Research Article

Can targeted job-information for adults with spinal cord dysfunction be effectively delivered online? A pilot study

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Objective: To pilot a novel email-based information package (*Work and SCI*) for job-seekers with an acquired spinal cord injury (SCI) or spinal cord dysfunction (SCI/D).

Study design: Prospective, non-randomized, repeated measures trial.

Setting: Community dwelling cohort in Australia.

Participants: Five people with SCI (mean age 46.4 years, SD = 10.2; 4 female) initially reviewed *Work and SCI*. Twenty-four with SCI/D subsequently enrolled, of whom 16 (mean age 46.4 years, SD = 11.1; 7 female), completed the intervention.

Intervention: Intervention participants accessed *Work and SCI* over a 4-week period.

Outcome measures: Individual changes in pre-post scores for the *My Vocational Situation Scale*, *Job Procurement Self-Efficacy Scale*, *Patient Health Questionnaire-9* and *Life Orientation Test-Revised* were examined.

Results: Reliable change in pre-post scores across outcomes were reported by 38% ($n = 6$) of participants. Favorable comments on the *Work and SCI* resource were provided in addition to suggestions for improvement.

Conclusions: Preliminary data suggest that *Work and SCI* may help to establish vocational interests among job-seekers with a SCI/D, however further work is needed to enhance participant compliance. This might include moderator support to promote and maintain participation. A controlled design will also help to identify factors that influence engagement with the *Work and SCI* resource.

Keywords: Spinal cord injury, Employment, Unemployment, Return-to-work

Introduction

Research indicates a sub-optimal return-to-work rate among adults with spinal cord injury or dysfunction (SCI/D), despite many being capable of engaging in paid employment.¹⁻³ The complexity of unemployment is highlighted by Australian economic data which demonstrates a steady decline in labor-force

participation rates over the last 10 years for working-age adults with physical disabilities, despite sustained economic growth.⁴ This underutilization of people with SCI/D of working age contributes to significant personal costs for the injured individual and their family in addition to economic costs associated with long-term care and lost productivity.^{4,5}

Multiple factors can impede participation and create disability for those living with SCