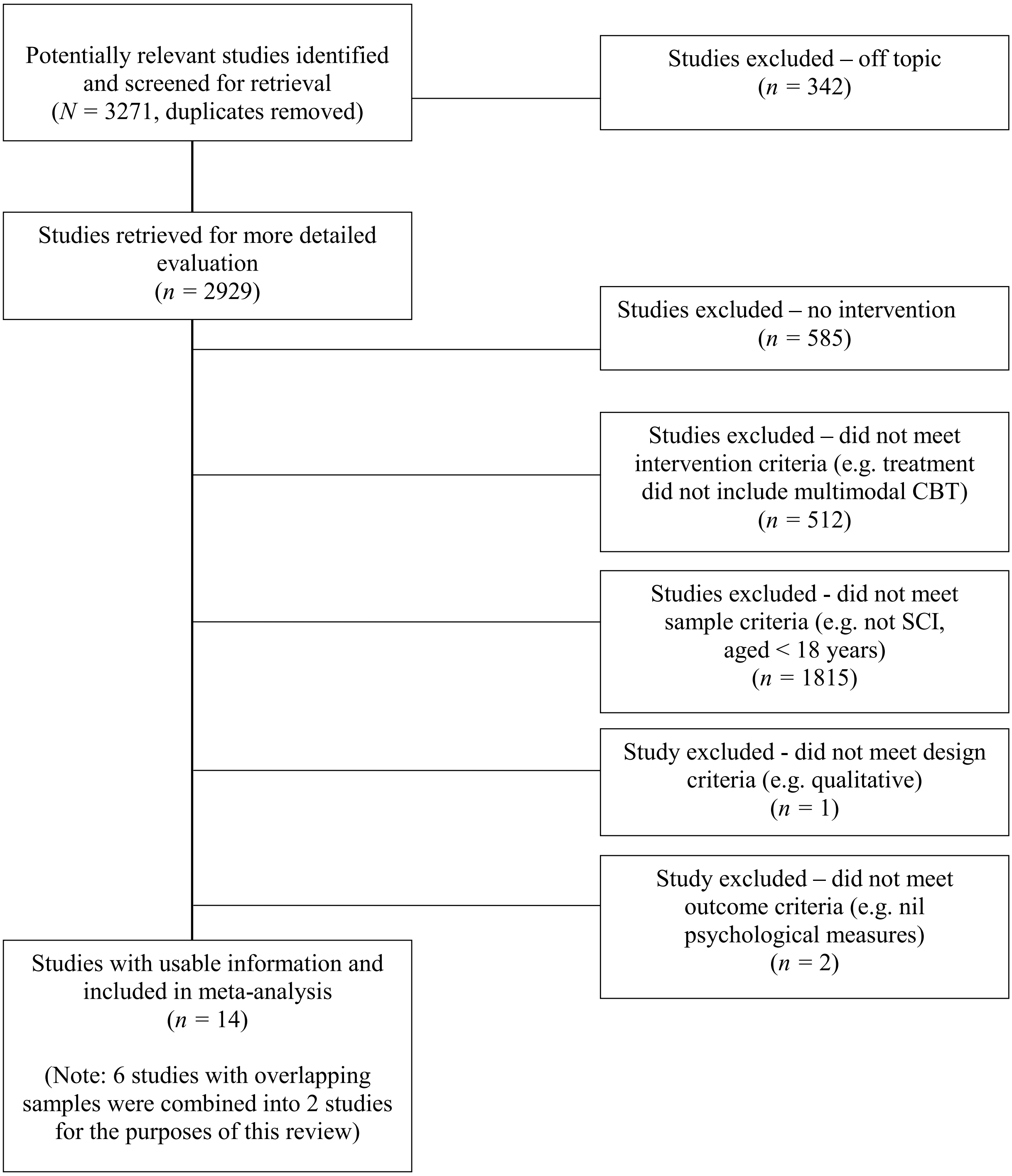

Figure 1: Flow chart of study selection

Data extraction was conducted by the first author (D.D.).

Statistical analysis

Quality assessment.

In order to ensure that only data from high quality studies were included (Higgins & Green, 2006; Juni, Witschi, Bloch & Egger, 1999), the methodological quality of each study was evaluated using a rating tool developed for this review (see Appendix). The 20-item rating scale focussed on methodological criteria such as sample selection and size, handling of withdrawals and dropouts, psychometric properties of outcome measures and statistical analysis. Individual criteria were rated as being 'met', 'unmet' or 'not addressed or unclear', with 1 point assigned for each criterion that was met. Item scores were tallied to obtain an overall quality score for each study (ranging between 0 and 20). Two reviewers (first author, D.D., and a fourth year psychology student) were involved in the rating process, with each reviewer independently evaluating each study, after which consensus ratings were determined. These ratings were then used to weight effect sizes (see below).

Effect size estimation.

Treatment efficacy was evaluated using Cohen's *d* effect sizes, based on the formula provided by Morris and Deshon (2002). This involved the calculation of effect sizes for studies that used a repeated measures, either with independent-groups (treatment and control; $N_{\text{studies}} = 9$) or a single-group (treatment only; $N_{\text{studies}} = 1$). Cohen's *d* is a conservative statistic that is recommended for use with clinical data because it does not presume equality of variance between the treatment and control samples (Zakzanis, 2001). As a guideline for the social sciences, Cohen's *d* values of 0.2, 0.5 and 0.8 equate to small, medium and large treatment effects, respectively (Cohen, 1992).

Effect sizes were calculated to determine: (a) immediate treatment effects (change in outcome measures from pre- to post-CBT); and (b) maintenance of treatment gains (post-CBT to follow-up). When means and standard deviations were not reported, the results of *t* and one-way *F* statistics were used to estimate *d* (Wolf, 1986). One study (Hanrahan, 1995) reported the non parametric Wilcoxon statistic, which cannot directly be converted into a standardised mean effect size. Based on statistical advice (M.W. Lipsey, personal communication, September 3, 2009), this statistic was transformed to its corresponding *t*-score and then converted to *d*, in order to estimate the treatment effect for this study.

Effect sizes were calculated in a multi-stage process. The first stage involved calculating an effect size for each outcome measure that was used by a study. Either the total score or a subscale score was used to calculate treatment effects, but not both, as per Lipsey and Wilson's (2001) recommendation. The effect sizes obtained from different studies that used the same measure and study design were then aggregated and averaged. Before doing so, each effect size was weighted by the study's quality rating. This overall weighted mean effect size (d_w) took into account the impact of methodological differences, such as sample size and randomisation, on estimates of treatment effect (Lipsey & Wilson, 2001). The direction of each effect size was also standardised across measures so that a positive effect size indicated that CBT was beneficial to outcome whereas a negative *d* indicated poor outcome. The 95% confidence intervals (CI) were additionally calculated to evaluate the statistical significance of each effect size (Lipsey & Wilson, 2001). A treatment effect is considered significant if a CI does not span zero, suggesting that there are likely to be group differences in the population at large (Dancey & Reidy, 2004).

Fail-safe *N*s (*N*fs) were also calculated to address a potential threat to validity, namely the problem of publication bias (Zakzanis, 2001). This statistic determines how many unpublished studies with non-significant results (i.e. small effects) would be required to call the current findings into question. For the purpose of this study a non-significant value was defined as an effect size less than 0.40, which represents a small treatment effect (Cohen, 1992; Orwin, 1983). Because different measures were used with varying frequency an *N*fs was considered adequate if its value was greater than the number of published studies that had used a particular measure (i.e. *N*fs > *N* studies). This provided a more conservative estimate than other formulas where *N* refers to the total number of studies that are undergoing a meta-analysis (Lipsey & Wilson, 2001). Fail-safe *N*s were calculated using the formula provided by Lipsey and Wilson (2001).

The conclusions drawn from this meta-analysis are based on the combined interpretation of these statistics. As such, any change in psychological outcome, from baseline to post-CBT, was considered significant if it met the following criteria: (a) produced at least a moderate treatment effect (i.e. $d > 0.40$); (b) had a 95% CI that did not span zero; and (c) had a large enough *N*fs score to suggest that the findings were unlikely to be compromised by the file drawer problem (i.e. *N*fs > *N* studies).

Results

Characteristics of study participants

The data from 10 independent studies contributed to this meta-analysis, comprising a total sample of 424 participants. The demographic characteristics of participants from studies who provided this information were examined to determine whether the treatment (CBT) and control groups were well-matched (see Table 2).

The two groups were comparable in terms of sample size ($U = 49.0$, $z = -0.36$, $d_{\text{sample size}} = -0.25$, $p = 0.97$), age ($U = 42.5$, $z = -0.12$, $d_{\text{age}} = -0.13$, $p = 0.90$), gender (male: 76% vs. 82%, χ^2 (1) = 0.06, $p = 0.81$), injury type (paraplegia: 53% vs. 54%, χ^2 (1) = 0.03, $p = 0.87$) and injury severity (complete lesion: 52% vs. 53%, χ^2 (1) = 0.59, $p = 0.44$), suggesting that it is unlikely these were confounding variables. Although there were no significant group differences in time since injury ($U = 24.5$, $z = -0.30$, $d_{\text{time in months}} = -0.29$, $p = 0.77$), this result should be treated with caution as it was based on limited data ($N_{\text{studies}} = 7$). The total sample comprised participants undertaking rehabilitation in the immediate post-injury period (47 days post-SCI) and outpatients, with longer-term physical disability (up to 22 years); the latter figure reflecting the fact that three studies included participants with congenital spinal conditions (e.g. spina bifida; Norrbrink Budh et al., 2006; Glueckauf & Quittner, 1992; Hanrahan, 1995).

Treatment characteristics

The average length of CBT was 10 sessions ($SD = 4.4$, $N_{\text{studies}} = 10$, range = 6 - 20 sessions) over a 9 week period ($SD = 5.9$, range = 4 - 24 weeks). This equated to

Table 2. Sample description and comparability of groups (N = 10 studies)

	CBT					Control				
	N_{studies}	$N_{\text{participants}}$	*M*	*SD*	Range	N_{studies}	$N_{\text{participants}}$	*M*	*SD*	Range
Sample size	10	226	18.8	12.2	4.0 - 45.0	9	198	22.0	12.8	6.0 - 41.0
Age (years)	9	207	40.8	6.9	31.0 - 53.2	8	183	41.1	9.7	30.5 - 54.6
Time since injury										
In days	2	65	102.1	78.3	46.7 - 157.5	2	60	90.7	43.9	59.6 - 121.8
In years	5	96	8.6	4.8	3.40 - 15.8	4	75	13.1	7.3	5.5 - 21.9
Gender										
Male	9	138				8	134			
Female	9	44				8	30			
Marital status										
Single	4	54				4	57			
Married	4	57				4	61			
Employment status										
Employed	3	40				3	56			
Unemployed	3	24				3	24			
Injury type										
Paraplegia	8	75				7	77			
Tetraplegia	8	66				7	66			
Lesion										
Incomplete	7	59				6	63			
Complete	7	64				6	73			

N_{studies} = number of studies providing data; $N_{\text{participants}}$= number of participants providing data approximately 120 minutes per session (*SD* = 59.4, range = 30 - 270 minutes), with sessions held on a weekly (N_{studies} = 8) or fortnightly (N_{studies} = 1) basis. In one study (Kemp et al., 2004) session frequency was tapered over a longer time period (6 months). Group therapy was the primary mode of treatment (N_{studies} = 7) and, in three studies, group therapy augmented individual-based therapy. The focus of CBT included management of mood (N_{studies} = 4), social skills training (N_{studies} = 3), management of SCI-related neuropathic pain (N_{studies} = 2) or a combination of these aims (N_{studies} = 1). CBT, as a specialised intervention, was delivered or monitored by a psychologist in all but one study, which did not report this information. Control conditions included standard medical care (N_{studies} = 3), no-treatment control (N_{studies} = 3), or a waiting-list control group (N_{studies} = 2). In one study (Duchnick et al., 2009), supportive counselling was examined as a comparative treatment to CBT.

Evaluation of study quality

In terms of methodological quality, the mean quality rating was 14.6 (*SD* = 1.9) from a possible total score of 20 (see Table 3). Of note is that most of the identified studies employed non-randomised designs with small sample sizes to examine the effects of CBT. Allocation to treatment was randomised in four studies but blinding of group allocation was not possible or detailed in any of the studies. In four studies, participants were closely matched on demographic and/or injury variables, although two studies required historic control groups, due to the limited availability of suitably matched controls. Another study (Hanrahan et al., 1995) did not include a control group. A variety (*N*= 23) of self-report questionnaires were used with clinician-based ratings included in two studies. Similarly, few studies (*N*= 2) reported masking of assessors to group assignment. Dropout rates were also variable, ranging from 0% to 43% ($N_{\text{studies}} = 9$).

Early effects of cognitive behaviour therapy

The weighted effect sizes (d_w) for all measures evaluating early CBT treatment effects, grouped by psychological domain and rank ordered by size, are provided in Table 3. A total of 26 different psychological measures of depression, anxiety and coping post-SCI, were used by these studies, with some measures providing multiple scores. The Beck Depression Inventory (BDI), Hospital Anxiety and Depression Scale (HADS) and State Anxiety Inventory (SAI) were the most commonly used measures, having been employed in two or three studies each (see Table 3). Their associated weighted effect sizes were positive and ranged from very small ($d_w = 0.04$; SAI) to moderate ($d_w = 0.59$; BDI). Additionally, the effect size for the BDI was statistically significant, suggesting a stronger degree of confidence in this finding.

Notably, individual measures of assertiveness (Behavioural Assertiveness Test - BAT; SCI Assertion Questionnaire – SCIAQ; Disability and Assertiveness Role-Play Test - DART), coping (Humour subscale, COPE; Pain Response Self Statements Catastrophising subscale - PRSS), self-efficacy (Pain Self-Efficacy Questionnaire - PSEQ), depression (Older Adult Health and Mood Questionnaire - OAHMQ), and quality of life (Medical Outcomes Short Form Health Survey Mental Component subscale - SF-12) were associated with large and significant treatment effects immediately after treatment. CBT was associated with moderate, albeit non-significant, improvements in acceptance of SCI (Acceptance of Disability - AD) and less improvement, compared with control participants, in locus of control (Multi-dimensional Health Locus of Control –

MHLOC) and self-esteem (Rosenberg Self-Esteem Scale - RSE).

Longer-term effects of cognitive behaviour therapy at follow-up

Follow-up assessments of participants ranged from 6 weeks to 2 years post-treatment and were undertaken in five studies (see Table 4). With the exception of humour as a coping strategy (COPE Humour subscale), which had deteriorated, all treatment effects were non-significant. Thus at follow-up most treatment effects were minimal or not sustained.

Discussion

The current study was designed to evaluate the effectiveness of CBT for improving the immediate and long-term psychological outcomes of individuals with a SCI. Meta-analytic techniques were employed to consolidate and critique the available literature. The data from 10 independent studies and a total *N* of 424 individuals with SCI were pooled and analysed.

The results were favourable in terms of the short-term efficacy of CBT, with substantial, positive effects associated with group programs that focussed on assertiveness skills training (Dunn et al., 1981; Glueckauf & Quittner, 1992), management of mood (Craig et al., 1998a, King & Kennedy, 1999) and management of chronic pain following SCI (Nicholson Perry, Nicholas & Middleton, 2009). Similarly, the use of humour as a coping skill improved as a consequence of CBT (King & Kennedy, 1999). Other aspects of coping also increased, although to a non-significant degree.

Table 3. Short-term treatment effects of cognitive behaviour therapy for the different psychological measures

Domain	Scale	Subscale	Study design	N_{studies}	$N_{\text{participants}}$	*M*	95% CI		*N*fs	Study author	Score
						d_{w}	lower	upper			
Assertiveness	BAT	Non-compliance	Treat vs. Cont	1	22	1.96*	0.87	3.05	9	Dunn et al., 1981	14
		Assertiveness	Treat vs. Cont	1	22	1.36*	0.35	2.37	6	Dunn et al., 1981	14
		Requests	Treat vs. Cont	1	22	1.14*	0.15	2.13	5	Dunn et al., 1981	14
	SCIAQ	Likelihood	Treat vs. Cont	1	34	0.89*	0.19	1.59	3	Glueckauf et al., 1992	14
		Social anxiety	Treat vs. Cont	1	34	0.88*	0.17	1.59	3	Glueckauf et al., 1992	14
	DART	Directed looking	Treat vs. Cont	1	34	0.78*	0.08	1.48	3	Glueckauf et al., 1992	14
		Affect	Treat vs. Cont	1	34	0.76*	0.06	1.46	3	Glueckauf et al., 1992	14
		Speech	Treat vs. Cont	1	34	0.50	- 0.19	1.19	2	Glueckauf et al., 1992	14
		Vocal resonance	Treat vs. Cont	1	34	0.25	- 0.43	0.93	0	Glueckauf et al., 1992	14
		Smiles	Treat vs. Cont	1	34	- 0.06	- 0.74	0.62	0	Glueckauf et al., 1992	14
	RAS		Treat vs. Cont	1	34	0.64	- 0.05	1.33	2	Glueckauf et al., 1992	14
Coping	SAMS	Imagery	Treatment	1	6	1.13	- 0.88	3.14	5	Hanrahan, 1995	12
		Positive self-talk	Treatment	1	6	0.94	-1.07	2.95	4	Hanrahan, 1995	12
	COPE	Humour	Treat vs. Cont	1	38	1.01*	0.34	1.68	4	King & Kennedy, 1999 [b]	16
		Planning	Treat vs. Cont	1	38	0.61	- 0.04	1.26	2	King & Kennedy, 1999 [b]	16
		Active coping	Treat vs. Cont	1	38	0.51	- 0.14	1.16	2	King & Kennedy, 1999 [b]	16
		Restraint coping	Treat vs. Cont	1	38	0.43	- 0.22	1.06	1	King & Kennedy, 1999 [b]	16
		Positive interpretation	Treat vs. Cont	1	38	0.33	- 0.31	0.97	1	King & Kennedy, 1999 [b]	16

Table 3. Short-term treatment effects of cognitive behaviour therapy for the different psychological measures (continued)

Domain	Scale	Subscale	Study design	$N_{studies}$	$N_{participants}$	M d_w	95% CI		Nfs	Study author	Score
							lower	upper			
Coping	COPE	Denial	Treat vs. Cont	1	38	0.31	- 0.33	0.95	1	King & Kennedy, 1999 [b]	16
		Suppress activity	Treat vs. Cont	1	38	0.30	- 0.35	0.93	1	King & Kennedy, 1999 [b]	16
		Instrumental support	Treat vs. Cont	1	38	0.29	- 0.35	0.93	1	King & Kennedy, 1999 [b]	16
		Substance use	Treat vs. Cont	1	38	0.16	- 0.48	0.80	0	King & Kennedy, 1999 [b]	16
		Venting emotion	Treat vs. Cont	1	38	0.10	- 0.54	0.74	0	King & Kennedy, 1999 [b]	16
		Mental disengagement	Treat vs. Cont	1	38	0.05	- 0.59	0.69	0	King & Kennedy, 1999 [b]	16
		Behavioural disengagement	Treat vs. Cont	1	38	0.05	- 0.59	0.69	0	King & Kennedy, 1999 [b]	16
		Emotional support	Treat vs. Cont	1	38	0.00	- 0.64	0.64	0	King & Kennedy, 1999 [b]	16
		Religion	Treat vs. Cont	1	38	- 0.05	- 0.69	0.59	0	King & Kennedy, 1999 [b]	16
	PRSS	Catastrophising	Treat vs. Cont	1	36	0.91*	0.22	1.60	4	Nicholson Perry et al., 2010	16
	SPSI-R	Rational	Treat vs. Cont	1	51	0.23	- 0.35	0.81	1	Shanmugham et al., 2004	15
		Negative	Treat vs. Cont	1	51	0.14	- 0.43	0.71	0	Shanmugham et al., 2004	15
		Positive	Treat vs. Cont	1	51	0.11	- 0.46	0.68	0	Shanmugham et al., 2004	15
		Avoidant	Treat vs. Cont	1	51	- 0.01	- 0.58	0.56	0	Shanmugham et al., 2004	15
		Impulsive	Treat vs. Cont	1	51	- 0.24	- 0.82	0.34	0	Shanmugham et al., 2004	15
Self Efficacy	PSEQ		Treat vs. Cont	1	36	1.13*	0.43	1.83	5	Nicholson Perry et al., 2010	16
	MSES		Treat vs. Cont	1	36	0.13	- 0.52	0.78	0	Nicholson Perry et al., 2010	16

Table 3. Short-term treatment effects of cognitive behaviour therapy for the different psychological measures (continued)

Domain	Scale	Subscale	Study design	$N_{studies}$	$N_{participants}$	*M* d_w	*SD d*	Min *d*	Max *d*	95% CI		*N*fs	Study author	Score
										lower	upper			
Depression	OAHMQ		Treat vs. Cont	1	43	0.98*				0.32	1.64	4	Kemp et al., 2004	14
	BDI		Treat vs. Cont	2	107	0.59*	0.47	0.27	0.93	0.20	0.98	4	Craig et al.,1998[a]	17
													King & Kennedy, 1999 [b]	16
	HADS	Depression	Treat vs. Cont	2	74	0.18	0.14	0.09	0.25	- 0.29	0.65	0	Norrbrink Budh et al., 2006 [b]	11
													Nicholson Perry et al., 2010	16
	CES-D		Treat vs. Cont	1	40	- 0.24				- 0.86	0.38	0	Duchnick et al., 2009	18
Quality of Life	LSQ		Treatment	1	28	0.98				- 1.00	2.95	4	Kemp et al., 2004 [b]	14
	SF-12	Mental	Treat vs. Cont	1	36	0.96*				0.25	1.63	4	Nicholson Perry et al., 2010	16
		Physical	Treat vs. Cont	1	36	0.05				- 0.61	0.71	0	Nicholson Perry et al., 2010	16
	MPI-SCI	Interference	Treat vs. Cont	1	36	0.86*				0.18	1.54	3	Nicholson Perry et al., 2010	16
	CAC		Treatment	1	28	0.86				- 1.11	2.83	3	Kemp et al., 2004 [b]	14
	SIP	Psychosocial	Treat vs. Cont	1	51	0.51				- 0.07	1.09	2	Shanmugham et al., 2004	15
Acceptance	AD		Treat vs. Cont	1	34	0.65				- 0.04	1.34	2	Glueckauf et al., 1992	14
	COPE	Acceptance	Treat vs. Cont	1	36	0.32				- 0.32	0.96	1	King & Kennedy, 1999 [b]	16
	SCL	Acceptance	Treat vs. Cont	1	38	0.05				- 0.60	0.70	0	Nicholson Perry et al., 2010	16
Anxiety	HADS	Anxiety	Treat vs. Cont	2	74	0.38	0.24	0.18	0.51	- 0.09	0.85	2	Norrbrink Budh et al., 2006 [b]	11
													Nicholson Perry et al., 2010	16

Table 3. Short-term treatment effects of cognitive behaviour therapy for the different psychological measures (continued)

Domain	Scale	Subscale	Study design	N_{studies}	$N_{\text{participants}}$	M d_w	SD d	Min. d	Max. d	95% CI		Nfs	Study author	Score
										lower	upper			
Anxiety	SAI		Treat vs. Cont	3	147	0.04	0.41	- 0.17	0.53	- 0.28	0.36	2	Craig et al.,1998 [a]	17
Locus of Control	MHLOC	Internal	Treat vs. Cont	1	51	0.20				- 0.37	0.77	0	Shanmugham et al., 2004	15
		Chance	Treat vs. Cont	1	51	- 0.05				- 0.62	0.52	0	Shanmugham et al., 2004	15
		Others	Treat vs. Cont	1	51	- 0.21				- 0.79	0.37	0	Shanmugham et al., 2004	15
	LCB		Treat vs. Cont	1	69	0.09				- 0.39	0.57	0	Craig et al., 1998 [b]	17
Self Esteem	RSE		Treat vs. Cont	1	69	- 0.13				- 0.61	0.48	0	Craig et al., 1997	17

Note: Treat vs. Control: effect size calculated on independent groups (i.e. treatment vs. control); Treatment: effect size calculated on dependent groups (i.e. pre-post intervention scores for treatment only); N_{studies} = number of studies providing data; $N_{\text{participants}}$= number of participants providing data; $M\ d_w$ = weighted mean effect size (note: weighting only applied to total effect sizes based on two or more studies); *SD* = standard deviation of *d*; Minimum *d* = minimum effect size; Maximum *d* = maximum effect size; *N*fs = approximate fail-safe *N*. Measure abbreviations: BAT Behavioural Assertiveness Test; SCIAQ Assertion Questionnaire; DART Disability and Assertiveness Role-Play Test; RAS Rathus Assertiveness Schedule; SAMS Self Assessment of Mental Skills; COPE Coping strategies; PRSS Pain Response Self Statements Scale; SPSI-R Social Problem Solving Inventory-Revised; PSEQ Pain Self Efficacy Questionnaire; MSES Mooring Self Efficacy Scale; OAHMQ Older Adult Health and Mood Questionnaire; BDI Beck Depression Inventory; HADS Hospital Anxiety and Depression Scale; CES-D Centre for Epidemiological Studies Depression Scale; LSQ Life Satisfaction Questionnaire; SF-12 Medical Outcomes Short Form Health Survey-12; MPI-SCI Multidimensional Pain Inventory – SCI version; CAC Community Activities Checklist; SIP Sickness Impact Profile; AD Acceptance of Disability Scale; SCL Spinal Cord Lesion-Related Coping Strategy Questionnaire; SAI Spielberger State Anxiety Inventory; MHLOC Multi-dimensional Health Locus of Control; LCB Locus of Control of Behaviour Scale; RSE Rosenberg Self Esteem Scale.

[a] Identified studies highlighted with asterisk in references section [b] Data provided by author on request

* Effect size met the study criteria; $d > 0.40$, $N\text{fs} > N_{\text{studies}}$, 95% CIs did not span zero.

Table 4. Longer-term treatment effects of cognitive behaviour therapy for the different psychological measures

Domain	Scale	Subscale	Study design	N_{studies}	$N_{\text{participants}}$	First follow-up				
						Months	*d*	*N*fs	95% CI	
									lower	upper
Assertiveness	RAS		Treatment	1	19	6	0.49	2	- 1.49	2.47
	SCIAQ	Likelihood	Treatment	1	19	6	0.22	0	- 1.74	2.18
		Social anxiety	Treatment	1	19	6	- 0.26	0	- 2.22	2.18
	DART	Smiles	Treatment	1	14	6	0.03	0	- 1.93	1.99
		Speech	Treatment	1	14	6	0.00	0	- 1.96	1.96
		Directed looking	Treatment	1	14	6	- 0.12	0	- 2.08	1.84
		Vocal resonance	Treat vs. Cont	1	14	6	- 0.28	0	- 2.24	1.68
		Appropriate affect	Treatment	1	14	6	- 0.37	0	- 2.33	1.59
Coping	COPE	Restraint	Treat vs. Cont	1	38	1.5	0.47	1	- 0.17	1.11
		Denial	Treat vs. Cont	1	38	1.5	0.18	0	- 0.46	0.82
		Emotional support	Treat vs. Cont	1	38	1.5	0.18	0	- 0.46	0.82
		Religion	Treat vs. Cont	1	38	1.5	0.13	0	- 0.51	0.77
		Venting emotion	Treat vs. Cont	1	38	1.5	0.06	0	- 0.58	0.70
		Behavioural disengagement	Treat vs. Cont	1	38	1.5	0.05	0	- 0.59	0.69
		Instrumental support	Treat vs. Cont	1	38	1.5	- 0.02	0	- 0.66	0.62
		Mental disengagement	Treat vs. Cont	1	38	1.5	- 0.05	0	- 0.69	0.59
		Planning	Treat vs. Cont	1	38	1.5	- 0.06	0	- 0.70	0.58
		Positive interpretation	Treat vs. Cont	1	38	1.5	- 0.09	0	- 0.73	0.55
		Suppress activity	Treat vs. Cont	1	38	1.5	- 0.16	1	- 0.79	0.48
		Substance use	Treat vs. Cont	1	38	1.5	- 0.36	1	- 1.00	0.28
		Active coping	Treat vs. Cont	1	38	1.5	- 0.38	1	- 1.02	0.26
		Humour	Treat vs. Cont	1	38	1.5	- 0.83*	3	- 1.49	- 0.17

Table 4. Longer-term treatment effects of cognitive behaviour therapy for the different psychological measures (continued)

Domain	Scale	Subscale	Study design	N_{studies}	First follow-up						Second follow-up					
					$N_{\text{participants}}$	Months	*d*	*N*fs	95% CI		$N_{\text{participants}}$	Months	*d*	*N*fs	95% CI	
									lower	upper					lower	upper
Coping	PRSS		Treatment	1	17	1	- 0.13	0	- 2.09	- 1.83	13	9	-0.17	0	- 2.13	- 1.79
Acceptance	COPE	Acceptance	Treat vs. Cont	1	38	1.5	0.32	1	- 0.32	0.96						
	AD		Treat vs. Cont	1	33	3	0.21	1	- 0.49	0.91						
	SCL	Acceptance	Treatment	1	17	1	0.00	0	- 1.96	1.96	13	9	0.00	0	- 1.96	1.96
	AD		Treatment	1	19	1.5	- 0.01	0	- 1.01	0.99						
Anxiety	HADS	Anxiety	Treatment	1	17	1	0.14	0	- 1.82	- 2.10	13	9	0.10	0	-1.86	- 2.06
	SAI		Treat vs. Cont	1	33	3	0.09	0	- 0.59	- 0.77						
			Treat vs. Control	1	38	1.5	- 0.11	0	- 0.75	- 0.53						
			Treat vs. Cont	1	69	12	- 0.04	0	- 0.52	- 0.44	58	24	0.07	0	- 0.45	- 0.59
Depression	HADS	Depression	Treatment	1	17	1	0.03	0	- 1.96	- 1.99	13	9	0.58	2	- 1.39	- 1.97
	CES-D		Treat vs. Cont	1	33	3	- 0.05	0	- 0.73	- 0.63						
	BDI		Treat vs. Cont	1	38	1.5	- 0.07	0	- 0.71	- 0.57						
			Treat vs. Cont	1	69	12	- 0.10	0	- 0.58	- 0.38	58	24	0.06	0	- 0.45	- 0.31

Table 4. Longer-term treatment effects of cognitive behaviour therapy for the different psychological measures (continued)

Domain	Scale	Subscale	Study design	N_{studies}	First follow-up						Second follow-up					
					$N_{\text{participants}}$	Months	*d*	*N*fs	95% CI		$N_{\text{participants}}$	Months	*d*	*N*fs	95% CI	
									lower	upper					lower	upper
Locus of Control	LCB		Treat vs. Control	1	69	12	- 0.08	0	- 0.56	- 0.40	58	24	-0.13	0	- 0.65	- 0.39
Quality of Life	MPI-SCI	Life interference	Treatment	1	17	1	- 0.08	0	- 2.04	- 1.88	13	9	-0.62	2	- 2.59	- 1.35
	SF-12	Physical	Treatment	1	17	1	- 0.02	0	- 1.98	- 1.94	13	9	-0.20	0	- 2.16	- 1.76
		Mental	Treatment	1	17	1	- 0.58	2	-2.54	-1.38	13	9	0.42	1	-1.55	-2.39
Self-efficacy	MSES		Treatment	1	17	1	- 0.02	0	-1.96	-1.94	13	9	-0.47	1	-2.43	-1.49
	PSEQ		Treatment	1	17	1	- 0.17	0	-2.13	-1.79	13	9	-0.65	2	-2.62	-1.32
Self Esteem	RSE		Treat vs. Control	1	69	12	- 0.24	0	-0.72	-0.24						

Treat vs. Control: effect size calculated on independent groups (i.e. treatment vs. control); Treatment: effect size calculated on dependent groups (i.e. pre-post intervention scores for treatment only), N_{studies} = number of studies providing data; $N_{\text{participants}}$ = number of participants providing data; Months = time (in months) when assessment was conducted; *d* = mean effect size; *N*fs = approximate fail-safe *N*.

[a] Identified studies highlighted with asterisk in references section [b] Data provided by author on request.

* Effect size met the study criteria; $d > 0.40$, $N\text{fs} > N_{\text{studies}}$, 95% CIs did not span zero.

Also important is the finding that the longer-term (i.e. up to 2 years post-injury) effects of CBT on many psychological outcomes were weak and non significant. At best, modest treatment gains were maintained on measures of assertiveness and acceptance up to 6 months post-CBT, whereas measures of depression and anxiety were associated with minimal or no improvement. Changes in the use of coping skills, over time, were also observed. The positive and negative effect sizes associated with the COPE subscales suggest that participants employed both maladaptive and adaptive coping strategies.

These findings support the current literature on psychological adjustment to SCI. CBT has been consistently associated with immediate decreases in anxiety and depression (Craig et al., 2009; Middleton & Craig, 2008; Pollard & Kennedy, 2007), when delivered in the post-acute period. The rehabilitation environment may also contribute to the adjustment process (Middleton & Craig, 2008), as patients have the opportunity to enhance their interpersonal and social skills in a supportive setting, and as physical gains are made (Ruff, Adamson, Ruff & Wang, 2007). Conversely, symptoms of anxiety and depression can increase after primary rehabilitation is complete, when individuals with SCI are faced with new challenges in the transition to community living and integration (Middleton & Craig, 2008). Indeed, it has been suggested that a sub-set of individuals require a continuum of mental health services throughout the lifespan (Migliorini et al., 2008).

In clinical practice, however, there is often a shortfall in outpatient mental health services for people with SCI. Resources (e.g., access to specialist services as follow-up) are limited and other factors, such as transport access and cost, also impact on individuals' satisfaction with community-based services (Cox, Amsters , & Pershouse, 2001). Accordingly, there is a need to improve psychological services for this group in a cost-effective manner (Australian Psychological Society, 2005). Within this context, telecommunication-based interventions are emerging as a service delivery option for persons living in the community with chronic disabilities (Kairy, Lehoux, Vincent & Visintin, 2009). However, use of this medium for specialised and highly individualised service delivery, such as psychological interventions for people with SCI, still needs to be trialled and evaluated (Cox et al., 2001).

The limitations to this meta-analysis need to be considered when interpreting these results. First, the search was restricted to published studies. The search terms were broad and the reference lists of all eligible studies were examined for additional studies but it is possible that some studies, including those that are not in the public domain (e.g. dissertations), were not included in this meta-analysis and this could alter the findings (Lipsey & Wilson, 2001). Fail-safe *N*s were calculated in an attempt to address this problem. Furthermore, the paucity of psychological intervention studies among the SCI group has been consistently noted (Elliott & Kennedy, 2004; McAweeney et al., 1997).

Secondly, studies with a methodologically weak research design, in particular the study by Hanrahan (1995), which did not employ a control group, or that by Kemp et al. (2004) where *d* was calculated from paired *t* tests, were associated with large treatment effects favouring the efficacy of CBT. There is an argument that a Cohen's *d* calculated from such studies may inflate the effect-size estimate because the research design does not account for spontaneous recovery in psychotherapy; a factor which is controlled for in the randomised controlled trial, or RCT (Wolf, 1986). Effect sizes were weighted by methodological quality to assist with this problem, however weighting could only be applied in cases where there was more than one study contributing to the calculation of a (mean) effect size. At the same time, the practical and ethical limitations of using RCTs in rehabilitation psychology are recognised (Schutz, Rivers & Ratusnik, 2008; Tate, Kalpakjian & Kwon, 2008). Alternative options to the RCT include a more detailed examination of within-subject variation, such as multiple-baseline designs (Schwartz et al., 2004).

Thirdly, the majority of effect size estimates were based on single studies, which are considered to be less reliable than estimates based on multiple studies (Lipsey & Wilson, 2001). However given that there was limited overlap in the measures utilised by the identified studies, it was necessary to consider all available results. It would be an advantage for future research to use the same measures of behavioural outcome in order to allow for greater comparison between studies and thereby increase the strength of these findings.

Fourthly, one needs to be cautious when interpreting effect sizes that are based on multi-dimensional inventories. For example, the COPE scale, utilised by King and Kennedy (1999), yields 15 factors that reflect conceptually distinct aspects of coping. Rather than aggregating the results in an ‘overall coping index’, the subscales were considered separately, as recommended by the authors (Carver, Scheier & Weintraub, 1989). However, this also increased the likelihood of making a Type I error. The role of situation-specific variables (e.g. the duration of SCI), should also be considered when measuring coping style. For example, in this meta-analysis, the Denial subscale was interpreted as a maladaptive coping response, based on research indicating that poorer acceptance of SCI is associated with higher distress (Elfstrom, Kreuter, Ryden, Persson &

Sullivan, 2002). However denial can also be viewed a functional response in the early stages of SCI rehabilitation, as it serves to minimise distress (Carver et al, 1989).

Fifthly, a criticism of meta-analytic procedures is that variations in treatment, methodology and sample characteristics are difficult to interpret based on a mean index of effect size. Statistical tests of homogeneity, such as the within-comparison heterogeneity index (Lipsey & Wilson, 2001), address this criticism. However statistical power for testing homogeneity in this meta-analysis was limited due to the small number of studies (Lipsey & Wilson, 2001), even if there was appreciable heterogeneity, as is the case in the SCI clinical population (Schwartz et al., 2004). Furthermore, many of the earlier studies did not provide the necessary data to analyse the impact of important injury variables, such as severity of SCI and time since injury. With injury classification now standardised in SCI rehabilitation (Marino et al., 2003), future research should provide a more accurate description of the study participants.

Despite these limitations, the findings of this meta-analysis support the effectiveness of CBT in optimising the early emotional outcomes of adults who have sustained a SCI. CBT delivered during inpatient rehabilitation was associated with stronger effects, although more research is needed to evaluate the impact of this specialised intervention in managing the long-term, emotional consequences of SCI and in ensuring that the short-term benefits of CBT are sustained over a longer period of time.

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Appendix

Table A1. Quality rating scale[4]

Item	Study variables	Yes (score 1)	No (score 0)	Not addressed or unclear (score 0)
	Sample			
1	Statistical justification for sample size (i.e. a priori or post-hoc power analyses) [2, 4, 5, 8, 10, 14,18]			
2	Confounding injuries (i.e. brain injury) excluded [1, 3, 4, 21]			
3	Relevant co-morbidities (i.e. psychiatric status) reported [1,3, 8, 21]			
4	Demographic characteristics of sample described (e.g. age, sex) [3,4,20]			
5	Clinical characteristics of sample described (e.g. SCI diagnosis) [3,4,20]			
6	Treatment and control groups matched on disability [3, 7, 13, 15, 16,17,20]			
7	Dropouts/withdrawals reported [3, 4, 7, 8, 12]			
	Measurement			
8	Only published outcome measures used [2,16,17]			
9	Dependant variables measured pre and post-intervention [2, 9,13]			
10	Multi-dimensional measurement provided (i.e. self-report & observer/other rating) [2]			
	Design			
11	Participants randomly allocated to groups [1,3, 4,12,19,20]			
12	Method of randomisation is outlined [3 ,4, 7]			
13	Masked or independent evaluation (i.e. those administering intervention did not assess outcomes) [1,2, 4,8,20,21]			
	Intervention			
14	Intervention delivered by a trained mental health professional (i.e. psychologist, psychiatrist, nurse, social worker) [11, 8,13]			
15	Co-interventions, or another form of treatment (i.e. psychotropic medication), reported [2, 7]			
16	Treatment standardised by a manual [4,8,11,13,19]			
17	Duration of treatment (no. of sessions over no. of weeks) reported [2,3,13,19]			
18	Therapist involvement is consistent within treatment groups (i.e. same therapist provides intervention to all treatment subjects) [2, 11]			
	Results			
19	Significant test statistics reported to enable the calculation of an effect size (i.e. M, SD, *t* score, one way *F* ratio or *p* value) [3, 4, 5, 8, 14]			
20	Non-significant tests statistics reported to enable the calculation of an effect size (i.e. M, SD, *t* score, one way *F* ratio or *p* value) [3, 4, 5, 8, 14]			

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[4] Superscript numbers by each item refer to references for scales that have used these items or to research recommending the use of this item.

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Chapter 4: Study 2

Psychological intervention during spinal rehabilitation: A preliminary study.

This chapter consists of a published paper, however copyright restrictions prevent the reproduction of this paper in its published form. The details of this publication are:

> Dorstyn, D.S., Mathias, J.L., & Denson, L.A. (2010). Psychological intervention during spinal rehabilitation: A preliminary study. *Spinal Cord, 48*, 756-761. doi:10.1038.sc.2009.161.

Preface

The preceding meta-analytic study provided evidence for the short-term efficacy of cognitive behaviour therapy (CBT) in managing psychological outcomes post-SCI. It also highlighted a need for further research on the application of individual-based CBT in the primary stages of SCI rehabilitation. Research incorporating follow-up assessment is also required to examine the longitudinal impact of this therapy.

A small-scale clinical study was therefore designed to assess the effectiveness of CBT when delivered in an inpatient SCI unit (Dorstyn, Mathias & Denson, 2010). CBT was compared to a control condition involving standard medical care and psychological monitoring. Outcomes were assessed at three time points: pre- and post-intervention (week 12 of rehabilitation) and, again, at 3 months post-discharge. Based on the results of the preceding meta-analysis, it was hypothesised that targeted psychological support provided to adults with a newly acquired injury would assist in the management of depression, anxiety and stress symptoms that may develop in response to SCI.

It is important to note that this study (Dorstyn, Mathias, & Denson, 2010) was undertaken within South Australia's only Spinal Injuries Unit, based at Hampstead Rehabilitation Centre. Consequently, the sample size was constrained by a small clinical population and, importantly, limited staffing resources - with one full-time clinical psychologist (Dorstyn) then employed for the inpatient and outpatient service, in addition to providing a consultative service to the Orthopaedic, Amputee and Burns Rehabilitation Unit (also based at Hampstead Rehabilitation Centre), and the acute spinal unit (based at the Royal Adelaide Hospital). In addition, there were the inevitable time constraints imposed on doctoral students (n.b. data was collected over an 18 month period) which impacted on the recruitment process. The original plan was to have 20 participants in each group which, although small, is comparable to existing SCI psychotherapy research which has used between 4 and 40 participants per treatment arm (Study 1; Dorstyn, Mathias, & Denson, 2011a). However, the small turnover of patients in this rehabilitation unit limited this, hence only 11 Treatment and 13 Standard Care participants were recruited. Given these limitations, the study was intended to provide preliminary data in order to encourage the development of larger-scale research. Furthermore, although journal space restrictions prevented a detailed description of the CBT program, additional information about the treatment is provided in this version, consistent with the reporting standards for research in psychology (American Psychological Association, 2008).

Psychological intervention during spinal rehabilitation: A preliminary study.

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The authors are very grateful for the cooperation of patients and staff of the Spinal Injuries Unit at Hampstead Rehabilitation Centre. Gratitude is also extended to Professor Tonge and Dr. Taleporos, Monash University, for their initial contribution to the study's design.

Abstract

Objective: To examine the effectiveness of individualised cognitive behaviour therapy (CBT) on the psychological adjustment of patients undergoing rehabilitation for newly acquired spinal cord injury (SCI). Setting: South Australian Spinal Cord Injury Service, Hampstead Rehabilitation Centre, South Australia. Methods: Eleven participants, referred to the psychology service at Hampstead Rehabilitation Centre due to high levels of distress, received individual CBT as part of their SCI rehabilitation. Self-reported depression, anxiety and stress scores were assessed prior to intervention, at week 12 of rehabilitation and at 3 months post-discharge, using the Depression, Anxiety and Stress Scales (DASS-21). Functional independence was also assessed, using the Functional Independence Measure (FIM). Responses were compared with 13 participants closely matched on demographic and injury variables, who received standard psychological care (that is, assessment and monitoring only). Results: Clinical improvements in symptoms of anxiety and stress were reported by the treatment group as therapy progressed. Depression scores for treatment participants also showed a significant time effect, with worsening symptoms reported at 3 month follow-up, after CBT was discontinued. The DASS-21 scores of standard care participants did not change over time. Conclusions: Targeted, individualised psychological treatment contributes to short-term, meaningful improvements in emotional outcomes for individuals reporting psychological morbidity following a recent SCI. The results also highlight the need for ongoing access to specialised, psychological services post-discharge. Replication of these results with a larger sample is required before definitive conclusions can be drawn.

Keywords: spinal cord injuries; depression; anxiety; rehabilitation, cognitive behavioural

The psychological impact of spinal cord injury (SCI) is significant, with 30% of patients showing clinical levels of anxiety and/or depression during rehabilitation (Craig, Tran, & Middleton, 2009)[5] and after returning to community living (Pollard & Kennedy, 2007). Research suggests that specialist psychological interventions play a role in managing these emotional outcomes (Craig, Hancock, Dickson, & Chang, 1997; Kennedy, Duff, Evans, & Beedie, 2003).

Research also indicates that the provision of psychotherapy in SCI rehabilitation is constrained by a number of factors including workforce issues, with staff resources often only allowing for a consultative service instead of comprehensive psychological assessment and intervention (Australian Psychological Society, 2006), in addition to service delivery models which emphasise time-limited therapy (Middleton & Craig, 2008). Although group-based programs using cognitive-behavioural therapy (CBT) have been advocated as a time-efficient inpatient therapy model (Craig, et al., 1997; Kennedy, et al., 2003) their effectiveness is influenced by group homogeneity, with regard to patient characteristics (Huebner, 2004). There is also evidence that patients prefer individual counselling when discussing emotive issues (Schoenberg & Shiloh, 2002). This suggests that group CBT should augment, rather than replace, individual therapy.

In light of these issues, we undertook a small scale study to evaluate the discipline-specific contribution of psychology to rehabilitation outcomes in patients with newly acquired SCI. This was achieved by comparing self-reports of patients who received psychological intervention to those of matched peers who required less intensive

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[5] This paper was originally prepared according to the publication requirements of the journal *Spinal Cord*, which required referencing in Vancouver style with superscript Arabic numerals for citations. However, for consistency, this thesis is formatted according to the American Psychological Association’s Publication Manual (2010).

psychological support. It was expected that individual-based CBT, similar to previous group trials, would be of therapeutic benefit. However, it was not known whether any such benefit would be maintained after being discharged from an inpatient setting and in the absence of continued CBT.

Method

Participants

Participants were adults (>18 years) with English comprehension (i.e. primary school level education) who were undergoing rehabilitation at the Spinal Injuries Unit of Hampstead Rehabilitation Centre. Only individuals with a newly acquired injury, no diagnosed psychiatric illness in the last 12 months (i.e. substance abuse, psychosis) and no significant cognitive deficits sufficient to interfere with therapy participation (as determined by medical report), were included. Participants were recruited on a prospective basis over an 18-month period. Details of participant selection and group allocation are provided in Figure 1.

Measures

A standard measure, the Functional Independence Measure (FIM), was used to assess disability severity (Hamilton, Granger, Sherwin, Zeilezny, & Tashman, 1987). The FIM was administered on a person's admission and discharge date, with ratings determined by a team of allied health, nursing and medical staff. The FIM consists of 18 items that address motor and cognitive aspects of function. Items are scored on a 7-point

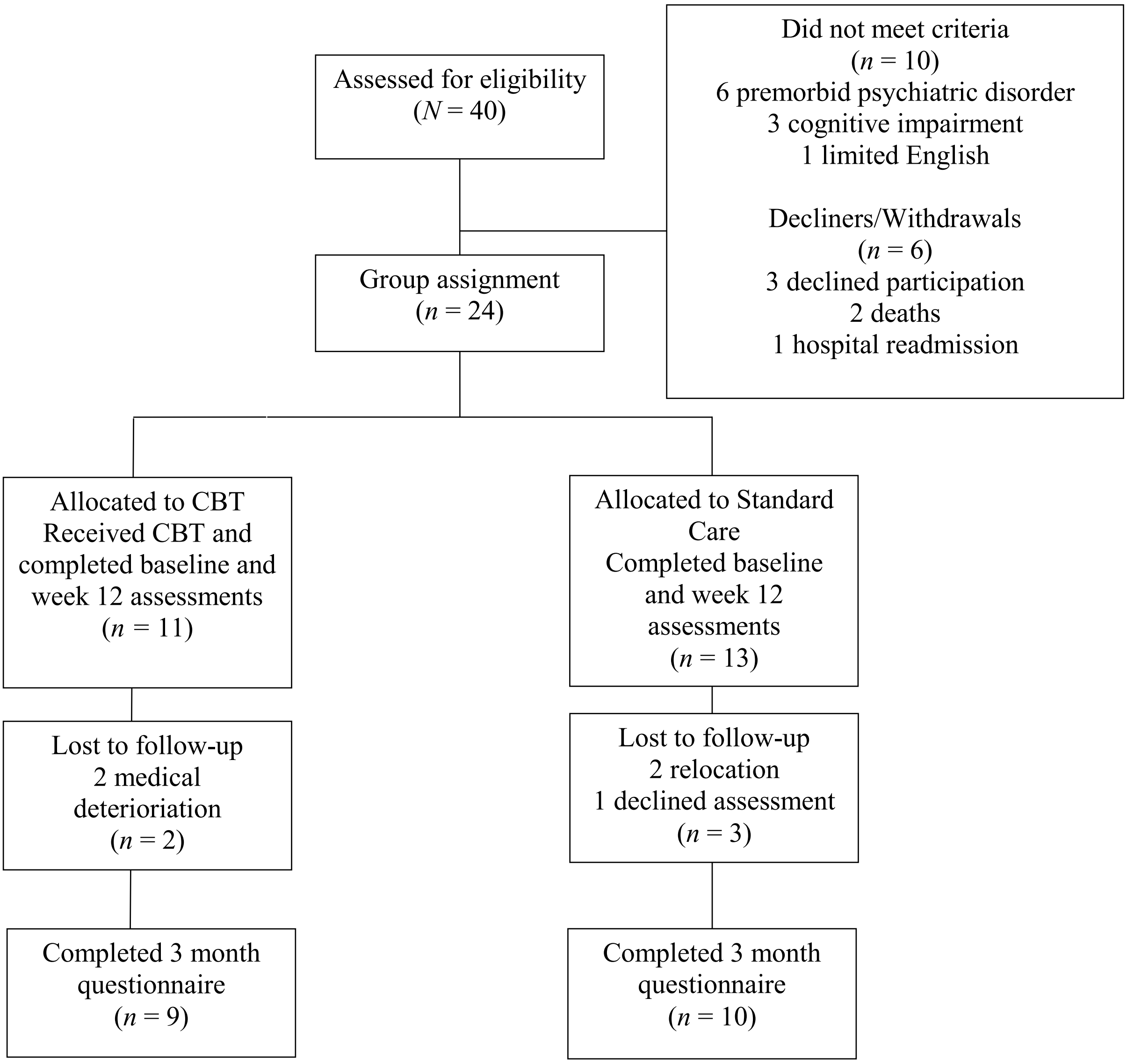

Figure 1: Flow chart of participation

scale that ranges from 1 (total assistance) to 7 (complete independence), with total scores ranging from 18 to 126. The FIM shows good evidence of reliability and validity and is routinely used in SCI rehabilitation (Dawson, Shamley, & Jamous, 2008).

The DASS-21 (Lovibond & Lovibond, 1995) was administered on an individual's admission to the rehabilitation unit. This 21-item questionnaire, derived from the original 42-item DASS, consists of three subscales designed to measure the emotional states of depression, anxiety and stress. Each subscale contains 7 items scored on a 4-point scale that ranges from 0 ('Did not apply to me at all') to 3 ('Applied to me very much'). Subscale scores are summed and multiplied by two to allow comparison with normative values. The subscale scores can also be added to produce a composite measure of distress, with a score range from 0 to 126. The DASS-21 has been shown to be a sensitive indicator of mood in people with SCI (Mitchell, Burns, & Dorstyn, 2008).

Procedures

Written informed consent was sought to access FIM and DASS-21 scores prior to psychological intervention (Time 1) and to re-administer at two additional time intervals; at week 12 (Time 2) of an individual's rehabilitation program or upon discharge, if earlier (average Time 2 interval = 11.3 weeks, *SD* = 2.1), and at three months post-discharge (Time 3; DASS-21 only). The standard care group was tested at the same time intervals.

A clinical psychologist (first author) was responsible for study recruitment. Although a detection bias is added by having one investigator allocate participants and deliver the intervention, this was unavoidable as the study was based in a single clinical setting which only employed one psychologist. Importantly, this clinician was not involved in assessing outcomes, with the FIM determined by other professionals and the DASS-21 based on self-report, thereby minimising any potential bias.

Participants were drawn from consecutive admissions to the Spinal Injuries Unit. Study eligibility was determined during the patient's routine screen with the psychologist. This assessment, which involved clinical interview and baseline measurement (i.e. DASS-21), determined the treatment decision. Those who reported elevated levels of distress (i.e. DASS-21 scores in the moderate to severe range) were offered individual CBT. This sub-group was targeted for intervention as research suggests that individuals with clinically significant levels of distress are at risk of poor, long-term emotional outcomes and are a priority for psychological treatment (Craig, et al., 1997; Pollard & Kennedy, 2007). In comparison, patients who reported DASS-21 scores in the sub-clinical range, and who met the same inclusion criteria, were assigned to the standard care group. These participants were also screened to match the treatment group on age, sex and injury. Participants in the standard care group continued to be monitored by the unit's medical team and psychologist and could withdraw from the study if their psychological treatment needs increased. Individuals who declined study participation or were ineligible were still offered individual CBT during their rehabilitation.

Treatment

Therapy followed a cognitive behaviour model, which has shown efficacy in SCI groups (Craig, et al., 1997; Kennedy, et al., 2003). CBT was delivered by the unit's clinical psychologist (first author) and provided in addition to physical therapies. Session duration was affected by physical rehabilitation schedule conflicts. On average, treatment participants received 11 CBT sessions (*SD* = 4.50; range from 7 to 22 sessions) during their rehabilitation. This involved consults with the psychologist ranging between 30 to 60 minutes in duration. Sessions commenced on a weekly basis, graduating to fortnightly consults as progress was made in therapy. There was a positive relationship between length of rehabilitation stay and amount of psychotherapy received (*rho* = .44, *p* = 0.03), with longer admissions allowing more opportunity for intervention. Because of limited staffing, CBT was only offered to patients in the rehabilitation setting, with psychology services not readily available in the acute or community settings.

Although therapy did not follow a standardised protocol, key concepts were introduced for each participant based on available CBT programs developed for SCI (Craig, et al., 1997; Kennedy, et al., 2003). The following is a broad outline of the CBT program used in this study:

Pre-intervention (1 - 2 sessions)

1. Introduction to the role of the psychologist.
2. Clinical interview and baseline (DASS-21) assessment.

Intervention (7 to 18 sessions, depending on length of rehabilitation admission)

1. Education on the benefits of CBT.
2. Treatment goals developed – i.e. to manage and monitor symptoms of depression/anxiety, to improve coping skills.
3. Education about the emotional impact of SCI.
4. Review of progress in rehabilitation discussed at the beginning of each session – i.e. praise for achieved treatment goals (both psychological and physical goals), encouragement for goals to be achieved.

5. Psycho-education on SCI-specific coping skills: relaxation, problem-solving, behavioural activation, cognitive appraisal. Discussed problem-solving vs. emotional coping. Encouraged to practice techniques outside of sessions. Written handouts on different relaxation techniques (e.g. autonomic relaxation for SCI) provided.

Maintenance phase (1 - 2 sessions):

1. Focus on relapse prevention - i.e. re-education about proactive coping skills.
2. Referral to community-based psychologist, if required.
3. Post-intervention (DASS-21) assessment.

Additionally, peer counsellors were available to all participants to provide mentoring. Peers are thought to play a critical role in SCI rehabilitation, with peer involvement contributing to improved emotional outcomes including self-esteem and social support (Middleton & Craig, 2008). Psychiatric evaluation was also required for five treatment participants who reported severe distress. Low dose amitriptyline was prescribed to these participants, as well as five participants in the standard care group, for night-time sedation and to manage neuropathic pain.

Data analysis

Median and interquartile ranges (IQRs) were used to examine variability in group DASS-21 scores. Median, rather than mean, scores were reviewed because the data was not normally distributed. Given that the treatment and standard care groups had differing prognoses, with more severely distressed persons allocated to CBT, the two groups were evaluated separately. As the data did not meet the stringent requirements of the parametric techniques, the Friedman's Analysis of Variance and Wilcoxon matched-pairs signed ranks test were considered the most appropriate statistical methods to determine the effectiveness of CBT.

Significant within-group differences would have been difficult to achieve due to the small sample size, even with clinically meaningful improvements in mood due to treatment (Zakzanis, 2001). Therefore, treatment efficacy was also evaluated using Cohen's *d* effect sizes, based on Morris and DeShon's (2002) formula for studies with a repeated measures design. As a guideline, Cohen's *d* values of 0.2, 0.5 and 0.8 equate to small, medium and large group differences, respectively (Cohen, 1992). The direction of effect was standardised so that a positive effect indicated that CBT was beneficial to outcome and a negative effect indicated an undesirable outcome.

Statement of Ethics

All applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during the course of this research.

Results

Sample comparability

The final sample of 24 participants was found to be comparable to those who either declined to participate or who withdrew prior to study commencement ($n = 6$) in terms of gender (83% male vs. 67%, χ^2 (1) = 0.57, $p = 0.17$) and injury type (58% with paraplegia vs. 67%, χ^2 (1) = 1.00, *p* = 0.07). Although these groups did not differ significantly in age (*U* = 49.00, *z* = 1.19, *p* = 0.25, *d* = 0.66) the moderate effect size indicates that the final sample was older (on average, 13.6 years older).

The sample demographics were also compared to the Unit's admission statistics to determine whether these results were likely to be generalisable to the larger group of SCI patients. There were no significant group differences in age (*t* (80) = 0.16, *p* = 0.88, *d* = 0.04), gender (83% male vs. 67%, χ^2 (1) = 2.18, *p* = 0.14) or injury severity (58% with paraplegia vs. 57%, χ^2 (1) = 0.10, *p* = 0.92), suggesting that the study sample was representative of the broader group of patients admitted to the unit.

The study sample was almost exclusively male (83%; Table 1) and all participants were Caucasian. The largest percentage had completed high school (63%), followed by tertiary qualifications (25%). Most were employed (63%) and a higher percentage of individuals were single (58%) at the time of their injury. In terms of their SCI details (Table 1), the treatment and standard care groups did not differ significantly on injury type or lesion severity. Both traumatically acquired injuries (e.g. falls, motor vehicle accidents) and non-traumatic injuries (e.g. spinal abscess) occurred.

Functional rehabilitation outcomes

There were no significant differences between the treatment and standard care groups in terms of their length of acute hospital stay or rehabilitation admission (Table 1). Although there was a trend for those in the treatment group to have had longer acute admissions (by approximately 33 days), this difference was not significant. Functional rehabilitation outcomes were also similar for the groups (refer to Table 1), with no

Table 1. Demographic and injury details of participants

		Treatment	Standard Care	Analysis			
		n = 11	n = 13	χ^2	*df*	Cramer's V	*p*
Sex	Male	9	11	1.00	1	0.04	0.86
	Female	2	2				
Injury type	Paraplegia	6	8	1.00	1	0.07	0.73
	Tetraplegia	5	5				
Lesion completeness	Complete	8	11	0.36	1	0.24	0.24
	Incomplete	3	2				
Injury cause	Traumatic	7	8	1.00	1	0.02	0.92
	Non-traumatic	4	5				
				U	*z*	*d*	*p*
Age	*M (SD)*	53.2 (20.2)	44.5 (24.4)	53.50	-1.04	0.39	0.30
Length of acute stay (days)	*M (SD)*	68.0 (65.8)	34.6 (25.1)	31.00	-1.07	0.69	0.31
Length of rehabilitation stay (days)	*M (SD)*	146.9 (79.5)	128.3 (55.3)	67.50	-0.23	0.28	0.82
Admission FIM	*M (SD)*	56.5 (14.5)	60.6 (15.1)	54.50	-0.99	0.27	0.33
Discharge FIM	*M (SD)*	94.6 (26.8)	99.5 (25.6)	63.00	-0.49	0.19	0.65

significant differences in mean total FIM scores on admission or at discharge. Moreover, the associated effect sizes were small ($d_{\text{admission}} = 0.27$, $d_{\text{discharge}} = 0.19$). Total FIM scores did not correlate significantly with total DASS-21 scores at admission (*rho* = .04, *p* = 0.86), or discharge (*rho* = -.03, *p* = 0.89), suggesting that functional state and mood were not strongly related. The employment rate post-injury was low, with only two participants returning to work following their discharge home. This figure may have been a reflection of either the older age range of participants, with 33% (*n* = 8) having retired prior to their injury, or of their ongoing rehabilitation needs, with 54% (*n* = 13) continuing to receive outpatient physical therapy at final follow-up.

Depression, anxiety, and stress outcomes

Table 2 summarises the median scores on the DASS-21 for the sample at each of the three time points. As expected, the treatment group reported significantly higher subscale and total DASS-21 scores at each time point, and greater variability in these scores, as evident by the large IQRs. The results of the Friedman tests (Table 2) demonstrated significant differences in the depression scores for treatment participants across time but no differences in their DASS-21 total scores or associated anxiety and stress subscale scores. The DASS-21 scores for the standard care group did not change significantly over time (Table 2).

Post hoc analyses and examination of the Cohen's *d* values for the treatment group (Table 3) showed a small treatment effect for depression (*d* = .08), with median DASS-21 scores slightly increasing from baseline to week 12. This was followed by a significant increase in depressive symptomatology at 3 month follow-up (*d* = -.68).

Table 2. Median DASS-21 scores (and interquartile ranges) at each time point

	Time 1	Time 2	Time 3	Analysis		
Treatment (*n* = 11)				*Friedman*	*df*	*p*
Total DASS-21	30.0 (44.0)	22.0 (32.0)	40.0 (37.0)	2.18	2	0.34
Depression	6.0 (16.0)	8.0 (20.0)	10.0 (20.0)	6.41	2	0.04*
Anxiety	8.0 (14.0)	8.0 (10.0)	12.0 (11.0)	0.81	2	0.67
Stress	12.0 (12.0)	10.0 (12.0)	12.0 (11.0)	0.27	2	0.88
Standard Care (*n* = 13)						
Total DASS-21	10.0 (12.0)	8.0 (9.0)	8.0 (16.0)	2.65	2	0.27
Depression	4.0 (7.0)	2.0 (5.0)	3.0 (7.0)	0.93	2	0.63
Anxiety	2.0 (7.0)	2.0 (5.0)	2.0 (5.0)	1.00	2	0.61
Stress	4.0 (4.0)	0.0 (5.0)	0.0 (7.0)	4.57	2	0.10

* $p < 0.05$ significant within-group difference, 2 tailed test

Table 3. Pair-wise comparisons of DASS-21 scores for the treatment group between each time point

	Time Point	Mean difference	*SD*	95% CI		Analysis			
				lower	upper	*Wilcoxon*	*p*	*d*	Power
Total DASS-21	1-2	8.55	22.49	- 6.56	23.65	- 1.23	0.22	0.38	0.35
	2-3	- 10.89	15.10	- 22.50	0.72	- 1.82	0.06	- 0.51	0.45
Depression	1-2	0.73	9.00	- 5.32	6.77	- 0.26	0.80	0.08	0.08
	2-3	- 4.44	4.45	- 7.86	- 1.03	- 2.38	0.02*	- 0.68	0.65
Anxiety	1-2	3.64	7.31	- 1.28	8.55	- 1.43	0.15	0.50	0.50
	2-3	- 3.11	5.01	- 6.96	0.74	- 1.69	0.10	- 0.37	0.30
Stress	1-2	4.18	8.69	- 1.66	10.02	- 1.43	0.15	0.48	0.44
	2-3	- 3.33	7.62	- 9.19	2.52	- 1.02	0.31	- 0.40	0.29

Power = power calculations using PASS, version 08.0.9, www.ncss.com

* $p < 0.05$ significant difference, 2 tailed test

Similarly, total DASS-21 scores and subscale scores for anxiety and stress declined from baseline to week 12 and were associated with moderate, positive effect sizes (total DASS-21 *d*: 0.38, anxiety *d*: 0.50; stress *d*: 0.48; Table 3). At 3 month follow-up, treatment participants reported an increase, albeit non-significant, in levels of anxiety and stress.

The clinical impact of these findings is highlighted by additionally examining individual 'caseness' on the DASS-21. Of the six treatment participants who reported clinical anxiety at baseline, two reported a reduction in symptom severity (i.e. from extremely severe to the moderate or mild range) and two reported a complete resolution of symptoms. Similarly, all three treatment participants who initially reported moderate to severe stress symptoms subsequently reported only mild levels of stress at week 12. In terms of depressive symptomatology, two of four treatment participants reported symptom improvement at week 12. Furthermore, this clinical change was significant (χ^2 (1) = 6.67, $p = 0.05$). The 3 month follow-up data is particularly revealing. Post-discharge, when there was no access to continued psychological support, 78% ($n = 7$) of the treatment participants met the criteria for caseness on one or more DASS-21 subscales compared to 10% ($n = 1$) of the standard care group. Chi-square analysis showed that this percentage change was significant (χ^2 (1) = 8.93, $p = 0.01$).

Discussion

This small-scale study examined the impact of individual CBT in an inpatient SCI rehabilitation setting when compared to less intensive psychological support. Not surprisingly, there was large within-group variability in the levels of psychological distress reported by treatment participants. The study results also highlight the variable impact of CBT on a sub-group of individuals reporting severe symptoms of depression, anxiety and stress at baseline.

Depression scores improved with CBT, then significantly declined post-intervention, in the treatment group. There were associated improvements in DASS-21 caseness for this group. In comparison, there was no significant time effect on the DASS-21 for participants receiving standard care. To an extent, these results mirror previous research on the effectiveness of CBT following SCI. The finding that distress levels of treatment participants were severe at the commencement of rehabilitation reinforces the need for psychological intervention in the acute stages of SCI management (Craig, et al., 2009). With self-reported distress levels increasing post-discharge, the continued mental health needs of this patient group are also evident (Craig, et al., 2009; Migliorini, et al., 2008).

These results need to be interpreted in light of the methodological difficulties. Power analyses (Table 3) indicate that the study was underpowered. As such, small treatment effects, which were more achievable, would have been difficult to detect (Cohen, 1992; Kraemer, 1991). Replication of the study with a larger sample is therefore essential.

The timing of assessments may have also affected the results. Some treatment participants had 21 weeks of rehabilitation and had not, therefore, completed their inpatient CBT program at the week 12 assessment. Higher treatment gains may have been observed if outcome was assessed immediately post-intervention.

Another limitation relates to sample selection. Participants in the minimal-intervention group reported different levels of psychological distress at baseline, reducing the equivalence of the two groups. Although the sample was highly selected, building the patient triage process into the CBT package acknowledged the practical aspects of delivering a service in a clinical setting with limited staff resources (Schutz, Rivers, & Ratusnik, 2008; Schwartz, Trask, Shanmugham, & Townsend, 2004).

This preliminary study highlights the difficulties encountered in clinical trials, in terms of methodology and availability of participants. The CBT was dependent on limited staff resources, which limited its frequency and duration. This may not have been the optimal treatment for the severity of problems reported. Although the efficacy of CBT was reinforced by accessing peer role models and liaison psychiatry, improvements to the service strategy could include a stepped-care service model (O'Donnell, Bryant, Creamer, & Carty, 2008), with psychological intervention commencing in the acute setting and including access to specialised outpatient services to prevent psychological relapse.

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Chapter 5: Study 3

Psychosocial outcomes of telephone-based counselling for adults with an acquired physical disability: A meta-analysis.

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> Dorstyn, D.S., Mathias, J.L., & Denson, L.A. (2011b). Psychosocial outcomes of telephone-based counselling for adults with an acquired physical disability: A meta-analysis. *Rehabilitation Psychology, 56*, 1-14. doi: 10.1037/a0022249.

Preface

In combination, the two studies presented in Chapters 3 and 4 highlight the critical role of psychological interventions in maximising emotional adjustment to SCI. They also suggest that continued counselling support in the community is needed to maintain the improvements achieved during rehabilitation, and reduce long-term psychological morbidity. However, the application of these services, while desirable, is often difficult to implement within the current context where staff resources are very limited.

One possible solution to this is telephone-based counselling, or telecounselling, which involves the delivery of psychological-based treatments to individuals or groups via the telephone. Telecounselling therefore has the potential to provide a cost-effective means by which to reduce the socioeconomic burden placed on the Australian public health care system by individuals with SCI who have co-morbid mental health disorders (Middleton, et al., 2004). However, there is a need to critically evaluate the efficacy of telecounselling before this treatment is used in mainstream health services in Australia. To address this, a meta-analysis of the available research on telecounselling services for people with an acquired physical disability was conducted (Dorstyn, Mathias & Denson, 2011b). Different diagnostic groups - specifically, adults with SCI, stroke, limb amputation, severe burn injury or multiple sclerosis - were included in the meta-analysis because of the limited research in this area. Importantly, these diagnostic groups are all acquired conditions which are considered to be associated with significant 'disease burden' due to their chronic and disabling effects (World Health Organisation, 2008).

Psychosocial outcomes of telephone-based counselling for adults with an acquired physical disability: A meta-analysis.

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Abstract

Background: The delivery of mental health services by telephone, referred to as telecounselling, has the potential to improve the health outcomes of adults with an acquired physical disability in a cost-effective way. However, the efficacy of this form of treatment requires further evaluation before it is used on a larger scale. Aim: This meta-analysis provides a critical and quantitative evaluation of the impact of telephone-administered psychological interventions on the psychosocial functioning of adults with an acquired physical disability caused by spinal cord injury, limb amputation, severe burn injury, stroke or multiple sclerosis. Method: A comprehensive search of eight electronic databases identified eight studies (*N* = 658 participants) that compared treatment efficacy to that of matched control groups. Differences in the psychosocial outcomes of treatment and control participants were examined using Cohen's *d* effect sizes. Fail-safe *N*s and 95% confidence intervals were used to evaluate the significance of these results. Results: Significant improvements in coping skills and strategies (overall $d = 0.57$), community integration (overall $d = 0.45$) and depression (overall $d = 0.44$) were observed immediately after telecounselling, with modest improvements in quality of life maintained at 12 months post-intervention (overall $d = 0.37$). Conclusions: The results suggest that telecounselling is an effective treatment modality for adults adjusting to a physical disability, however further trials are needed to establish the long-term psychosocial benefits.

Keywords: telephone, treatment outcome, meta-analysis, spinal cord injuries, multiple sclerosis

Psychological needs associated with acquired physical disability

Adults who acquire a permanent physical disability following trauma (e.g., spinal cord injury, SCI; severe burn injury; limb amputation) or disease (e.g., stroke; multiple sclerosis, MS) may experience a range of long-standing psychosocial problems. The immediate stress caused by a traumatic injury, or diagnosis of a life-threatening illness, can trigger symptoms of depression and anxiety (for reviews see Craig & Middleton, 2009; deRoon-Cassini, Mancini, Rusch & Bonnano, 2010; Park, Choi, Jang, & Oh, 2008; Thombs et al., 2007), whilst ongoing stressors related to changed social roles and relationships can impact adversely on quality of life (Saadat et al., 2010; Sousa, Corredeira & Pereira, 2009; Zidarov, Swaine & Gauthier-Gagnon, 2009). Medical variables, including neuropathic pain secondary complications to injury (e.g., urinary tract infection, skin ulcers), prolonged medical treatment and rehabilitation, and degree of functional impairment also contribute to these psychosocial problems (Nicholson Perry, Nicholas & Middleton 2010; Ullrich, Askay & Patterson, 2009). Additionally, if the course of the disease or recovery from an injury is unstable, the adjustment process is prolonged (Livneh & Antonak, 2005; Ptacek & Pierce, 2003). As such, adjustment to an acquired physical disability is psychologically distinct from adjustment to a congenital disability, which is more affected by childhood social experiences (Huebner & Thomas, 1995; Hwang, Johnston, & Smith, 2009; Shindi, 1983).

It is now generally recognised that outreach psychological services can reduce the likelihood and impact of these psychosocial problems. For example, programs with a psycho-educational component have contributed to improved self-care routines among amputees (Wegener, Mackenzie, Ephraim, Ehde, & Williams, 2009), in addition to positive changes in self-efficacy (Vail & Xenakis, 2007), symptoms of depression (Kemp, Kahan, Krause, Adkins & Nava, 2004), and pain management (Nicholson Perry, Nicholas & Middleton, 2010) following SCI. However, such services are currently very limited, leaving a large unmet need (Blakeney, Rosenberg, Rosenberg, & Faber, 2008; Bloemen-Vrencken, de Witte & Post, 2005; Cox, Amsters & Pershouse, 2001; Craig & Tan, 2008; Kennedy et al., 2010; Richard et al., 2008). Moreover, consumer dissatisfaction with the available mental health services has been documented (Darnall et al., 2005; Suddick & O'Neill, 2009), suggesting a demand for additional services. However, there are a number of barriers that need to be addressed if these services are to be delivered effectively; including workforce shortages, which reduce the staff available to provide specialist follow-up (Australian Psychological Society, 2005), and the high costs associated with community-based care (Booth & Kendall, 2007; Cox et al., 2001, Horn, Yoels & Bartolocci, 2000).

Advantages and disadvantages of telecounselling

Within this context, telephone-based counselling, also referred to as telecounselling, has emerged as a promising medium for the provision of continued health services for individuals who are no longer in-patients and who have limited mobility and/or problems accessing transportation (Brennon, Mawson & Brownsell, 2009; Kairy, Lehoux, Vincent & Visintin, 2009; Liss, Glueckauf & Eclund-Johnson, 2002). The main advantages of telecounselling include increased access to specialised care (Bloemen-Vrencken et al., 2005), its time efficiency and cost-effectiveness (Bendixen, Levy, Olive, Kobb & Mann, 2009). Consumer satisfaction with this medium has also been consistently good when it has been evaluated in telecounselling trials (Hersh et al., 2001; Kairy et al., 2009; Linassi & Pi Shan, 2005; Liss et al., 2002; Lutz, Chumbler, Lyles, Hoffman, & Kobb, 2009).

Also important are comparisons between the treatment effects associated with telecounselling and those associated with face-to-face therapy. Although limited, the available research suggests that rates of participation in telecounselling trials compare favourably to clinical trials involving face-to-face therapies (Wierzbicki & Pekarik, 1993). Moreover, one of the few studies comparing the benefits of these two treatment modalities found no significant group differences in self-efficacy between participants with MS who received coping skills training and a control group that received telephone-based peer support (Schwartz, 1999). Although further large-scale research comparing both treatment modalities for persons with a physical disability is needed to confirm the clinical efficacy of telecounselling, these early findings are promising.

Nevertheless, telecounselling has a number of potentially negative features. These include issues related to quality control, particularly in relation to the need to establish clear standards for the provision of telephone-based care (Miller, 2007; Mozer, Franklin & Rose, 2008). There may also be problems in establishing therapeutic rapport as, unlike traditional face-to-face therapy where it is possible to monitor non-verbal behaviour, all communication is vocal (Coman, Burrows, & Evans, 2001). Furthermore, a client’s readiness to use this medium needs to be considered, as some individuals may not be comfortable communicating with a therapist primarily by telephone (Fann et al., 2009; Krousel-Wood et al., 2001; Shore, Savin, Novins & Manson, 2006).

Evaluations of telecounselling

Although existing trials of group-based telecounselling for individuals with an acquired physical disability have yielded positive results (Evans, Fox, Pritzl & Halar, 1994; Evans, Smith, Wekhoven, Fox & Pritzl, 1986; Jalovcic & Pentland, 2009), much of the data from these studies is qualitative. In addition, estimates of the immediate treatment gains associated with telecounselling services differ substantially. For example, Phillips, Vesmarovich, Hauber, Wiggers and Egner (2001) reported significant improvements in quality of life following a psycho-educational program for individuals with a newly acquired SCI. However, Egner, Phillips, Vora and Wiggers (2003) failed to replicate this benefit in a cohort with advanced MS. Similarly, Mohr, Burke, Beckner and Merluzzi (2005) reported improvements in quality of life outcomes with a skills-based peer-support program for participants with MS but these benefits were not evident in composite measures of physical health and mental well-being.

The maintenance of treatment gains that result from telephone counselling also requires further evaluation because the available findings are inconsistent. Lucke, Lucke and Martinez (2004), for example, reported significant positive changes in social functioning at 6-month follow-up for individuals who accessed a nursing and peer-based cognitive behavioural program following their inpatient SCI rehabilitation. In contrast, Phillips et al., (2001) observed a smaller reduction in depressive symptoms in participants with SCI who had accessed telecounselling, compared to those who had received standard care.

Differences in treatment benefits may, in part, be explained by differences in research methodologies, including variations in participant characteristics (e.g., time since injury), treatment characteristics (e.g., group versus individual therapy), and in the outcomes that were measured (Kairy et al., 2009). Systematic reviews of the literature (Bloemen-Vrencken et al, 2005; Liss et al., 2002) suggest that discontinuity in service provision may also be a contributing factor, with most telecounselling programs having a short-term focus, which may not meet the needs of those individuals with chronic physical disability who require ongoing mental health services (Migliorini, Tonge & Taleporos, 2008).

Thus, while there is some preliminary evidence to support the use of telephone-administered counselling services that are designed to improve clinical outcomes following a physical disability, the specific findings and quality of this research needs closer examination. The current study was therefore designed to quantitatively evaluate the available evidence for the efficacy of psychological interventions delivered by telephone on both the short- and long-term emotional outcomes of individuals with SCI, amputation, severe burn injury, stroke, or MS. A broad range of acquired physical disabilities, with a focus on conditions associated with significant disease burden (Australian Government Bureau of Statistics, 2003; World Health Organisation, 2008, 2002), was examined because the available telecounselling outcome research in this population is extremely limited.

Method

Literature search

Eligible studies were sourced from a comprehensive search of eight electronic databases that are relevant to rehabilitation psychology (PubMed, PsycINFO, CINAHL, Cochrane Library, Australian Medical Index, Informit Health Collection, Rural and Remote Health and Scopus), using the terms listed in Table 1. The initial searches of the electronic databases were deliberately kept broad in order to increase the chances of capturing all relevant studies. Additional studies were identified from a manual search of the reference lists of all retrieved studies and an electronic search of two peer-reviewed telemedicine journals; the *Journal of Telemedicine and e-Health* (formerly known as *Telemedicine Journal*), and the *Journal of Telemedicine and Telecare*. Requests for published data were also made through list-serves for the American Psychological Association's Division 22 (Rehabilitation Psychology) and the Australian Psychological Society's Rehabilitation Psychology Interest Group.

Inclusion and exclusion criteria

For a study to be included in the current meta-analysis, it had to: (a) be published in English between January 1970 and October 2010 (note: quantitative studies of telephone counselling services can be dated from 1970; Hornblow 1986); (b) directly target an adult sample (aged 18 years and older); (c) directly target individuals with an acquired physical disability (SCI, amputation, severe burn injury, stroke, MS); (d) contain telephone counselling as a therapeutic component, with the purpose being to facilitate psychosocial recovery following diagnosis (Mozer, Franklin & Rose, 2008); include (e) at least four sessions by telephone (as per the criteria developed by Mohr, Vella, Hart, Heckman, & Simon, 2008); in addition to (f) a treatment and a control group. An acceptable outcome measure also had to be used, with the requirements that studies: (g) used standardised psychological measures (e.g., of depression, quality of life); and (h) provided pre- and post-treatment data so as to allow the calculation of Cohen's *d* effect sizes. This included data that was provided in response to a request, from the current authors, for missing data (e.g., Means and *SD*s, results of *F* tests from a one-way ANOVA; Wolf, 1986).

Studies were excluded if: (a) they involved trials of people with a chronic medical condition (e.g., hypertension, severe psychiatric illness) or cognitive difficulties (e.g., traumatic brain injury) but not a physical disability per se; (b) the telephone-based intervention did not have a psychological focus (e.g., entailed physical therapies, medical assessments); or (c) the intervention had a counselling component but was not delivered via the telephone (e.g., interactive website).

Data collection and preparation

The following information was extracted from each study: (a) sample demographics (e.g., sample size, age, gender; diagnosis); (b) methodological variables (e.g., study design, method of recruitment); and (c) treatment characteristics (e.g., behavioural outcomes, whether treatment involved individual- or group-based therapy, number and frequency of sessions, attrition rate and control conditions). Outcome data (e.g., participants' pre- and post-treatment scores on the measures of psychosocial functioning) were also extracted from each study and classified into the following broad domains: coping, disability impairment, community integration, depression, health care, fatigue, quality of life, and social support, in order to facilitate data presentation and interpretation. Data extraction was conducted by the first author (D.D.).

Table 1. Keywords and boolean (logical) operators used in the database searches

	AND ⇨	AND ⇨	NOT ⇩
OR	traumatic injury/s	teletherapy	child*
⇩	physical injury/s	telemedicine/tele-medicine	adolesce*
	physical disability/s	telehealth	
	spinal cord injury/s	e-therapy	
	spinal injury	teleconferenc*	
	paraplegia	telerehabilitation	
	quadriplegia	teleconsultation	
	tetraplegia	teleassistance	
	burn/s	telemedical	
	amputee/s	telephone	
	amputation/s	telecommunication/s	
	stroke	counselling/counselling	
	multiple sclerosis		

* Search includes stated terms and derivatives, e.g. adolesce* matches adolescence, adolescent, adolescents. Both plural and singular terms searched.

Statistical analyses

The baseline demographic characteristics of the telecounselling and control groups were compared using the Mann Whitney *U* test and chi-square test in order to ensure that they were matched. Cohen's *d* statistic was used to examine both the immediate treatment effects (i.e., from pre- to post-treatment) and the maintenance of treatment gains from telecounselling (i.e., immediate post-treatment to follow-up) for the treatment and control groups. As a general guide for the social sciences, Cohen's *d* values of 0.2, 0.5 and 0.8 equate to small, medium and large treatment effects, respectively (Cohen, 1992).

All effect sizes were calculated in a multi-stage process. The first stage involved calculating an effect size for each outcome measure (Zakzanis, 1999) using the raw score formula for use with studies that adopted a repeated measures (pre-post) independent groups (treatment and control) design (Morris & DeShon, 2002):

$$d = \frac{M_{\text{post E}} - M_{\text{pre E}}}{SD_{\text{pre E}}} - \frac{M_{\text{post C}} - M_{\text{pre C}}}{SD_{\text{pre C}}}$$

Where M = mean, post = post-treatment; pre = pre-treatment, E = experimental group; C = control group; SD = standard deviation. Effect size calculations were based on data for treatment completers.

The effect sizes for the different outcome measures were then pooled to calculate treatment effects for each of the eight psychosocial domains: coping, disability impairment, community integration, depression, health care, fatigue, quality of life, and social support. When a study reported more than one outcome measure for a domain, effect sizes were first calculated for each individual measure and then averaged to provide a single, pooled effect size for that study. The effect sizes for all studies in each domain were then averaged, with each effect size being weighted (d_w) by the study's sample size because N is known to impact on the reliability of an effect size (Lipsey & Wilson, 2001, note: weighting only applied when effect sizes were calculated using data from two or more studies). Finally, the direction of each effect size was standardised across measures so that a positive Cohen's d value indicated that telecounselling was beneficial to outcome, whereas a negative d reflected greater improvement by control participants who did not receive telecounselling. Ninety-five per cent confidence intervals (95% CI) were additionally calculated to evaluate the statistical significance of each effect size (Lipsey & Wilson, 2001), as follows:

$$d \text{ L/U} = d + 1.96 \text{ x } (SE\, d)$$

Where d L/U = lower/upper 95% CI limit of mean effect size, d = mean effect size, 1.96 = critical value for the z-distribution for $\alpha = 0.05$, and $SE\, d$ = standard error of the mean effect size. A treatment effect is considered statistically significant if the 95% CI does not include the value of zero.

One criticism levelled at meta-analytic procedures is that they are reliant on published data and, consequently, may overestimate treatment effects because they fail to include non-significant findings due to a bias toward publishing studies with significant findings (referred to as the ‘file drawer problem’). Fail-safe *N* (*N*fs) statistics, which estimate how many unpublished studies with non-significant results would need to exist in order to nullify the current finding (i.e., reduce an effect size to < 0.4; a small effect), were calculated to address this problem. The larger the *N*fs, the more confident we are that these unpublished studies are unlikely to exist. The *N*fs statistic was calculated using the formula given below, which provides a more conservative estimate than other formulas in which *N* refers to the total number of studies that are being meta-analysed (Lipsey & Wilson, 2001). For the purpose of this study, an *N*fs was considered adequate if it exceeded the number of published studies per psychosocial domain (i.e. *N*fs > *N* studies).

$$N\text{fs} = N \times \left(\frac{d_w}{d_c} - 1 \right)$$

Where N = number of studies that assessed a psychosocial domain, d_w = weighted mean effect size, and d_c = criterion effect size level. A criterion of 0.40, which equates to a small treatment effect, was used for d_c (Orwin, 1983).

The conclusions drawn from this meta-analysis are based on the combined interpretation of these statistics. Any change in outcome from baseline to post-intervention, and any treatment gains maintained at follow-up, were considered clinically important if it met the following criteria: (a) equated to a modest treatment effect (i.e. $d > 0.40$); (b) had a 95% CI that did not include zero (i.e., the treatment effect was statistically significant); and (c) the Nfs score was sufficient to suggest that the findings were unlikely to be compromised by the file drawer problem.

Results

Fourteen of the initial 3,642 studies identified from the electronic and literature searches met all of the inclusion criteria (see Figure 1). However, six studies from one research group (Beckner, Vella, Howard, & Mohr, 2007; Beckner, Howard, Vella, & Mohr, 2010; Burns, Siddique, Fokuo & Mohr, 2010; Hart, Vella, & Mohr, 2008; Mohr, Hart et al., 2005; Mohr et al., 2007) and two from another (Stuifbergen, Becker, Blozis, Timmerman & Kullberg, 2003; Stuifbergen, Becker, Timmerman & Kullberg, 2003) used overlapping samples with MS; consequently these were combined and treated as two studies in order to ensure that the data were independent (Lipsey & Wilson, 2001). Thus, in total, the data from eight independent studies, which treated 658 participants using eight telephone-based counselling programs, were analysed (Figure 1).

Participant characteristics

Statistically, the treatment and control groups were well-matched in terms of sample size, age and gender (see Table 3). Injury-specific details were, however, limited with only five studies providing this information (Bombardier et al., 2008; Evans et al, 1985; Mohr et al., 2000, 2005; Stuifbergen, Becker, Blozis et al., 2003). The participants in these studies had long-term disabilities (*M* = 8.7 years; *SD* = 2.9; range 6.1 to 13 years) and were generally not working (74%). Additionally, most participants were identified as Caucasian (65%), with a small percentage of African-Americans (7.1%) and Hispanics (2.3%). However, this data was limited, with six studies reporting incomplete details regarding racial composition.

Summary methodological and treatment information for each of these studies is provided in Table 2. Five of the telecounselling programs were tailored to the needs of individuals with relapsing-remitting or advanced MS, two for those with SCI, and one involved a heterogeneous group, including individuals with a diagnosis of SCI, central nervous system disease (e.g., MS), or stroke (see Table 2). The search did not identify any telecounselling studies for individuals with a severe burn injury or limb amputation.

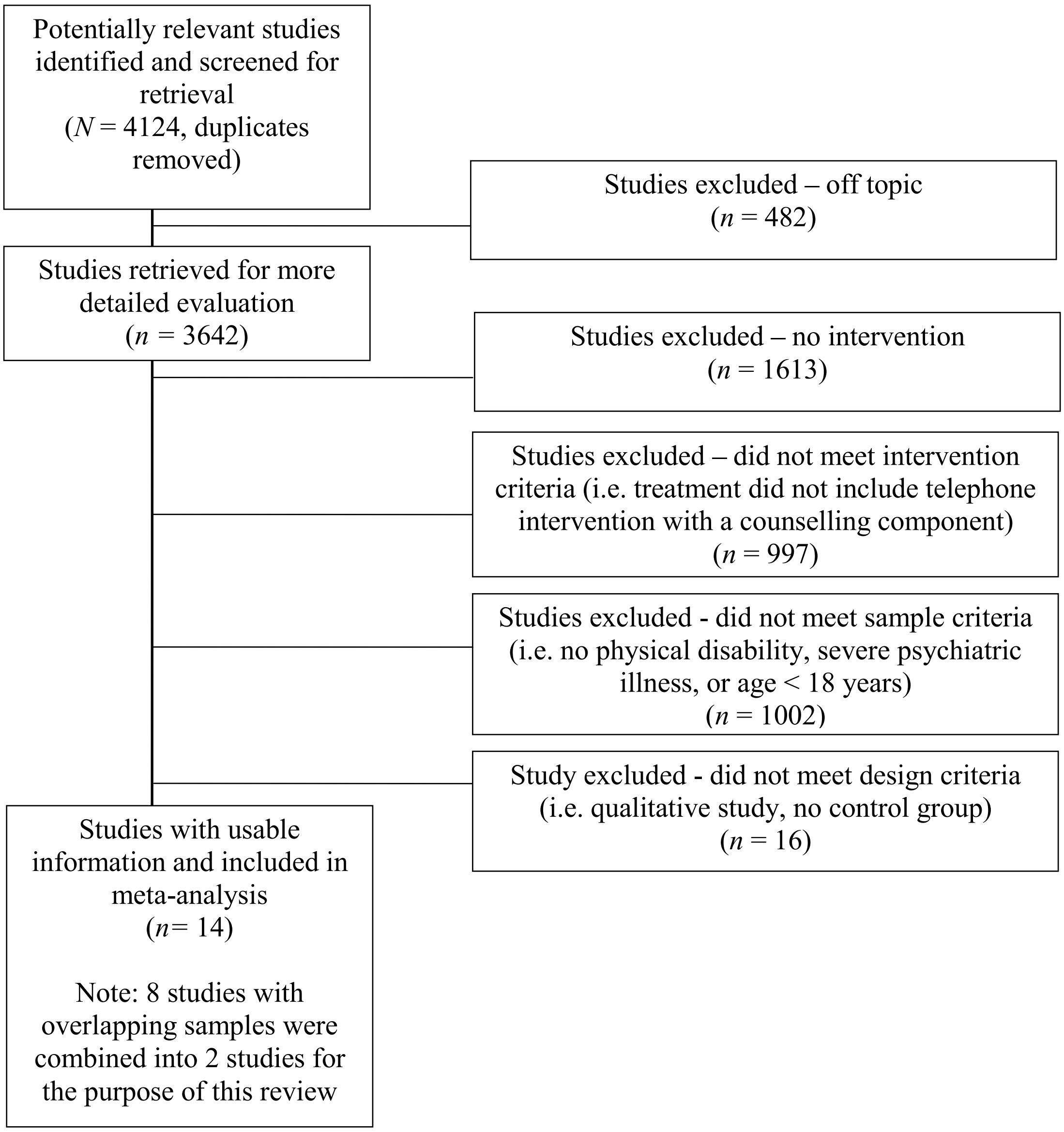

Figure 1: Flow chart of study selection

Treatment characteristics

On average, eight telecounselling sessions were provided (*SD* = 3.4) over a 12-week period (*SD* = 5.5; Table 2). Individual sessions varied from 30 to 90 minutes duration (*M* = 44 minutes, *SD* = 13.3), equating to an average of 7 hours (*SD* = 3.7) total contact time between therapist and participant for each telecounselling program. The programs involved individual sessions held weekly ($N_{\text{studies}} = 3$) or fortnightly ($N_{\text{studies}} = 1$), or commenced with weekly sessions that gradually reduced to monthly consults ($N_{\text{studies}} = 4$). Therapy frequency and duration was generally tailored to participants' needs. For example, Bombardier et al., (2008) examined a modest intervention to monitor individuals' progress in achieving specific health-related goals, with an average of 2 hours total contact time. In comparison, Mohr, Hart et al. (2005) and Mohr et al. (2007) examined a more intensive program, equating to a total of 13 hours contact time for a sample diagnosed with MS and co-morbid depression. The mean attrition rate was 19.7 % (*SD* = 19.0), with client-related variables (e.g. medical co-morbidities, difficulties in scheduling sessions) cited as the key reasons for study decliners or withdrawals.

Additionally, the study by Mohr et al. (2000), provided information on a supplemental medical treatment for participants with MS; interferon beta-1a. The authors report that adherence to this disease-modifying medication was significantly improved with telecounselling. None of the other studies provided information on possible co-interventions, such as participants' psychopharmacological needs.

Methodological characteristics

Although telecounselling is a relatively new type of treatment, with very few large

Table 2. Descriptive characteristics of included studies

Lead author	Sample			Method							Treatment			
	N		Group	Design	Recruitment	Treatment outcomes	Clinician	Therapy format	Measures	Therapy model	No. sessions	No. weeks	Attrition (%)	Control
	T	C												
Phillips et al., (2001)	36	39	SCI	Randomised	Acute rehabilitation	Reduce incidence of secondary conditions	Nurse	Individual	QWB CES-D	Psycho-education & SC	9	9	Not reported	UC
Evans et al., (1985)	19	19	SCI stroke MS	Randomised	Acute rehabilitation	Improve mood/social activity	Social Worker	Group	PARS	Psycho-education & SC	8	8	58.2%	No treatment
Schulz et al., (2009)	57	60	SCI	Randomised	Community	Improve health behaviours	Psychologist	Group & individual	CES-D Self-care Health SI, SS	CBT & SC	7	24	12.3%	I
Mohr et al., (2000)	16	16	MS	Randomised	Primary care	Treatment of depression	Psychologist	Individual	POMS -D	CBT	8	8	28.0%	UC
Egner et al., (2003)	11	7	MS	Randomised	Primary care	Reduce incidence of secondary conditions	Nurse	Individual	QWB CES-D FSS	Psycho-education & SC	9	9	0.0%	UC
Bombardier et al., (2008)	70	60	MS	Randomised	Primary care & community	Improve health behaviours	Psychologist	Individual	HPLP II SF-36 MFIS CHART	MI	6	12	8.6%	W
Stuifbergen, Becker, Blozis et al., (2003) Stuifbergen, Becker, Timmerman et al., (2003)	76	66	MS	Randomised	Community	Improve health behaviours	Nurse	Group & Individual	SRAHP PRQ-85 SF-36 HPLP-II	Psycho-education & SC	6	12	20.5%	I

Table 2. Descriptive characteristics of included studies (continued)

Lead author	Sample			Method						Treatment				
	N		Group	Design	Recruitment	Treatment outcomes	Clinician	Therapy format	Measures	Therapy model	No. sessions	No. weeks	Attrition (%)	Control
	T	C												
Beckner et al., (2007, 2010); Burns et al., (2010); Hart et al. (2008); Mohr, Hart et al., (2005), Mohr et al., (2007)	62	65	MS	Randomised	Primary care & community	Treatment of depression	Psychologist	Individual	LOT-R Stress related growth scale BDI-II PANAS -PA HDRS GNDS	CBT	16	16	5.5%	SC

N = number of participants; T = treatment (telecounselling) participants; C = control participants, Group = sample group's primary diagnosis, UC = usual care; I = information only; W = wait-list control, SC = supportive counselling. SCI = Spinal Cord Injury, MS = Multiple Sclerosis. Measure abbreviations: QWB, Quality of Well-Being Scale (Kaplan, Bush, & Berry, 1976); CES-D, Centre for Epidemiologic Studies Depression Scale (Radloff, 1977); PARS, Personal Adjustment and Role Skills (Ellsworth et al.., 1968); Self-care problems (Burton, Schulz, Jackson, Hirsch, & Zdaniuk, 2000); Health, Health symptoms (Belle et al., 2006); SI, Social integration (Belle et al., 2006); SS, Social support (Belle et al., 2006); POMS, Profile of Mood States Depression-Dejection subscale (McNair, Lorr, & Droppleman, 1981); LOT-R, Life Orientation Test -Revised (Scheier, Carver & Bridges, 1994); Stress related growth scale (Armeli, Gunthert & Cohen, 2001); (BDI-II, Beck Depression Inventory II (Beck, Steer, & Brown, 1996); PANAS-PA, Positive and Negative Affect Scale – Positive Affect Scale (Watson , 1988); HDRS, Hamilton Depression Rating Scale (Hamilton , 1960); GNDS Guys Neurological Disability Score (Sharrack & Hughes, 1999), FSS, The Fatigue Severity Scale (Krupp, LaRocca, Muir-Nash, & Steinberg, 1989); HPLP II, Health Promotion Lifestyle Profile II (Walker, Sechrist, & Pender , 1995); SF-36, Medical Outcomes Study Short-Form Health Survey (Ware, 1993); MFIS, Modified Fatigue Impact Scale (Fisk, Ritvo, Ross, Haase, Murray & Schlech , 1994); CHART, Craig Handicap Assessment and Reporting Technique (Whiteneck, Charlifue, Gerhart, Overholser & Richardson ,1992); SRAHP, Self Rated Abilities for Health Practices (Becker, Stuifbergen, Oh, & Hall (1993), Self-care problems (Burton, Schulz, Jackson, Hirsch, & Zdaniuk, 2000); PRQ-85, Personal Resource Questionnaire (Weinert & Brandt, 1987); Barriers, Barriers to Health Promoting Activities for Disabled Persons Scale (Becker, Stuifbergen & Sands, 1991). Therapy abbreviations: CBT, cognitive behaviour therapy; MI, motivational interviewing.

Table 3. Sample description and comparability of groups (N = 8 studies)

		Telecounselling				Control				Statistical analyses			
		$N_{\text{participants}}$	M	SD	Range	$N_{\text{participants}}$	M	SD	Range	U	z	p	d
Sample size		332	41.5	23.8	11 - 70	326	40.8	23.7	7 - 65	31.5	-0.05	0.96	0.03
Age (years)		332	47.6	6.1	37 – 55	326	46.4	7.5	33 – 55	20.5	-0.51	0.61	0.17
										χ^2	df	p	
Gender	Female (%)	203 (61.0)				213 (65.3)				0.24	1	0.62	
	Male (%)	129 (39.0)				113 (34.7)				1.06	1	0.30	
Diagnosis	MS (%)	226 (68.1)				212 (65.1)							
	SCI (%)	97 (29.2)				107 (32.8)							
	Stroke (%)	4 (1.2)				5 (1.5)							
	Other/not specified (%)	5 (1.5)				2 (0.6)							

$N_{\text{participants}}$ = number of participants per category (percentage of participants, per category, in brackets) scale clinical trials having been undertaken with disability groups (Glueckauf et al., 2002), the methodological quality of the studies examined here was relatively good. All studies randomly assigned participants to the treatment and control groups, with the majority also: providing data relating to dropouts and withdrawals ($N_{\text{studies}} = 7$); using standardised treatments based on a written protocol ($N_{\text{studies}} = 5$); and utilising independent assessors who were blinded to group assignment when administering the self-report measures to participants ($N_{\text{studies}} = 3$). Additionally, all studies employed self-report questionnaires to evaluate treatment-efficacy. Two studies (Evans et al., 1985; Mohr, Hart et al., 2005) also incorporated assessments completed by a significant other (e.g., family or friend) or a clinician-based interview.

Short-term efficacy of telecounselling

A total of 22 different measures were used were used by the eight studies to assess eight broad psychosocial domains: coping ($N_{\text{measures}} = 2$), disability impairment ($N_{\text{measures}} = 1$), community integration ($N_{\text{measures}} = 3$), depression ($N_{\text{measures}} = 5$), fatigue ($N_{\text{measures}} = 2$), health care ($N_{\text{measures}} = 5$), quality of life ($N_{\text{measures}} = 2$), and social support ($N_{\text{measures}} = 2$). The weighted effect sizes (d_{w}) for measures evaluating immediate post-treatment effects are provided in Table 4; grouped by domain and rank ordered by size. Notably, measures that have shown good reliability and validity among medical populations were generally employed (Alexander et al., 2009; Kalpakjian, Bombardier, Schomer, Brown & Johnson, 2009). This included the Craig Handicap Assessment and Reporting Technique (CHART; Whiteneck, Charlifue, Gerhart, Overholser & Richardson, 1992); Centre for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977); and Short-Form Health

Survey (SF-36; Ware, 1993).

One study examined the impact of telecounselling on specific *coping skills and strategies,* including optimism and benefit-finding (overall $d = 0.57$). This study showed strong and statistically significant treatment effects, with telecounselling contributing to positive cognitions and attitudes for individuals with MS. In contrast, a single measure of *disability* produced moderate and significant improvements on a scale that assesses many of the disabling aspects of MS. However, this result was associated with a small Nfs statistic, indicating that a single unpublished study with non-significant results would be sufficient to negate this finding.

There were three studies that assessed *community integration*, which together yielded moderate and significant improvements to this domain (overall $d_w = 0.45$). Importantly, this result was largely due to a single study that used a group-based supportive telecounselling program for participants with SCI or stroke ($d = 3.46$; Evans et al., 1985). This program produced very strong improvements on the measure of 'Personal Adjustment and Role Skills' (PARS, Ellsworth 1968), which assesses peer relations, dependency, hostility, depression and productivity.

Similarly, *depression* showed modest and significant improvements (overall $d_{w =}$ 0.44), although individual telecounselling for a sample with MS produced very strong and significant treatment effects ($d_w = 1.34$; Mohr et al., 2000). Beckner et al., (2007, 2010), Hart et al, (2008), Mohr, Hart et al., (2005), and Mohr et al. (2007) replicated this finding in their study, with cognitive behaviour therapy delivered by telephone ameliorating symptoms of depression for individuals with MS.

Telecounselling participants also reported improvements to the physical, cognitive and psychological effects of *fatigue* associated with MS (overall $d_w = 0.42$), however the *N*fs statistic was small, reducing our confidence in this finding. Furthermore, although telecounselling had a modest impact on the physical and psychological aspects of *health care* (overall $d_w = 0.32$), it did not meet the study criteria ($d > 0.40$, $Nfs > N_{studies}$, 95% CIs $\neq 0$). Indeed, results across the individual health care measures varied, with telecounselling participants reporting moderate improvements in health symptoms associated with SCI (Health symptoms scale; Belle et al., 2006), and better engagement in health promoting activities, such as stress management, following diagnosis of MS (HPLP, Health Promotion Lifestyle Profile II; Walker, Sechrist, & Pender, 1995). However, measures of health self-efficacy (SRAHP, Self Rated Abilities for Health Practices; Becker, Stuifbergen, Oh & Hall, 1993), perceived barriers to health care (Barriers to Health Promoting Activities for Disabled Persons Scale; Becker, Stuifbergen & Sands, 1991) and problems with self-care (Self Care Problems; Burton, Schulz, Jackson, Hirsch, & Zdaniuk, 2000) showed negligible change.

Immediate post-treatment assessments of *quality of life* were based on limited data, with a variety of scores from one measure (SF-36; Medical Outcomes Study Short-Form Health Survey; Ware, 1993) in the two studies contributing to this domain. The overall weighted effect size ($d_w = 0.08$), in addition to the effect sizes associated with each subscale, were small or negative. Similarly, there were non-significant and small group differences in participants' satisfaction with *social support* (overall $d_w = -0.03$).

Table 4. Short-term treatment effects of telecounselling for the different psychological measures

Domain	Measure	$N_{studies}$	$N_{participants}$	d_w [a]	*SD d*	95% CI lower	95% CI upper	*N*fs	Study references [b]
Coping strategies	LOT-R	1	128	0.69*		0.33	1.05	3	Hart et al.., (2008) [c]
	Stress related growth	1	123	0.44		0.08	0.80	1	Hart et al.., (2008) [c]
	Overall d_w	1	128	0.57*	0.18	0.22	0.92	2	
Disability impairment	GNDS								Beckner et al., (2007)
	Overall d_w	1	123	0.49*		0.13	0.84	2	
Community integration	PARS	1	38	3.46*		2.46	3.46	16	Evans et al.., (1985)
	CHART	1	123	0.06		-0.27	0.39	0	Bombardier et al.., (2008) [c]
	Social integration	1	104	-0.20		-0.19	0.19	0	Schulz et al.., (2009)
	Overall d_w	3	265	0.45*	2.04	0.19	0.71	4	
Depression	POMS	1	23	1.34*		0.58	2.10	6	Mohr et al., (2000)
	PANAS-PA	1	117	0.69*		0.33	1.05	3	Beckner et al., (2007, 2010); Burns et al., (2010); Hart et al., (2008); Mohr, Hart et al., (2005), Mohr et al., (2007) [c]
	HDRS	1	117	0.46*		0.10	0.82	2	Beckner et al., (2007, 2010); Burns et al., (2010); Hart et al., (2008); Mohr, Hart et al., (2005), Mohr et al., (2007) [c]
	BDI II	1	117	0.34		-0.01	0.69	1	Beckner et al., (2007, 2010); Burns et al., (2010); Hart et al., (2008); Mohr, Hart et al., (2005), Mohr et al. (2007) [c]
	CES-D	1	104	0.17		-0.22	0.56	0	Schulz et al.., (2009)
	Overall d_w	3	244	0.44*	0.45	0.20	0.70	4	

Table 4. Short-term treatment effects of telecounselling for the different psychological measures (continued)

Domain	Measure	$N_{studies}$	$N_{participants}$	d_w [a]	*SD d*	95% CI lower	95% CI upper	*N*fs	Study references [b]
Fatigue	MFIS								Bombardier et al., (2008),[c] Beckner et al., (2007)
	Overall d_w	2	249	0.42	0.13	0.17	0.67	2	
Health care	Health symptoms	1	104	0.45		0.05	0.85	1	Schulz et al.., (2009)
	HPLP	2	233	0.41	0.04	0.16	0.66	2	Bombardier et al., (2008) [c] , Stuifbergen, Becker, Blozis et al., (2003), Stuifbergen, Becker, Timmerman et al. (2003)
	SRAHP	1	110	0.24		-0.13	0.61	0	Stuifbergen, Becker, Blozis et al., (2003), Stuifbergen, Becker, Timmerman et al., (2003)
	Barriers	1	110	0.08		-0.29	0.45	0	Stuifbergen, Becker, Blozis et al., (2003), Stuifbergen, Becker, Timmerman et al., (2003)
	Self care problems	1	104	0.00		-0.39	0.39	0	Schulz et al., (2009)
	Overall d_w	3	337	0.32	0.20	0.10	0.54	2	
Quality of Life	SF-36 MCS	1	123	0.33		0.00	0.66	1	Bombardier et al., (2008) [c],
	SF-36 Social function	1	110	0.17		-0.20	0.54	0	Stuifbergen, Becker, Blozis et al., (2003), Stuifbergen, Becker, Timmerman et al., (2003)
	SF-36 Pain	1	110	0.15		-0.22	0.52	0	Stuifbergen, Becker, Blozis et al., (2003), Stuifbergen, Becker, Timmerman et al., (2003)
	SF-36 Physical role	1	110	0.12		-0.25	0.49	0	Stuifbergen, Becker, Blozis et al., (2003), Stuifbergen, Becker, Timmerman et al., (2003)
	SF-36 Vitality	1	110	0.11		-0.26	0.48	0	Stuifbergen, Becker, Blozis et al., (2003), Stuifbergen, Becker, Timmerman et al., (2003)

Table 4. Short-term treatment effects of telecounselling for the different psychological measures (continued)

Domain	Measure	$N_{studies}$	$N_{participants}$	d_w [a]	*SD d*	95% CI		*N*fs	Study references [b]
						lower	upper		
Quality of Life	SF-36 Health	1	110	0.10		-0.27	0.47	0	Stuifbergen, Becker, Blozis et al., (2003), Stuifbergen, Becker, Timmerman et al., (2003)
	SF-36 Emotional	1	110	0.06		-0.31	0.43	0	Stuifbergen, Becker, Blozis et al., (2003), Stuifbergen, Becker, Timmerman et al., (2003)
	SF-36 Physical function	1	110	-0.07		-0.44	0.30	0	Stuifbergen, Becker, Blozis et al., (2003), Stuifbergen, Becker, Timmerman et al., (2003)
	SF-36 Mental	1	110	-0.08		-0.45	0.29	0	Stuifbergen, Becker, Blozis et al., (2003), Stuifbergen, Becker, Timmerman et al., (2003)
	SF-36 PCS	1	123	-0.12		-0.45	0.21	0	Bombardier et al., (2008) [c],
	Overall d_w	2	233	0.08	0.14	-0.17	0.35	0	
Social Support	PRQ-85	1	110	0.12		-0.25	0.49	0	Stuifbergen, Becker, Blozis et al., (2003), Stuifbergen, Becker, Timmerman et al. (2003)
	Social Support	1	104	-0.17		-0.56	0.22	0	Schulz et al., (2009)
	Overall d_w	2	214	-0.03	0.21	-0.30	0.24	0	

$N_{studies}$ = number of studies providing data; $N_{participants}$ = number of participants providing data; d_w = weighted mean effect size; *SD* = standard deviation of *d*; *N*fs = approximate fail-safe *N*.

[a] Weighting only applies to total effect sizes that are based on two or more studies [b] Identified studies highlighted with asterisk in references section [c] Data was supplied by authors, on request.

* Effect size met the study criteria: $d > 0.40$, $Nfs > N_{studies}$, 95% CIs did not include zero

Table 5. Longer-term treatment effects of telecounselling for the different psychological measures

Domain	Measure	First follow-up								Second follow-up							
		N_{studies}	$N_{\text{participants}}$	Months	d_w [a]	*SD d*	*N*fs	95% CI lower	95% CI upper	N_{studies}	$N_{\text{participants}}$	Months	d_w [a]	*SD d*	*N*fs	95% CI lower	95% CI upper
Quality of life	QWB [d]	2	93	12	0.96*	0.62	8	0.53	1.39	1	18	24	0.13		0	-0.82	1.08
	SF-36 Physical function	1	104	3	0.00		0	-0.39	0.39								
	SF-36 Emotional	1	104	3	-0.07		0	-0.32	0.46								
	SF-36 Mental	1	104	3	-0.07		0	-0.32	0.46								
	SF-36 Vitality	1	104	3	-0.19		0	-0.58	0.20								
	SF-36 Pain	1	104	3	-0.21		0	-0.60	0.18								
	SF-36 Social	1	104	3	-0.25		0	-0.64	0.14								
	SF-36 Physical role	1	104	3	-0.37		1	-0.76	0.02								
	Overall d_w	3	197	3	0.37	0.42	3	0.09	0.65	1	18	24	0.13		0	-0.82	1.08
Fatigue	FSS [d]	1	18	12	0.00		0	-0.95	0.95	1	18	24	-0.76		3	-1.74	0.22
	Overall d_w																

Table 5. Longer-term treatment effects of telecounselling for the different psychological measures (continued)

Domain	Measure	First follow-up								Second follow-up							
		N_{studies}	$N_{\text{participants}}$	Months	d_{w} [a]	*SD d*	*N*fs	95% CI		N_{studies}	$N_{\text{participants}}$	Months	d_{w} [a]	*SD d*	*N*fs	95% CI	
								lower	upper							lower	upper
Coping strategies	Stress related growth	1	120	6	0.00		0	-0.36	0.36	1	117	12	-0.12		0	-0.48	0.24
	LOT-R	1	121	6	-0.23		0	-0.59	0.13	1	117	12	0.11		0	-0.25	-0.25
	Overall d_{w}	1	121	6	-0.12	0.16	0	-0.24	0.48	1	117	12	-0.01	0.16	0	-0.37	0.35
Health care	SRAHP	1	104	3	-0.03		0	-0.42	0.36								
	HPLP	1	104	3	-0.09		0	-0.48	0.30								
	Barriers	1	104	3	-0.15		0	-0.54	0.24								
	Overall d_{w}	1	104	3	-0.09	0.06	0	-0.48	0.30								
Social support	PRQ-85	1	104	3	-0.15		0	-0.54	0.24								
	Overall d_{w}																

Table 5. Longer-term treatment effects of telecounselling for the different psychological measures (continued)

Domain	Measure	First follow-up								Second follow-up							
		N_{studies}	$N_{\text{participants}}$	Months	d_w [a]	SD *d*	*N*fs	95% CI		N_{studies}	$N_{\text{participants}}$	Months	d_w [a]	*SD* *d*	*N*fs	95% CI	
								lower	upper							lower	upper
Depression	BDI	1	117	12	- 0.02		0	-0.37	0.33								
	PANAS	1	117	12	-0.14		0	-0.49	0.21								
	CES-D [d]	2	93	12	-0.25	0.43	2	-0.66	0.16	1	18	24	-0.12		0	-1.07	0.83
	HDRS [d]	1	117	12	-0.27		0	-0.62	0.08								
	Overall d_w	3	246	12	- 0.19	0.12	0	-0.46	0.08	1	18		-0.12		0	-1.07	0.83

N_{studies} = number of studies providing data; $N_{\text{participants}}$ = number of participants providing data; d_w = weighted mean effect size; *SD* = standard deviation of *d*; *N*fs = approximate fail-safe *N*.

[a] Weighting only applies to total effect sizes that are based on two or more studies [b] Identified studies highlighted with asterisk in references section [c] Data was supplied by authors, on request [d] Only post-treatment and follow up data provided by Phillips et al (2001) and Egner et al (2003)

* Effect size met the study criteria: $d > 0.40$, $N\text{fs} > N_{\text{studies}}$, 95% CIs did not include zero

Longer-term efficacy of telecounselling.

Four studies reported longer-term follow-up data for individuals with SCI or MS, with assessments ranging from 3 months to 2 years post-intervention (see Table 5). Continued, albeit modest, treatment gains were noted for *quality of life* (overall $d_w = 0.37$) but this was associated with a small *N*fs, suggesting that this finding may be affected by publication bias. Additionally, this positive result largely reflected the results of two studies that used the Quality of Well Being Scale (QWB; Kaplan, Bush, & Berry, 1976). This scale was associated with a d_w of 0.96 - which indicated significantly improved well-being among telecounselling participants from post-treatment to first follow-up. Interestingly the two studies that utilised this measure produced varying results, with Phillips et al (2001) reporting strong treatment gains for individuals with a newly acquired SCI and Egner et al. (2003) reporting no significant findings among a sample with long-standing MS.

Fatigue scores for both treatment and control participants were not significantly different at 12 month (overall $d_w = 0.0$) or two years (overall $d_w = -0.76$) post-intervention. However, at the two year follow-up Egner et al. (2003) reported greater variability in the severity of fatigue scores amongst treatment participants - as reflected by the negative effect size.

Follow-up measures of *health care* ($d_w = -0.09$), *coping* (overall $d_w = -0.12$), *social support* ($d_w = -0.15$), and *depression* ($d_w = -0.19$), also produced small negative treatment effects. That is, control participants reported greater improvement in levels of health self-efficacy (Stuifbergen, Becker, Blozis et al., 2003), coping (Hart et al., 2008), perceived social support (Stuifbergen, Becker, Blozis et al., 2003) and depression

(Beckner et al., 2007, 2010; Burns et al., 2010; Hart et al., 2008; Mohr, Hart et al., 2005, Mohr et al., 2007) than their treated counterparts once telecounselling had ceased. Again, these findings did not meet the study criteria and therefore need to be interpreted cautiously.

Discussion

This study employed a meta-analytic design to consolidate and evaluate the available literature on telephone-based psychological interventions for adults with an acquired physical disability. In total, the data from eight independent studies and 658 individuals with MS, SCI or stroke were analysed. Although a variety of measures were used to evaluate telecounselling, only a limited number met the study criteria for significance. The strongest treatment effects were reported immediately post-intervention, with significant group differences noted for telecounselling programs to promote positive coping (Hart et al., 2008), certain aspects of community integration, such as peer advocacy and support (Evans et al., 1985), and programs to manage clinical depression (Mohr et al., 2000).

These findings lend support to other research, which recommends that the telephone be used as a treatment modality for individuals with a chronic physical disability (Kairy et al., 2009; Shepard, 1987). Although there were limited data to analyse the role of moderator variables, such as treatment format, the group program by Evans et al., (1985) produced the strongest treatment effect. At the same time, the significant treatment gains associated with the individualised intervention developed for a sample with a dual diagnosis of MS and severe depression (Beckner et al., 2007, 2010; Burns et al., 2010; Hart et al., 2008; Mohr et al., 2000; Mohr, Hart et al., 2005), suggest the importance of targeted treatment for those with psychological co-morbidities (Mohr, Hart & Marmar, 2006; Shepard, 1987). Further research will help to elucidate the comparative value of the group experience to telephone programs tailored to the needs of individual participants. Additionally, the treatment effects reported by Mohr, Hart et al., (2005) and associated studies (Beckner et al., 2007, 2010; Burns et al., 2010; Hart et al., 2008), may have been an underestimate of the true value of individualised CBT delivered by telephone. In these studies, the control condition involved an active treatment arm; telephone-based supportive counselling. Furthermore, all participants reported significant improvements in depression. Thus, the control condition may have minimised differences between the treatment and control groups. Further research should therefore include a non-treatment, or wait-list, control condition in order to rule out any possible placebo effect.

The available follow-up data also indicated that telecounselling may contribute to continued improvements in specific measures of health-related quality of life at one year post-intervention. The suggestion is that telecounselling provides an opportunity for the early identification of health-related problems, which if left untreated, may be detrimental to quality of life (Phillips et al., 2001). This follow-up is particularly important soon after primary rehabilitation, when individuals are making the transition to community living (Craig & Tan, 2008).

The negative, albeit non-significant, findings related to measures of fatigue management, heath care, perceived social support and levels of depression in the longer-term, may reflect participants' co-morbidities, including high baseline levels of depression reported by several of the studies (Beckner et al., 2007, 2010; Hart et al., 2008; Mohr, Hart et al., 2005; Mohr et al., 2007). Pre-existing psychological conditions are known to impact on the pace and course of an individual's adjustment to physical disability (Craig & Tan, 2008). Further trials with early and extended treatment intervals and both immediate and long-term follow-up assessments are therefore needed to establish the psychosocial benefits of telecounselling.

While the current findings are both interesting and important, there are a number of limitations that need to be borne in mind. Firstly, although this meta-analysis was based on a comprehensive and systematic search of the literature, it is possible that some studies failed to be identified, which may have impacted on the effect size estimates (Lipsey & Wilson, 2001). Fail-safe *N*s were designed to address, but do not alleviate, this problem. At the same time, it must be recognised that despite being a rapidly expanding field of rehabilitation, telecounselling remains an under-researched application, particularly in groups with physical disabilities (Glueckauf, 2002; Liss et al., 2002).

Secondly, the majority of treatment effects were based on single studies, which are considered to be less reliable than effect sizes calculated from multiple studies (Lipsey & Wilson, 2001). However, given that there was limited overlap in the measures utilised by the current studies, all available data was examined. The small sample sizes examined by some of the studies may have also reduced the power of the analyses. Nevertheless, the significant treatment effects associated with the broad areas of coping, community integration and depression are clinically promising.

A third limitation of this meta-analysis relates to the sample characteristics. For example, our findings may not apply to individuals of minority races because the majority of participants in this review were Caucasian. Indeed, research suggests that cultural issues and differences may be associated with comfort with telecommunications (Shore et al., 2006). Unfortunately, few studies provided the necessary information to analyse the impact of participant characteristics, such as race, on treatment efficacy, thereby precluding an analysis of this data.

Similarly, many of the studies did not provide the necessary data to analyse the impact of clinical variables, such as time since diagnosis, even if there was appreciable heterogeneity, as is often the case with medical populations (Schwartz et al., 2004). Statistical tests of homogeneity, such as the chi-square (Higgins & Green, 2009), address this criticism. However statistical power for testing homogeneity is limited for meta-analyses with few studies or a small number of effect sizes that can be averaged into a mean effect size index (Lipsey & Wilson, 2001), as was the case in this review.

Fourthly, the timing of assessment may have impacted on the treatment effects. Specifically, the study by Schulz et al (2009) provided outcome data obtained during their initial treatment phase, which involved face-to-face therapy. Given that this paper is one of the few available that has examined a dual telecounselling intervention for care recipients with SCI and their care-givers we felt that it was critical to include it in this preliminary review. However, it must be recognised that the treatment effects calculated for this study may be confounded with those of face-to-face therapy.

A final limitation relates to the reported attrition rates. In the studies by Evans et al. (1985), Mohr et al. (2000) and Stuifbergen, Becker, Blozis et al. (2003), the percentage of participants who declined or withdrew during treatment was substantial.

Consequently, this may have inflated the treatment effects for the community, depression, health care and quality of life domains, which were examined by these studies.

Despite these limitations, the current results support the effectiveness of telephone counselling for optimising coping and community integration skills and the management of depression for adults with either a newly acquired or long-term physical disability. Continued demonstration of the benefits of telecounselling, particularly data on its clinical feasibility, acceptability and cost effectiveness, will facilitate decisions about the utility of telephone-administered therapies.

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References marked with an asterisk indicate studies included in the meta-analysis.

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Chapter 6: Study 4

Effectiveness of telephone counselling in managing psychological outcomes after spinal cord injury: A preliminary study.

This chapter consists of a paper that has recently been accepted for publication. The details of this publication are:

Dorstyn, D.S., Mathias, J.L., & Denson, L.A. & Robertson, M.T. (2012). Effectiveness of telephone counselling in managing psychological outcomes after spinal cord injury: A preliminary study. *Archives of Physical Medicine and Rehabilitation*. Advance online publication. doi:10.1016/j.apmr.2012.06.002

Preface

The findings of the preceding meta-analysis (Chapter 5; Dorstyn, Mathias & Denson, 2011b) suggest that telecounselling is an effective treatment modality for individuals with an acquired physical disability, leading to significant improvements in their psychosocial outcomes. This included treatment gains in coping skills, aspects of community integration, and psychological health. However, telecounselling remains an under-researched clinical application, particularly in the context of SCI.

A small-scale clinical study was therefore developed to evaluate the effectiveness of a telephone-based psychological intervention for individuals recently discharged from SCI rehabilitation. It was anticipated that telecounselling would have comparable clinical benefits, further highlighting the need for a continuum of psychology services following patients' discharge home to prevent the development or recurrence of psychological problems after SCI.

It is important to note that the scope of this clinical study was limited by a small clinical population of individuals with SCI who were recruited from the single spinal injuries rehabilitation outpatient clinic available within this state; the South Australian Spinal Cord Injury Service. Furthermore, although recruitment occurred over a 24 month period, it was time-limited due to the time restrictions imposed on a doctoral thesis.

Effectiveness of telephone counselling in managing psychological outcomes after spinal cord injury: A preliminary study.

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Abstract

Objective: To determine whether an individualised counselling intervention delivered by telephone - telecounselling - feasibly improves the emotional adjustment of adults with a newly acquired spinal cord injury (SCI). Design: Randomised controlled trial. Setting: Hampstead Rehabilitation Centre, Spinal Injuries Unit, South Australia. Participants: Adults (N = 40) aged 18 or older, who were recently discharged home from inpatient SCI rehabilitation, were randomly assigned to a telecounselling Treatment or standard-care Control group. All participants had recently received psychological treatment as inpatients, to assist them adjust to their disability. Referral to the inpatient psychology service was therefore a key indicator of participants' baseline distress levels and, consequently, their need for counselling support post-discharge. Intervention: Seven telephone counselling sessions were delivered over a 12-week period by a single psychologist (first author, D.D.). Pre- and post-intervention data, plus a three month follow-up assessment, were compared to that of a SCI Control group who received standard care. Main Outcome Measures: Psychosocial outcome was measured using: the Depression, Anxiety and Stress Scale; Mini International Neuropsychiatric Interview; Spinal Cord Lesion Emotional Well-being and Coping Strategies Questionnaires; and Multidimensional Measure of Social Support. Cost effectiveness and clinical feasibility were also evaluated. Results: Telecounselling participants reported clinical improvements in depression and anxiety and aspects of SCI coping post-intervention. However these treatment gains were not statistically significant. Additionally, treatment effects were minimal at the three month follow-up. Delivery related outcomes, including participation rate and cost analyses, were all positive. Conclusions: The results suggest that continued psychological services for individuals reporting distress during their inpatient rehabilitation is important and that such services can be delivered by telephone cost-effectively and efficiently. However, the long-term benefits of telecounselling, once ceased, were not demonstrated.

Key words: spinal cord injuries; depression; anxiety; telephone; rehabilitation.

The World Health Organisation’s global report on disability (2011) highlights the need for additional mental health care resources that are accessible and affordable for adults living in the community with a physical disability, such as SCI. Within this context, group or individual counselling that is delivered via telephone, telecounselling, has been identified as a community service option for individuals with SCI (Bloemen-Vrencken, de Witte & Post, 2005; Brennan, Mawson & Brownsell, 2009; Liss, Glueckauf, & Eclund-Johnson, 2002). A key advantage of this form of delivery is its accessibility; particularly for those with mobility or transport restrictions due to their disability, as well as individuals living in rural and remote areas where specialised health services are not readily available (Mozer, Franklin & Rose, 2008; Suddick & O’Neill, 2009).

It has also been argued that telephone-based psychological (and other medical) services offer a time- and cost-effective treatment package, compared to traditional outpatient programs that provide onsite therapy (Bendixen, Levy, Olive, Kobb, & Mann, 2009; Kairy, Lehoux, Vincent & Visintin, 2009). However, the data supporting this claim is extremely limited, highlighting the need for research that additionally incorporates a cost-analysis in order to evaluate the financial benefits of this treatment medium.

Although early research examining telecounselling in SCI rehabilitation is limited in it's scope, the findings have proven promising. For example, individual-based telecounselling programs for persons with SCI have yielded positive treatment results. In one of the few available quantitative studies, Lucke, Lucke and Martinez (2004) noted significant improvements in psychological adjustment, including affect, with a cognitive behaviour program delivered by telephone. Moreover, although Phillips, Vesmarovich, Hauber, Wiggers and Egner (2001) observed no significant treatment gains in depression immediately after a nursing- and peer-led telecounselling program, they found strong treatment effects in relation to general well-being when participants were followed up one year later. Similarly, group-based telecounselling has been associated with significant improvements in specific psychosocial outcomes, including perceived social support (Evans, Kleinman, Halar & Herzer, 1985; Jalovcic & Pentland, 2009). Telecounselling programs targeting groups of family members and those with SCI have also contributed to an increase in constructive coping strategies (Schulz et al., 2009) and problem-solving skills (Elliott, Berry, & Grant, 2009).

While differences in the treatment benefits reported in the aforementioned studies may, in part, be explained by characteristics of the treatments (e.g., group versus individual therapy), differences in the research methodologies are also likely to be important. For example, Lucke et al (1994) did not include a control group, which may have inflated the treatment effect estimate, as they did not account for spontaneous recovery (Dorstyn, Mathias & Denson, 2011b; Wolf, 1986).

The current study was therefore designed to examine the contribution of a 12-week individual telecounselling program to the short-term psychological outcomes of adults with a newly acquired SCI. The focus of the intervention was to provide participants with psycho-education on the nature and degree of change in distress (i.e. depression, anxiety, stress), in addition to enhancing the utilisation of proactive coping skills over the course of treatment (e.g. stress management techniques, utilisation of social support networks). The key aims were to then: (a) compare these results to those of a matched group of SCI peers who received standard medical care; (b) determine whether any treatment gains with telecounselling were maintained at a three-month follow-up, once treatment had discontinued; and (c) measure the clinical feasibility of telecounselling by examining its estimated costs. It was anticipated that, in addition to providing a cost-effective service, telecounselling would have a beneficial effect on psychosocial outcomes for individuals making the transition to community living, post in-patient rehabilitation. However, given the absence of available literature on telecounselling, the magnitude and duration of this change could not be predicted.

Method

Participants were: (a) adults (≥18 years); (b) who had good English comprehension (i.e. at least primary school level); (c) had recently acquired a spinal cord injury (SCI ≤ 1 year); (d) had sufficient cognitive capacity to enable them to provide informed consent and participate in the therapy process; (e) had completed their primary rehabilitation in the Spinal Injuries Unit at Hampstead Rehabilitation Centre; and (f) had accessed psychological services during their inpatient rehabilitation in order to assist with their adjustment to disability. This inpatient intervention involved fortnightly cognitive-behavioural sessions (30 - 60 minutes each) with a psychologist for the duration of an individual's rehabilitation. The Spinal Injury Unit's sole psychologist (D.D.) was responsible for providing the inpatient cognitive behaviour therapy to all participants. This sub-group was specifically targeted for intervention because research suggests that individuals with clinically significant levels of distress following SCI are at risk of experiencing poor emotional outcomes and should, therefore, be a priority for continued psychological treatment following their primary rehabilitation (Craig & Middleton, 2009; Migliorini et al., 2008).

Individuals were excluded from the study if they: (a) had a congenital spinal condition (e.g. spina bifida); (b) had significant cognitive impairment which would impact on their ability to participate in therapy (i.e. severe traumatic brain injury; as determined by medical report); or (c) were currently engaged in another psychotherapeutic intervention from another agency (e.g. psychology, psychiatry, social work). Participants were specifically asked whether they had accessed these other sources of professional support.

Baseline measures

Demographic and injury information.

General demographic information (i.e. ethnicity, age, gender, marital and employment status) and details pertaining to SCI (i.e. diagnosis, length of rehabilitation stay) were collected from participants' medical records. Details of psychiatric history (i.e. previous diagnosis of a DSM-IV disorder) were also documented to identify potential treatment confounds.

Functional Independence Measure (FIM).

The FIM is a valid and reliable measure of disability (Dawson, Shamley, & Jamous, 2008; Hamilton, Granger, Sherwin, Zeilezny, & Tashman, 1987). It consists of 18 items that assess an individual's motor (i.e. self-care, bladder and bowel management, mobility) and cognitive functioning (i.e. communication, social cognition). Items are scored on a scale that ranges from 1 (total assistance) to 7 (complete independence), with total scores ranging from 18 to 126. Higher scores reflect greater physical function and independence. FIM ratings were determined by a team of allied health, nursing and medical staff at the time of an individual's discharge from rehabilitation.

Primary outcome measures

Depression, Anxiety and Stress Scale (DASS-21).

The Depression Anxiety Stress Scale (DASS-21) consists of three subscales designed to measure the emotional states of depression, anxiety and stress (Lovibond & Lovibond, 2002) and has been used in SCI research (Mitchell, Burns, & Dorstyn, 2008). Each subscale contains 7 items, which are scored on a 4-point scale (i.e. from 0: Did not apply to me at all; to 3: Applied to me very much). Subscale scores are aggregated and multiplied by two to allow comparison with normative values (Lovibond & Lovibond, 2002). Higher scores on each subscale indicate higher levels of distress. Individual 'caseness' was also examined, based on DASS-21 definitions of symptom severity, in order to identify the number of participants with clinically significant levels of depression (score: $\geq$10), anxiety (score: $\geq$ 8) and stress (score $\geq$15; Lovibond & Lovibond, 2002).

MINI International Neuropsychiatric Interview (Version 6.0.0).

The number of participants with a clinical diagnosis of major depression and/or social anxiety, which are both common sequelae of SCI (Craig & Middleton, 2009), was determined using the MINI (Sheehan et al., 1998).

Secondary outcomes

Spinal Cord Lesion Coping Strategies Questionnaire (SCL CSQ) and Emotional Wellbeing Questionnaire (SCL EWQ).

The SCL CSQ has three subscales which focus on the coping mechanisms of fighting spirit, acceptance, and social reliance. Its counterpart, the SCL EWQ, examines the emotional consequences of SCI with three subscales measuring degree of personal growth, helplessness, and intrusive thoughts (Elfstrom, Ryden, Kreuter, Persson, & Sullivan, 2002; Migliorini, Elfstrom & Tonge, 2008). Items on each of the SCL subscales are rated from 1 to 4, with scores calculated by computing the mean value of all items in a given subscale (range: 1 - 4). Higher scores indicate that participants utilised the aforementioned coping strategies to a greater degree (SCL CSQ) and that the SCI had a greater emotional impact (SCL EWQ).

Multidimensional Measure of Social Support (MDSS).

This 12-item scale evaluates the amount and adequacy of social support received from family and close friends (Winefield, Winefield & Tiggeman, 1992). Individuals rate the support that is provided to them by these sources on a scale ranging from 1 (never) to 4 (usually/always), with higher scores reflecting stronger social networks.

Procedures

After receiving ethics approval from the relevant institutional ethics committee, all individuals referred to the psychology service in the Spinal Injuries Unit were assessed for study eligibility by the unit's psychologist (first author, D.D). Eligible participants were informed of, and recruited into, the study by this clinician.

Those who consented to participate were randomly assigned to the treatment (telecounselling) or standard care control condition. Group assignment was determined prior to participant enrollment and was based on a computer generated and blocked randomisation sequence (www.randomizer.org). Assignment was conducted by the treating clinician (first author, D.D). Participants were recruited over a 2-year period. Details of participant eligibility, recruitment are provided in the CONSORT flow-chart (Begg et al, 1996; Figure 1).

Importantly, all assessments of treatment efficacy were telephone-administered by an independent psychologist (fourth author, M.R.) who was based at another agency (Royal Adelaide Hospital), and was not informed of group allocation. Participants were assessed on discharge from the rehabilitation unit (pre-intervention baseline; Time 1); at week 12 post-discharge (post-intervention; Time 2); and three-months after the treatment had ceased (Time 3; DASS-21 only). The standard care control group was tested at the same intervals.

Intervention

The telecounselling program, which was designed to improve short-term

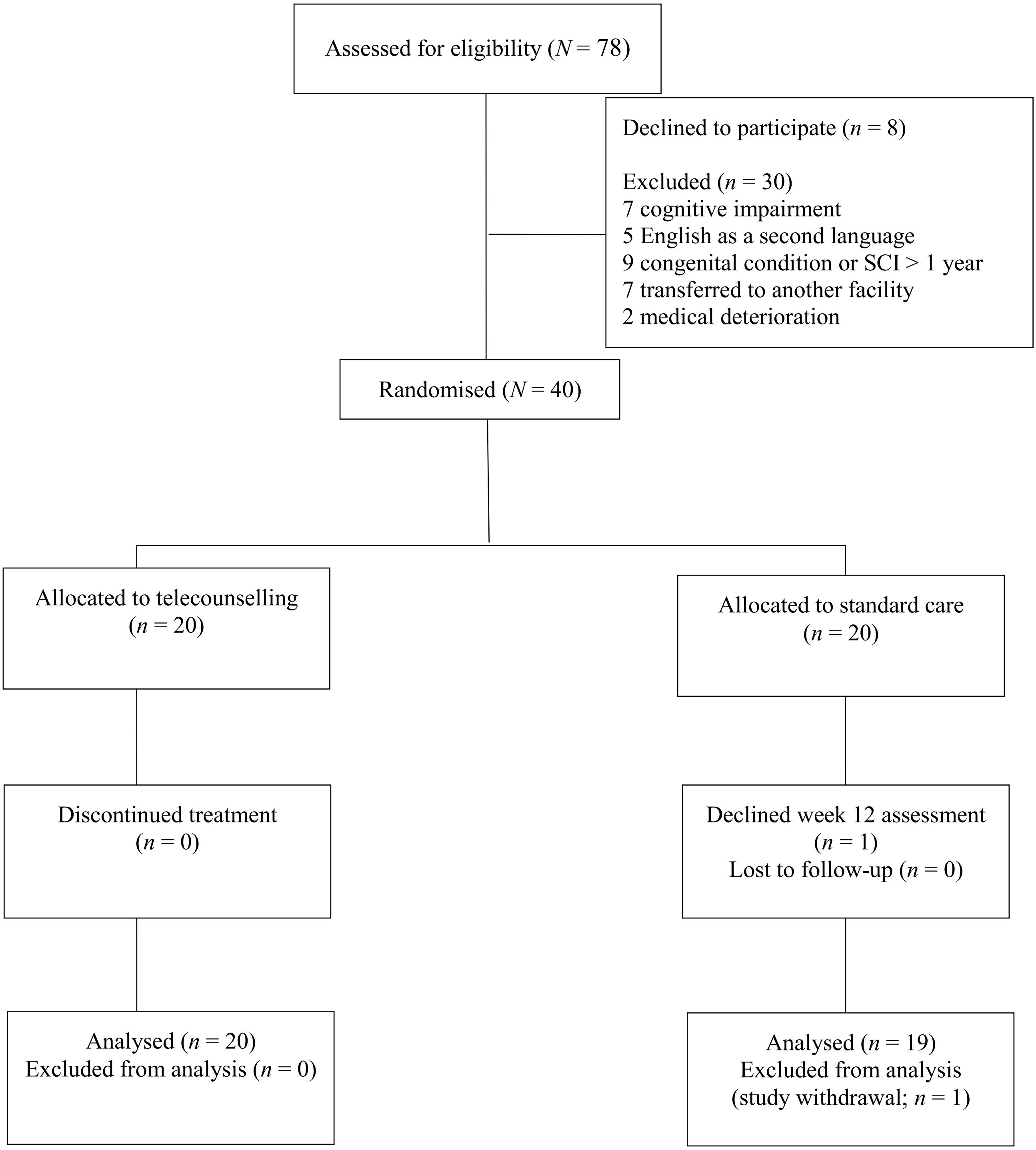

Figure 1: CONSORT flow chart

emotional outcomes in adults post-SCI, was delivered by the unit's clinical psychologist (D.D.). The 12-week program involved fortnightly phone consults at pre-scheduled times. As this was developed as a brief intervention, phone consults averaged less than 20 minutes per session (*M* = 19 minutes; SD = 8.2 minutes). Although treatment was catered to individual's specific psychological needs, a broad treatment protocol was followed. This protocol, outlined below, was based on the principles of motivational interviewing (Rollnick, Miller & Butler, 2008) - a therapy technique which has been successfully implemented in previous telecounselling trials (Bombardier, Cunniffe, Wadhwani, Gibbons, Blake, & Kraft, 2008; Stuifbergen, Becker, Blozis, Timmerman, & Kullberg, 2003).

Session 1: An introduction to the intervention, which included treatment aims and session time. General aims were to monitor and manage both mood and coping skills. Although session frequency (i.e. fortnightly) was predetermined, weekday and time of telephone consults were negotiated with participants.

Sessions 2-3: Included education on the psychosocial impact of SCI and normalisation of individuals' reactions to the transition from hospital to community.

Sessions 4-6: Involved education, reinforcement and monitoring of positive coping strategies. This included activity scheduling, encouraging contact with social support networks, relaxation techniques and the maintenance of health care behaviours (i.e. diet, exercise, attendance at medical appointments). These goals were achieved using psycho-education, reflective listening, affirmations, and reassurance. Participants were encouraged to practice taught techniques between sessions.

Session 7: Review of treatment progress and referral to community-based psychological services, if required.

Telecounselling was provided to treatment participants in addition to standard care which was provided to everyone. The 'standard care' condition involved individual medical follow-up and physical therapies (e.g., physiotherapy, occupational therapy) in addition to a face-to-face consultation with the psychologist (D.D.) at 3 months post-discharge. Participants could withdraw from the study if their psychological treatment needs increased. Similarly, all persons who declined to participate (i.e. did not complete all assessments) were provided information on appropriate outreach services.

Statistical analyses

The comparability of the telecounselling and standard care groups at the commencement of the study was initially assessed using chi-square analyses (for socio-demographic and injury-related variables) and *t*-tests (for DASS-21, SCL and MDSS scales).

The effectiveness of telecounselling on DASS-21 subscale scores was examined using three repeated measures analyses of variance (ANOVA) with a 3 x 2 (Time x Groups) design. Group allocation (telecounselling Treatment vs. standard care Control) was the between-subjects factor whilst assessment Time was the within-subjects factor (pre-treatment, post-treatment, follow-up). The interaction effect between Group and Time was of primary interest to evaluating whether telecounselling resulted in a greater reduction in DASS-21 scores than standard care. ANOVAs with a 2 x 2 (Time x Groups) design were then conducted to identify group differences on the SCL and MDSS (Group:

telecounselling Treatment vs. standard care Control; Time: pre-treatment vs. post-treatment). All statistics were conducted with SPSS (Version 19.0).

Given the relatively small sample size (caused by the constraints of a single small clinical setting), it was recognised that statistically significant group differences would be difficult to achieve, even if clinically meaningful improvements in mood and coping occurred. Therefore, treatment effects were additionally evaluated using Cohen's *d* effect sizes (Cohen, 1992; Zakzanis, 2001). Effect sizes were calculated using the change score formulae provided by Morris and Deshon (2002) for a repeated measures (pre-post) independent groups (treatment, control) design, with *d* values of 0.2, 0.5 and 0.8 equating to small, medium and large treatment effects, respectively (Cohen, 1992). The direction of each effect size was standardised across measures so that a positive *d* indicated that telecounselling was resulted in greater improvements in outcome, whereas a negative *d* reflected greater improvements by standard care participants.

The study's delivery-related outcomes were also examined in order to better understand the affordability, accessibility, availability and acceptability of this treatment. Specifically, attrition rates, total contact time and costs were recorded.

Results

All participants identified themselves as Caucasian (*N*= 40) and the majority were men (69%), married or in a relationship (59%), and employed (59%), at study commencement (Table 1). The majority of participants (62%; *n* = 24) had a diagnosis of paraplegia. Both traumatic (56%) and non-traumatic causes (44%) were responsible for the SCIs and most of the injuries (64%; *n* =25) involved an incomplete cord lesion

As Table 1 shows, the telecounselling and standard care groups were comparable in terms of their sex distribution, pre-injury relationship and employment status, and age when they entered the study. Although a higher percentage of telecounselling participants (25% vs. 5%) had a documented history of major depression, this difference was not statistically significant. Nevertheless, this may represent an important clinical difference.

In contrast, there were significant group differences on injury-related variables (Table 1). Specifically, the telecounselling group comprised more individuals with a complete SCI. Despite these differences, both groups had similar medication requirements at the start of the study, including the use of prescription mood stabilisers, and opiates or analgesics to manage neuropathic pain (see Table 1). Similarly, there were no significant group differences in need for formal care support by a community agency, or government income support following discharge from primary rehabilitation.

In relation to other functional rehabilitation outcomes, telecounselling participants required a significantly longer duration of rehabilitation and had lower FIM scores; indicating poorer motor and cognitive outcomes (Table 1). Delays in finalising home modifications and establishing individuals' support needs were cited as key reasons for participants' extended rehabilitation admission.

Primary outcomes

Summary data for all the outcome measures are provided in Table 2. Although the two groups reported no significant differences in baseline depression (t (37) =1.74, p =

Table 1: Demographic and injury details of participants

Characteristics		Telecounselling (n = 20)	Standard Care (n = 19)	Analyses			
				x^2	*df*	Cramer's *V*	*p*
Sex	Male (%)	13 (65)	14 (74)	0.35	1	0.09	0.56
	Female (%)	7 (35)	5 (26)				
Marital status	Married/partner (%)	12 (60)	11 (58)	0.02	1	0.02	0.89
	Single/widowed (%)	8 (40)	8 (42)				
Pre-injury employment	Employed/student (%)	9 (45)	14 (70)	3.31	1	0.29	0.07
	Unemployed/retired/pension (%)	11 (55)	5 26)				
Pre-morbid depression	No previous diagnosis (%)	15 (75)	18 (95)	2.92	1	0.27	0.18
	Previous diagnosis (%)	5 (25)	1 (5)				
Injury type	Paraplegia (%)	15 (75)	9 (47)	3.14	1	0.28	0.08
	Tetraplegia (%)	5 (25)	10 (53)				
Injury cause	Traumatic (%)	9 (45)	13 (68)	2.17	1	0.24	0.14
	Non-traumatic (%)	11 (55)	6 (30)				
Lesion	Complete (%)	11(55)	3 (15)	6.51	1	0.41	0.01*
	Incomplete (%)	9 (45)	16 (84)				

Table 1: Demographic and injury details of participants (continued)

Characteristics		Telecounselling ($n = 20$)	Standard Care ($n = 19$)	Analyses			
				x^2	*df*	Cramer's *V*	*p*
Medication	Psychotropic (%)	15 (75)	11 (58)	1.28	1	0.18	0.26
	Pain (%)	19 (95)	16 (84)	1.23	1	0.18	0.34
Post-injury care	Requiring support (%)	9 (45)	6 (30)	1.48	1	0.19	0.22
	Not requiring support (%)	11 (55)	14 (70)				
Post-injury employment	Employed/student (%)	5 (25)	8 (42)	1.28	1	0.18	0.26
	Unemployed/retired/pension (%)	15 (75)	11 (58)				
				t	*df*	*d*	*p*
Age (years)	*M (SD)*	53.8 (16.3)	53.1 (20.1)	- 0.12	37	0.04	0.91
LOS (days)	*M (SD)*	205.3 (131.2)	110.8 (86.5)	2.67	37	0.85	0.01*
Discharge FIM	*M (SD)*	98.9 (21.9)	111.4 (15.5)	2.09	37	-0.66	0.01*

* $p \leq 0.05$ significance.

0.09), anxiety (*t* (37) = 1.71, *p* = 0.09), or stress (*t* (37) = 1.27, *p* = 0.21), levels, telecounselling participants showed greater within-group variability (Table 2), as seen by the associated large SDs. However, the average subscale scores of both groups remained within sub-clinical levels (i.e., below the cut-off scores for identifying 'caseness'; Lovibond & Lovibond, 2002).

The 3 x 2 ANOVAs revealed no significant main effects for the individual DASS-21 subscales (Table 2, Figure 2). Inspection of the mean scores indicated that participants in each group reported similar changes in their depression, anxiety and stress scores (Table 2). The associated Cohen's *d* values suggested small improvements in depression (*d* = 0.32), anxiety (*d* = 0.24) and stress levels (*d* = 0.27) among telecounselling participants immediately post-intervention, contrasting with a small to moderate increase in anxiety among this group at follow-up (*d*= -0.38).

The effectiveness of telecounselling was also evaluated by examining the number of individual participants who met the criteria for clinical 'caseness' on the DASS-21. Of the eight telecounselling participants who reported mild, moderate or extremely severe levels of depression at baseline (Time 1), four reported no symptoms immediately post-intervention (Time 2). Similarly, four out of six telecounselling participants reported complete amelioration of anxiety symptoms from Time 1 to Time 2. These treatment gains were also maintained at follow-up (Time 3). In contrast, two standard care participants who reported mild to severe levels of depression, anxiety and stress ('cases') at baseline continued to report clinically significant symptomatology over time (Time 2 and Time 3).

This data is consistent with the pre- and post-telecounselling evaluations conducted with the MINI (undertaken by M.R.). The MINI revealed that two treatment participants met the criteria for major depression at baseline whilst an additional treatment participant reported symptoms of social anxiety. Post-intervention (Time 2), one treatment participant remained clinically depressed whereas the participant with clinical anxiety reported no further symptoms. Additionally, two standard care participants were newly diagnosed with depression at Time 2. These case analyses (DASS-21, MINI) suggest a decreasing, albeit statistically non-significant, trend in clinical levels of depression and anxiety with telecounselling.

Secondary outcomes

The potential impact of telecounselling on the utilisation of cognitive and emotional coping strategies (SCL subscales) and social support networks (MDSS) was also examined. Both groups reported similar pre-treatment coping skills, based on the independent samples t tests (fighting spirit: t (37) = -1.82 p = 0.42; acceptance: t (37) = -1.39 p = 0.17; social reliance t (37) = 0.35, p = 0.73), and emotional consequences arising from their injury, although telecounselling participants reported more intrusive thoughts related to their SCI (t (37) = 2.17, p = 0.04). Both groups also had comparable scores on the MDSS, indicating initial satisfaction in the frequency (t (37) = 0.85, p = 0.40); and intensity (t (37) = -1.18, p = 0.25) of their available social supports (Table 2).

The 2 x 2 ANOVAs revealed no significant effects for the SCL-CSQ subscales (Table 2). However, the associated effect sizes (Table 2) suggest that degree of disability acceptance among the telecounselling participants moderately increased over the period of the treatment, whereas standard care participants reported a reduction in both fighting

Table 2: Mean values (standard deviations) and associated effect sizes of outcome measures at each time point

Measure	Time	Telecounselling (*n* = 20)	Standard Care (*n* = 19)	Cohen's *d*		Analyses			
				Time 1 - 2	Time 2- 3	*F*	*df*	*p*	*Power*
DASS-21									
depression	1	7.10 (9.12)	2.74 (6.15)	0.32	0.06	0.96	1,37	0.38	0.20
	2	5.30 (6.23)	3.16 (4.73)						
	3	5.20 (5.13)	3.37 (8.00)						
anxiety	1	5.70 (6.37)	2.84 (3.54)	0.24	- 0.38	0.69	1,37	0.51	0.16
	2	3.70 (4.01)	2.32 (3.35)						
	3	4.70 (4.69)	1.89 (3.23)						
stress	1	8.30 (8.76)	4.84 (8.20)	0.27	0.21	0.78	1,37	0.46	0.17
	2	7.10 (8.34)	5.26 (7.78)						
	3	6.60 (7.01)	6.53 (9.47)						
SCL-CSQ									
fighting spirit	1	3.31 (0.39)	3.53 (0.30)	0.32		0.69	1,37	0.41	0.13
	2	3.29 (0.35)	3.39 (0.40)						
acceptance	1	2.73 (0.64)	2.98 (0.48)	0.46		3.07	1,37	0.09	0.40
	2	2.93 (0.65)	2.88 (0.55)						
social reliance	1	2.95 (0.60)	2.89 (0.40)	- 0.15		0.69	1,37	0.41	0.13
	2	2.89 (0.62)	2.79 (0.48)						

Table 2: Mean values (standard deviations) and associated effect sizes of outcome measures at each time point (continued)

Measure	Time	Telecounselling (*n* = 20)	Standard Care (*n* = 19)	Cohen's *d*		Analyses			
				Time 1 - 2	Time 2- 3	*F*	*df*	*p*	*Power*
SCL-EWQ									
personal growth	1	2.56 (0.57)	2.58 (0.40)	0.24		0.33	1,37	0.57	0.09
	2	2.58 (0.48)	2.52 (0.50)						
intrusion	1	2.43 (0.79)	1.95 (0.56)	0.53		3.78	1,37	0.05*	0.47
	2	2.17 (0.60)	2.01 (0.56)						
helplessness	1	2.23 (0.77)	1.79 (0.61)	0.41		1.62	1,37	0.21	0.24
	2	2.14 (0.54)	1.93 (0.54)						
MDSS									
frequency	1	20.45 (3.12)	21.42 (3.98)	- 0.15		0.31	1,37	0.58	0.08
	2	20.25 (3.29)	20.68 (4.03)						
satisfaction	1	16.20 (3.71)	17.26 (1.55)	0.14		0.01	1,37	0.99	0.05
	2	16.35 (3.51)	17.42 (1.47)						

Abbreviations: *F* = repeated measures ANOVA Group x Time interaction effect.

* *p* = 0.05 significance.

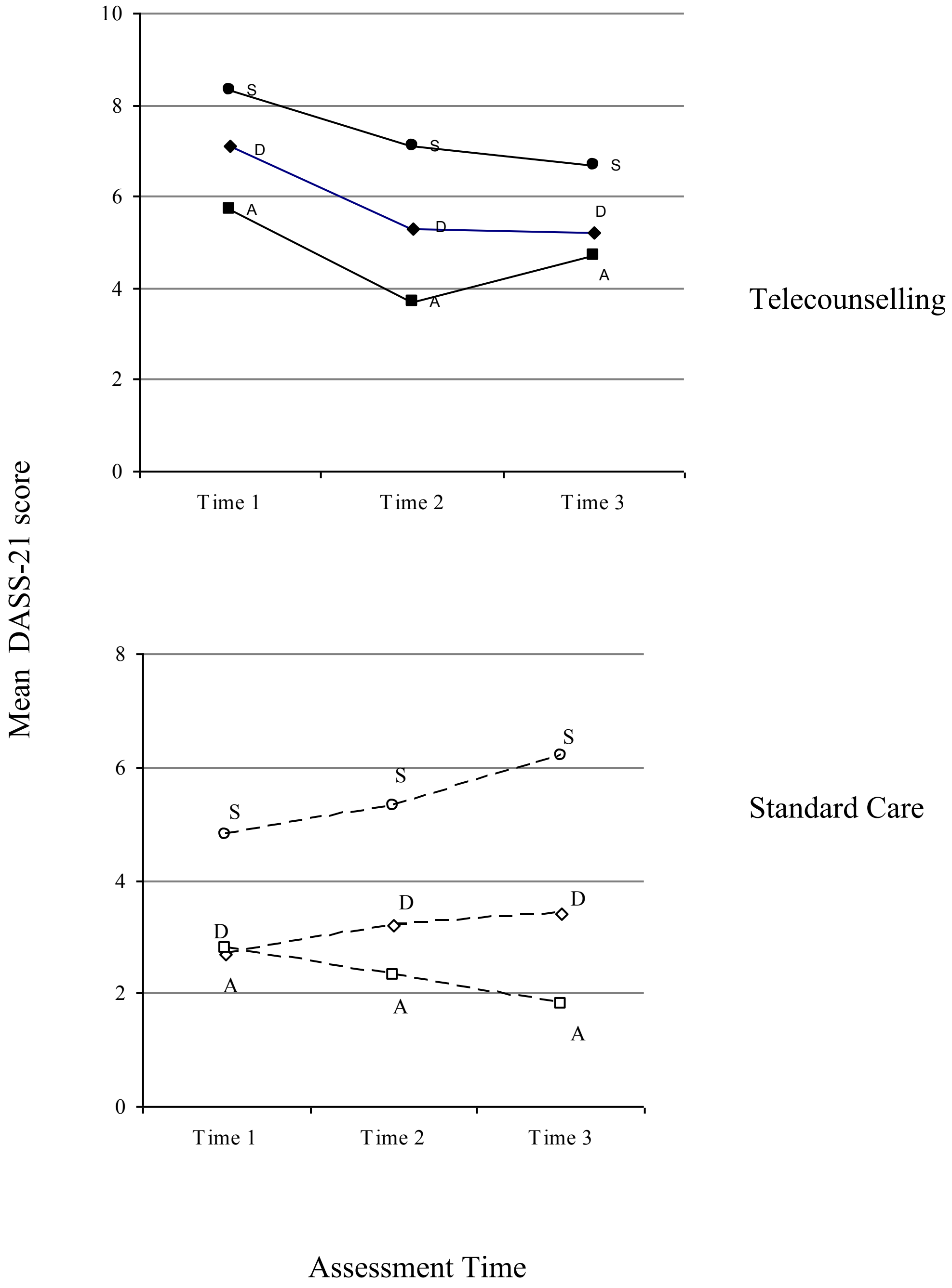

Figure 2: Depression (D), Anxiety (A) and Stress (S) scores (DASS-21) over time by group

spirit and acceptance (Table 2). Additionally, the interaction effect for the SCL-EWQ Intrusion subscale (Table 2) was significant ($p = 0.05$). This subscale, in addition to the Helplessness subscale, was associated with a moderate and positive effect size ($d > 0.40$) suggesting that telecounselling participants reported some benefits in the emotional consequences of SCI.

Finally, a one-way ANOVA revealed no significant differences for the MDSS as a function of the interaction between group membership or time (Table 2). This suggests that telecounselling did not significantly alter the frequency of participants' social interactions or their level of satisfaction with the instrumental and emotional support provided by family and friends.

Treatment feasibility

The attrition rate for this study was 3%, with one standard care participant reportedly withdrawing due to low mood. Importantly, all participants who were assigned to the telecounselling intervention completed all seven sessions and none were lost to follow up. The therapist service delivery contact time was also economical, with treatment participants requiring an average of 135 minutes (range = 70 to 270 minutes; *SD* = 48 minutes) of telephone-based psychotherapy in total. However, higher DASS-21 baseline scores were associated with longer treatment sessions (depression $r = 0.61$; anxiety $r = 0.75$, stress $r = 0.64$, $p \leq 0.01$, 2 tailed). Based on a salaried therapist cost of approximately \$50[6] per hour, this equated to a total treatment cost of \$150 per patient.

The telecounselling program also provided an opportunity to monitor and refer

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[6] Costs are represented in Australian dollars

participants, where required, to additional community-based psychological services following completion of the 12-week program. Specifically, one telecounselling participant and two standard care participants were referred to psychological services, due to continued depression, anxiety and/or stress levels (DASS-21).

Discussion

Adults newly discharged from SCI rehabilitation reported clinically meaningful (albeit statistically non-significant) improvements with telecounselling, including improved mood and the utilisation of SCI-specific coping skills. The results of this preliminary study therefore support the potential for telecounselling to provide a useful home-based psychological treatment for individuals with a physical disability. These results require replication in an expanded trial but serve to supplement the findings of a small number of previous telecounselling trials with this group (Bombardier et al., 2008; Schwartz, 1999; Stuifbergen, Becker, Blozis, Timmerman, & Kullberg, 2003).

Unfortunately, the longer-term benefits of telecounselling have yet to be demonstrated as there were no statistically significant treatment gains noted for depression, anxiety or stress at 3 months post-intervention. However, this result is consistent with the findings of previous telecounselling trials in SCI groups, which report a steady decline in treatment gains once treatment has ceased (Dorstyn, Mathias, & Denson, 2011b).

One explanation is that, at the 3-month follow-up, participants were still in the early stages of adjustment to their disability, as the psychological consequences of SCI are known to be long-lasting (Craig & Middleton, 2009; Migliorini et al., 2008). Further telecounselling trials incorporating longer treatment periods, which cover a more extended period of psychosocial adjustment, and additional follow-up assessments are therefore needed to establish the long-term benefits of this treatment approach.

It is also known that individual differences, such as chronic pain, can predict psychological functioning in the early stages of adjustment to a SCI (Nicholson Perry, Nicholas, Middleton, & Siddall, 2009). Indeed, the majority of participants in this study required long-term prescription medication for the management of neuropathic pain. However, this relationship was not examined in the current research. Further telecounselling trials should therefore examine the contribution of individual psychological variables, such as pain, in mediating treatment effectiveness post-SCI.

Clinical implications

The delivery-related outcomes in this study were favourable. Indeed, the high completion rate is better than previous telecounselling trials in outpatient samples, which have reported withdrawal rates as high as 58% (Dorstyn et al., 2011b). The estimated costs, although not covering administrative fees (e.g. cost of telephone call), also indicate that telecounselling is both a time and cost-efficient treatment. This is consistent with previous cost analyses for telecounselling (Bombardier, et al., 2008).

However, it is important to recognise that it is not possible to determine, on the basis of the information collected in this study, whether these positive outcomes suggest consumer satisfaction with the delivery of psychotherapy by telephone. The 100% participation rate may, in part, reflect the affordability and/or accessibility of the treatment program (Andersen, 1995). The individual therapist's contribution to patient change should also be considered. In this study, participants saw the same psychologist (D.D.) for their in-patient and out-patient care, providing continuity of service, which commenced at participants' initial admission to the inpatient unit. Consequently, a therapeutic rapport had been established at the study's commencement, which may have contributed to the high completion rates and improved treatment efficacy. Service delivery by a therapist who has already developed a rapport with the person may therefore play an important role. Future research could perhaps incorporate qualitative data, in the form of consumer feedback, to clarify the SCI community's perception of this innovative therapy and, in particular, which treatment factors – be it accessibility, availability and/or affordability –are more salient among this group when rating satisfaction with telecounselling.

The results of this preliminary telecounselling trial also suggest that there may be a need for longer treatment duration - particularly for individuals with chronic depression and/or anxiety. Indeed, a number of studies that have examined telephone-based psychotherapy involving both longer and more frequent sessions have reported significant improvements in mood for individuals with psychiatric co-morbidities. For example, the telephone-based program for individuals with progressive multiple sclerosis and depression, outlined by Mohr and colleagues (2005), comprised of 16 weekly sessions at 50 minutes per session. Similarly, the health promotion program developed by Stuifbergen (2003), involved a two-phase intervention for adults with multiple sclerosis, commencing with an intensive 8 week (face-to-face) psycho-educational program followed by 12 weeks of telecounselling. Both of these examples contrast with the modest telecounselling program that was examined in this current study. Indeed the brief intervention detailed here (i.e. 7 phone consults at < 20 minutes per session) may not have adequately addressed the mental health needs of the patient group and, consequently, this may have reduced its efficacy.

Future telecounselling trials could also examine other therapy modalities, in particular cognitive behavioural therapy, which has shown efficacy in individuals with chronic health conditions (e.g. multiple sclerosis), but has not been adequately explored in the SCI population (Dorstyn et al., 2011b). It may be that the specific components of cognitive behaviour therapy, including modification of negative thoughts and teaching of problem solving skills can help individuals with SCI better identify and improve their stress management skills (Mohr et al, 2005), in comparison to the motivational interviewing intervention evaluated in this trial, which indirectly focussed on cognitive skills and behaviours.

Study limitations

The current findings need to be considered in the context of a number of limitations. Specifically, statistically significant treatment effects were difficult to detect using the current sample size, even though low to moderate effect sizes occurred (Cohen, 1991). Furthermore, the power analyses (Table 2) indicate that the study was underpowered. Indeed, the study sample was constrained by the fact that it was undertaken in a single, small treatment setting. Replication of the study with a larger clinical sample, preferably involving a multi-centre trial, is therefore required to validate the results.

Additionally, the maximum benefit of randomisation was not achieved in this study – with the telecounselling group reporting greater variability in their initial levels of psychopathology. In order to improve the samples' homogeneity and, subsequently, the interpretation of group differences, future telecounselling trials could stratify allocation of participants based on injury variables (i.e. lesion completeness or level), to minimise bias when randomising small samples (Tuszynski et al, 2007).

Furthermore, an experimenter bias was also introduced by having the same therapist, who was aware of group assignment, provide telecounselling. Again, this was an unavoidable bias due to the limited staffing resources for psychology available in this particular rehabilitation setting. Further telecounselling trials therefore need to involve different therapists to deliver telecounselling, in order to rule out any potential investigator and/or interventional bias.

The time and cost-effectiveness of telecounselling also require further evaluation. This includes cost analyses across multiple treatment settings in order to generalise the present findings. These economical issues need to be addressed before telephone-based psychotherapy can be recommended as a standard practice in SCI rehabilitation.

Conclusions

The results suggest that telecounselling offers an accessible and affordable therapy option for individuals with SCI, in addition to providing an effective means of monitoring the post-rehabilitation mental health needs of this group. The need to broaden the current scope of psychotherapy delivery options for individuals with SCI is particularly important considering the long-term need for psychological services among a subgroup of this population who report continued distress.

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Chapter 7: Discussion

This thesis outlined the findings of four independent studies, which were designed to evaluate the effectiveness of cognitive behaviour therapy (CBT) and telecounselling for managing the mental health outcomes of adults with a spinal cord injury (SCI). This research was motivated by a clinical need to determine whether these psychological therapies could address the current mental health issues of this underserviced population. The specific objectives were to: (1) meta-analyse existing research that has examined the efficacy of CBT in SCI rehabilitation; (2) evaluate the effectiveness of a CBT program delivered in an inpatient clinical setting; (3) analyse previous research that has assessed the effectiveness of telecounselling when used with community-dwelling individuals with an acquired disability; and (4) evaluate the clinical and economic utility of a telecounselling program for adults with SCI recently discharged from primary rehabilitation.

A combination of research methodologies was adopted to meet these objectives, namely meta-analyses and clinical research studies. In addition, this research examined both inpatient and outpatient samples immediately after completing treatment and at a 3 month follow-up. The key findings from these four studies are summarised in this chapter, followed by a discussion of the methodological strengths and limitations of each. Finally, the broader clinical implications of these findings and future directions for SCI research will be examined.

Summary of Findings

CBT and SCI rehabilitation: Past and present research.

The first meta-analysis (Study 1, Chapter 3) examined the evidence-base for CBT among adults with a SCI; a psychotherapy that has demonstrated strong treatment efficacy for reducing symptoms of depression and anxiety among other clinical populations (Cuijpers et al., 2011; Tolin, 2010). The results of Study 1 indicated that CBT has immediate benefits for this population, contributing to significant and large treatment gains ($d_{\text{range}} =$ 0.76 to 1.96) in individuals' coping, level of assertiveness, mood and quality of life. These results were consistent across the 10 studies that underwent analysis, despite differences in the research methodologies. However, only tentative conclusions can be drawn in relation to the longer-term effectiveness of this therapy, with minimal treatment change reported for the 6 weeks to 2 years post-CBT by the small number of studies that provided these data ($N_{\text{studies}} = 5$). This meta-analysis also highlighted the need for further research on the application of individual-based CBT in SCI rehabilitation, with only one identified study evaluating this form of delivery.

The small-scale clinical trial (Study 2) detailed in Chapter 4 addressed this research need by evaluating the short-term effectiveness of an individualised 12-week CBT program delivered to 11 adults with a newly acquired SCI. This modest CBT program involved, on average, 11 treatment sessions (session duration: 30 to 60 minutes) during the course of an individual's rehabilitation. CBT participants reported moderate (albeit statistically non significant) improvements in their levels of anxiety ($d_{\text{anxiety}} = 0.50$) and stress ($d_{\text{stress}} = 0.48$) immediately following treatment. Additionally, participants who received CBT reported a significant increase in their levels of depression

($d_{\text{depression}} = -0.68$) at 3 months follow-up, after being discharged from primary rehabilitation. Standard care participants (*N* = 13), who were still being monitored by the psychologist but did not receive CBT, reported no significant change in their mood throughout the study period. Although promising, the study's lack of statistical power suggests that these results should be interpreted cautiously and that additional research is needed to confirm these findings.

Telecounselling and SCI rehabilitation: Past and present research.

The meta-analysis described in Chapter 5 (Study 3) highlighted the potential benefits of telecounselling, with strong treatment effects reported by telephone-based programs that were designed to promote coping, positive affect and community living skills in individuals with an acquired physical disability. This is consistent with other research, which suggests that the telephone can be effectively used in the delivery of psychological-based treatments for adult outpatient groups (Leach & Christensen, 2006; Mohr, et al., 2008). However, longer-term treatment gains (3 months to 2 years post-intervention) were difficult to evaluate, with only four studies providing this information. In addition, these four longitudinal studies reported non-significant treatment effects, despite using 20 different measures of quality of life, fatigue, coping, health care, social support and depression. Cost analyses of the available telecounselling programs were also lacking.

The randomised controlled trial (Study 4) reported in Chapter 6 was designed to provide these much needed data. Twenty individuals who participated in a 12-week telecounselling program, comprising 7 fortnightly sessions (average = 19 minutes, SD = 8 minutes), reported small clinical improvements in their levels of depression (*d* = 0.32), anxiety (*d* = 0.24) and stress (*d* = 0.27) immediately after treatment. Telecounselling participants also reported utilising more proactive coping strategies, including disability acceptance (*d* range: 0.24 to 0.53), than peers who received standard medical care (*N* = 20). However these treatment gains were not statistically significant. Importantly, the delivery-related outcomes were all positive. Moreover, telecounselling proved to be a highly feasible service option, achieving a 100% compliance rate, an efficient use of therapist time (total contact time ranging between 70 to 270 minutes) and favourable cost analyses (total treatment cost of $150 per client[7]).

Methodological Strengths and Limitations of this Research

As identified from the literature reviews in Chapters 1 and 2, methodological problems are inherent in the SCI and psychotherapy research. Although the four studies presented in this thesis endeavoured to address some of these concerns, there were still a number of limitations in study design, implementation and/or evaluation that could not be overcome, given the constraints of the clinical setting in which the research was undertaken and the fact that the research was completed as part of a Doctor of Philosophy degree and did not receive independent funding.

Study 1.

A key strength of this study is that it is the first meta-analytic review to examine

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[7] Cost is represented in Australian dollars

the effectiveness of CBT in SCI rehabilitation. Meta-analysis is considered to be a necessary tool to implement evidence-based practice because it has the advantage of quantifying treatment differences, in comparison to systematic or narrative reviews (Cooper, 2011; Liberati et al., 2009; Lipsey & Wilson, 2001). Therefore, Study 1 helps to bridge the gap between clinical research and practice.

This meta-analysis applied strict inclusion and exclusion criteria in order to evaluate studies that examined adult samples with a SCI (traumatic or non-traumatic). Specifically, CBT had to be delivered face-to-face by a trained health professional (e.g. psychologist, or psychiatrist). Eligible studies also had to evaluate treatment with standardised outcome assessments, administered pre- and post-CBT. These criteria contributed to the study's internal validity, which can be compromised if the results of dissimilar studies are combined in a meta-analysis (Sharpe, 1997). Additionally, no study was excluded due to limited statistical data, with both parametric and non-parametric statistics converted to Cohen's *d* effect sizes. Authors of identified studies were also contacted in order to obtain data, where this information was missing. Consequently, the maximum amount of data was available for analysis.

Despite these strengths, some problems were encountered in the data analyses. Specifically, only seven of the 10 studies provided data relating to demographic and injury variables of the respective samples. Furthermore, nine studies examined group CBT and only one study involved individual CBT. This small number of studies therefore prevented separate analyses of the impact of potential moderator variables, particularly time since injury and therapy format (group vs. individual), both of which have been identified as having a role in people's psychological adjustment to SCI (Chevalier, Kennedy, & Sherlock, 2009).

Another criticism relates to the variability in the quality of the studies that underwent analysis. In particular, the study by Hanrahan (1995) did not include a control group. Although this methodologically flawed study presented a threat to the validity of this meta-analysis (Sharpe, 1997; Strube, Gardner, & Hartmann, 1985), it was necessary to include this study given the extremely limited available research on CBT in SCI rehabilitation. Furthermore, in an attempt to address this criticism, the methodological quality of all studies was evaluated. This allowed an examination of the impact of individual methodological variables on effect size, such as the use of randomisation, published outcome measures and standardisation of treatment – all of which have previously been shown to influence treatment outcomes in psychotherapy research (Cooper, 2011; Elliott & Kennedy, 2004; Hill, Noonan, Sakakibara, Miller, & Team, 2010; Kazdin, 1985; Rosenthal, 1995; Sipski & Richards, 2006). At the same time, it can be argued that less robust study designs can still make a clinical contribution to psychological research (Andrews, 1989; Schwartz, et al., 2004). For example, the studies by Nicholson Perry et al (2010) and Glueckauf et al (1992) provided follow-up assessment, ranging between 6 and 9 months post-CBT. Both studies therefore provided valuable information about the longer-term efficacy of CBT, even though these data were only available for participants who underwent treatment.

Study 2.

The main strength of Study 2 is its generalisability to clinical activity; an issue that is often neglected in rehabilitation research (Schutz, Rivers, & Ratusnik, 2008).

Specifically, the study examined how CBT can be best delivered within a small medical setting that is characterised by limited psychological services and a clinical sample presenting with chronic symptoms of distress. Indeed, this is one of the few CBT studies conducted in a rehabilitation setting that has targeted treatment to individuals with elevated baseline levels of depression, anxiety and/or stress. The criterion that group allocation be based on the triage guidelines in place within the spinal injury unit's psychology service (i.e. participants with low DASS-21 scores being allocated minimal or 'standard' psychological monitoring/care, vs. participants with high DASS-21 scores who required targeted CBT to manage their distress), ensured that the data were more informative of the psychosocial difficulties that a subpopulation of individuals experience post-SCI (Migliorini, et al., 2008; Schwartz, et al., 2004).

At the same time, Study 2 highlighted the complexities of conducting psychotherapy research in a 'real world' setting. In particular, there are ethical problems in withholding treatment or introducing a non-treatment control condition in a clinical setting; an environment which necessitates that treatment be equitable and available to all patients, particularly when that treatment (i.e. CBT) has shown efficacy in the literature (Imber et al., 1986; Kazdin, 1994; Nicholson Perry & Craig, 2008; Schwartz, et al., 2004; Tuszynski, et al., 2007). This problem was addressed by using a low or minimal therapeutic contact 'standard care' group as a control condition, which is consistent with recommended clinical practice guidelines for psychosocial interventions in SCI rehabilitation (Nicholson Perry & Craig, 2008). However, this control condition still involved elements of a psychotherapeutic relationship, including a supportive therapist-patient relationship and monitoring of patients' clinical status, even though the active elements of CBT (i.e. psycho-education, discussion of relapse prevention) were not provided. In this respect, the control condition might have been therapeutic on its own, thereby minimising treatment differences between the two study groups (Fawcett, Epstein, Fiester, Elkin, & Autry, 1987; Kazdin, 1994).

Secondly, the treatment and controls groups in Study 2 were not randomised – with consecutive referrals to the rehabilitation unit's psychology service allocated to the CBT or standard care groups, based on their DASS-21 scores. This reduced the baseline equivalence of the two groups on the primary outcome measure. In order to improve the samples' homogeneity and, subsequently, the interpretation of group differences, participants were matched on demographic (i.e. age, sex) and injury (i.e. paraplegia vs. tetraplegia) variables, consistent with previous recommendations for SCI research (Tuszynski, et al., 2007). Furthermore, the final sample was compared to individuals who either declined participation or withdrew from the study, in addition to comparisons made with the larger group of SCI patients admitted to the rehabilitation unit. These analyses indicated that there were no significant group differences in age, gender or injury severity – suggesting that the study findings were generalisable to the larger population of individuals with SCI from this particular clinical setting.

Thirdly, the CBT treatment did not follow a standardised treatment protocol. Although a broad outline of session content is provided in this thesis, using existing protocols for CBT with SCI groups (Craig, et al., 1997; Kennedy, et al., 2003), it would be difficult to replicate this treatment based on the description provided in the published manuscript. However, specific details of the intervention were also limited due to the space restrictions imposed by the journal which published this manuscript.

Finally, the small sample size had inadequate power to detect significant treatment effects on the primary outcome measure; the DASS-21 (Cohen, 1992). This was confirmed by the post-hoc power calculations. It is important to note, however, that the sample was limited by inherent difficulties encountered with unfunded rehabilitation research that is conducted in clinical settings. In this case, the sample was based in a single inpatient setting, which serviced a small population of individuals with SCI. In recognition of the study's limited power, CBT was therefore evaluated by the calculation of Cohen's *d* effect sizes; a recommended statistic, particularly when large samples are untenable (McAweeney, Tate, & McAweeney, 1997). Consequently, the *d* values demonstrated moderate to large treatment effects for DASS-21, even though the ability to draw statistically significant conclusions was limited.

Study 3.

This meta-analysis provided the first quantitative evaluation of the available evidence on telecounselling for adults with a physical disability, as only systematic reviews of the literature have previously been conducted. This study therefore represents an important contribution to the rehabilitation literature by undertaking a high quality objective review of a specific telecommunication-based service for a specific medical population.

Study 3 involved a comprehensive search of the literature, using recommended search strategies for meta-analyses (Cooper, 2011). This included: a broad search of available electronic databases and peer-reviewed journals; a manual search of the reference list of all retrieved studies; in addition to correspondence with the authors of studies that were identified as being relevant. The search method, including the key terms used for the database searches, was reported in detail, allowing the study to be replicated.

However, the results relating to the longer-term impact of telecounselling can only be considered tentative in this study. Specifically, the follow-up assessments provided by four of the studies included in the meta-analytic review were brought into question by the associated low fail safe *N* (*N*fs) statistics. This suggests that the results could potentially be overturned by a small number ($N > 4$) of unpublished papers reporting telecounselling to be an ineffective form of treatment. Further telecounselling trials that incorporate longitudinal assessments are therefore needed in order to clarify whether treatment gains with this therapy are maintained in the longer-term.

Another limitation related to the study's statistical analyses, which may have contributed to an increase in the chances of making a Type 1 error. Specifically, effect sizes were calculated for each independent outcome measure to allow more detailed examination of the impact of telecounselling on multiple domains of psychosocial functioning. This resulted in individual effect size calculations for 31 subscales for 22 different questionnaires – thereby increasing the likelihood of a Type 1 error, or finding a significant treatment effect when in fact there isn't one. However, a complete description of the methods used to calculate effect size estimates was also provided to allow validation of the data (Cooper, 2011).

Study 4.

Study 4 evaluated the treatment effectiveness of telecounselling by: randomising the allocation of participants with SCI to a telecounselling Treatment or standard care Control group; having an independent assessor who was not informed of group allocation;

utilising a clinician-based interview in addition to self-report measures of outcome; and including a follow-up assessment. These features are consistent with recommendations for SCI outcome research (Craig, et al., 2009; Hill, et al., 2010; Lammertse et al., 2007; Tuszynski, et al., 2007) and, therefore, address some of the methodological problems inherent in other SCI psychotherapy trials (Elliott & Kennedy, 2004; Gerber, et al., 2011; McAweeney, et al., 1997).

Study 4 is also one of the first telecounselling trials conducted with an Australian sample, with other research based on community samples with SCI living in the United States (Study 3). It is important for SCI trials to be conducted across a variety of settings and with different clinical samples, to increase our confidence in the accuracy and generalisability of the available findings to the SCI population at large (Elliott & Kennedy, 2004).

Despite these methodological strengths, there were a number of threats to internal validity. Specifically, the use of a block randomisation procedure for group allocation did not effectively equalise the telecounselling and standard care participants across the measured characteristics. This was evident in the baseline measures of depression and anxiety, which approached statistical significance ($p = 0.09$) – with telecounselling participants reporting greater variability in these outcomes. Furthermore, statistically significant group differences were noted for a number of injury-related variables (i.e. severity of SCI, length of rehabilitation stay, and degree of functional independence), with the telecounselling group achieving poor outcomes across these measures.

The efficacy of telecounselling may also have also been compromised by participants' pre-morbid psychiatric history - with a larger proportion (25% vs. 5%) of telecounselling participants having had a past diagnosis of major depression. In addition, neuropathic pain may have acted as a moderating treatment factor – with the majority of participants requiring long-term prescription medication for the management of SCI-related pain. Although both of these variables are known to impede functional outcomes post-SCI, including depression (Bombardier, et al., 2004; Nicholson Perry & Middleton, 2010; Nicholson Perry, et al., 2009; Tawashy, et al., 2009), they were not examined in detail in the current research.

Study power was also problematic. This was demonstrated by the post hoc power analyses, which identified consistently low power across the analyses of variance conducted on the measures of primary (DASS-21) and secondary outcome (SCL scales, MDSS). The small sample size probably resulted in insufficient power to detect potentially significant treatment effects, despite achieving a moderate size (i.e. $d > 0.40$) across the SCL subscales measuring acceptance, intrusion and helplessness (Cohen, 1991).

Given that Study 4 involved an intervention that was delivered on a one-to-one basis, in addition to the small sample size, it may have been better to evaluate treatment efficacy using a methodological design that focussed on individual change in participants over time. One example of this is the multiple-baseline design, which requires a well established baseline involving repeated assessments over a specified time-period (Perdices & Tate, 2009). Another example is the multi-phase (A-B-A-B) design which commonly involves 4 phases: (a) baseline; (b) treatment; (a) withdrawal of treatment (i.e. return to baseline); and (b) second treatment phase (Howick, Glasziou, & Aronson, 2010; Perdices & Tate, 2009). Both of these designs control for the above-mentioned threats to internal validity because they allow for individual variability in the dependent variable (i.e. the behaviour being evaluated) and, importantly, they cater to small sample sizes (Perdices & Tate, 2009; Schutz, et al., 2008). Furthermore, the replicability of these experimental designs meets best practice standards for research in psychology, whilst allowing the methodological flexibility that is required for psychotherapy research in clinical rehabilitation settings (Bauer, 2007; Des Jarlais, Lyles, & Crepaz, 2004).

Clinical Implications and Recommendations for Future Research

The present findings have contributed to the SCI literature by providing empirical support for the application of psychological interventions across both primary and community-based rehabilitation settings. The relevant findings also have broader implications for clinical practice in SCI rehabilitation.

CBT in primary SCI rehabilitation.

Importantly, the significant treatment effects associated with the CBT programs that were evaluated in Study 1 are comparable to current biomedical (i.e. pharmacological) interventions for the treatment of diagnosed mental health disorders (e.g. depression, anxiety) among adult samples in primary health care (Australian Psychological Society 2010; Vohringer & Ghaemi, 2011) . This suggests that CBT should be considered a first-line psychological treatment option for individuals experiencing psychological difficulties following a SCI (Ehde & Jensen, 2007; Tolin, 2010).

Study 1 also highlighted CBT’s efficacy in reducing specific symptoms of illness (e.g. depression, anxiety), in addition to improving general health functioning (e.g. quality of life, coping skills). This indicates that CBT can be efficacious for all individuals with a newly acquired SCI, regardless of their psychological co-morbidities. Moreover, this is consistent with available clinical practice guidelines for SCI rehabilitation, which recommend that a standard psychosocial protocol involving an evidence-based treatment, such as CBT, be readily available to all patients (Consortium for Spinal Cord Medicine, 1998; Nicholson Perry & Craig, 2008). This would also support a biopsychosocial model of care, which acknowledges the importance of early management of psychological issues in order to maximise patients' psychological rehabilitation outcomes (Middleton & Craig, 2008; Migliorini, et al., 2009; Nicholson Perry & Craig, 2008; O'Donnell, Bryant, Creamer, & Carty, 2008; Schwartz, et al., 2004). Future research could perhaps examine plausible alternatives to CBT, including mindfulness-based therapy, which has shown promise as a therapeutic model with medical populations but has not yet been adequately investigated in the SCI population (Veehof, Oskam, Schreurs, & Bohlmeijer, 2011).

However, more work needs to be done to distinguish the relative benefits of CBT delivered on a group versus individual basis, with Studies 1 and 2 identifying the statistical and/or clinical effectiveness of both formats across individual psychological outcomes, including depression. Again, this is consistent with the psychotherapy literature, with significant gains associated with both group- and individual-based CBT for a range of affective disorders among community primary care samples (Tolin, 2010). However, the SCI literature has also identified time- efficiency and cost-effectiveness as being the key determinants for selecting a therapy format (Craig & Hancock, 1994). Future CBT trials could therefore evaluate the treatment effectiveness and cost-efficiency of both group- and individual-based therapy programs within the same clinical setting, to determine the relative benefits of each therapy format. Combined, this additional data would provide further information on how to improve the CBT interventions currently offered by rehabilitation professionals to individuals with SCI. Furthermore, this data could possibly compel resource allocation to successful CBT programs within SCI rehabilitation.

The clinical treatment gains reported by CBT participants in Study 2 may have also reflected the multidisciplinary context in which psychotherapy was provided. Specifically, the spinal injuries unit examined in this study utilised a peer support model, whereby SCI-related information and counselling was provided by two peers with SCI employed by the Paraquad Association of South Australia (http://www.pqasa. asn.au). Additionally, participants had access to psychiatric assessment and treatment so, potentially, medication was included in conjunction with CBT. Clinical practice guidelines emphasise psychopharmacology (i.e. antidepressant medication) as a critical and effective component of the psychosocial care of individuals with SCI (Consortium for Spinal Cord Medicine, 1998). The literature also identifies peer programs as a service model in SCI rehabilitation (Middleton & Craig, 2008). However, quantitative evaluations of these peer programs are currently limited. Future CBT trials could therefore employ two treatment conditions: CBT delivered by a trained mental health practitioner (i.e. psychologist, social worker, psychiatrist, nurse), in addition to CBT delivered by two co-therapists; a practitioner and a peer with SCI. The inclusion of these two comparison groups would help to clarify the extent to which the contribution of a peer, as a role model, enhances an individual's progress in CBT.

Telecounselling in community-based SCI rehabilitation.

The results of Study 3 suggest that established psychological therapies, such as CBT, can be effectively delivered by telephone, in an individual or group format, to individuals with a SCI. Once again, this supports the biopsychosocial model of rehabilitation, which emphasises the importance of adapting psychotherapeutic techniques to meet an individual's emotional needs in addition to the demands of the treatment environment (World Health Organisation, 2001).

The use of telecounselling in the time following inpatient SCI rehabilitation has significant clinical appeal because of its cost-effectiveness and ability to assist in overcoming some of the physical barriers faced by individuals with a SCI when trying to access services (World Health Organisation, 2011). The clinical feasibility of telecounselling was indeed highlighted in Study 4, which reported a 100% participation rate. This high participation rate is consistent with research on Andersen's Behavioural Model of Health Service Usage, which suggests that an important predictor of people's use and acceptance of a health service is the accessibility of the service (Andersen & Davidson, 1997; de Boer, Wijker, & de Haes, 1997). Study 4 also found that telecounselling is an economical treatment.

The clinical and economic feasibility of telecounselling could be further supported with additional research which compares this therapy to other telecommunication systems for the delivery of psychotherapy. This includes video technology and internet-based therapies, both of which have been associated with comparable (i.e. small to moderate) treatment effects for individuals who have chronic health conditions (Barak, Hen, Boniel-Nissim, & Shapira, 2008; Cuijpers, van Straten, & Andersson, 2008; Dellifrane &

Dansky, 2008; Demiris, Shigaki, & Schopp, 2005) This research would highlight the clinical benefits and limitations of the above mentioned therapies, in addition to the needs of both consumers and service providers. This information could, in turn, help provide a framework for the use of these technologies in the psychosocial care of persons with SCI in the community.

Importantly, telecounselling can also be considered an ethical practice. In particular, telecounselling has the potential to offer community-based mental health practitioners more opportunities to effectively and efficiently monitor the long-term psychological health of individuals with SCI, thereby helping to prevent and treat psychological problems before they become more serious and established. This is consistent with a preventative biopsychosocial model of mental health care (Mohr, Hart, et al., 2005). It also complies with the local, state-wide plan for SCI rehabilitation services (South Australian Government, 2012) - which emphasises the need to expand and improve community-based treatments for this population.

Unfortunately, the long-term effectiveness of telecounselling has yet to be demonstrated, with a tendency for early treatment gains (including quality of life and symptoms of depression) across the evaluated telecounselling trials in Studies 3 and 4, not to be maintained, once treatment had ceased. Similarly, the treatment effects reported by the telecounselling participants at 6 months post-rehabilitation, in Study 4, were minimal. Combined, these results suggest that there may be a need for more extended service delivery, involving a longer treatment duration or with telecounselling provided on a 'needs basis' - particularly for individuals with chronic symptoms of clinical depression and/or anxiety. The need to provide periodic maintenance sessions to help individuals sustain the coping skills that they are taught during primary (inpatient) care is emphasised in the rehabilitation literature (Mozer et al., 2008; World Health Organisation, 2011).

In recognition of the need for data on the longitudinal impact of telecounselling, the researchers of Study 4 are planning a 12-month follow-up of the original sample (*N* = 40 participants), again using the key outcome measures (i.e. DASS-21, SCL coping scales). In addition, these researchers are planning to expand this study by recruiting an additional sample of 40 participants (20 Telecounselling, 20 Standard Care) with SCI from the South Australian Spinal Cord Injury Service, thereby increasing the final sample size to 80. Furthermore, a different therapist will be utilised to deliver telecounselling. This larger sample would ensure that the study has sufficient statistical power to detect clinically meaningful treatment effects (Cohen, 1991). The results of this proposed study will also have direct clinical significance by contributing to the development of a standardised protocol for the delivery of telecounselling with this population. The availability of such a manual would then allow the telephone-based intervention to be replicated by different specialists within the mental health care field. Furthermore, this protocol has the potential to be applied and/or extended to other chronic conditions associated with long-term psychological difficulties, such as multiple sclerosis and traumatic brain injury; conditions that have shown significant psychosocial improvements in recent telecounselling trials (Bombardier, et al., 2009; Bombardier, et al., 2008).

Summary

The four independent studies detailed in this thesis highlight the critical role of psychological interventions in the rehabilitative care of adults with an acquired SCI.

Consistent with a biopsychosocial approach to rehabilitation, the findings of Studies 1 and 2 reinforce the importance of assessing and managing psychological variables (e.g. mood, coping skills), using targeted CBT in the early stages of rehabilitation, in order to facilitate an individual's early adjustment to their SCI. The findings of Studies 3 and 4 further suggest that telecounselling can help to broaden the SCI population's access to community-based psychotherapy by circumventing some of the financial and practical barriers associated with the standard model of outpatient spinal health care in Australia.

Importantly, the combined studies addressed an under-researched and neglected clinical area: the impact of targeted psychological treatments in SCI rehabilitation. The findings therefore contribute to evidence-based practice by evaluating the effectiveness of two treatments, CBT and telecounselling, which have the potential to decrease the burden of mental illness among a sub-group of individuals with SCI who experience chronic psychological problems. Both ethics and economics also support a role for these treatments in the mental health care of individuals with SCI. Further large-scale and longer-term research will help to translate the findings of this research into clinical practice.

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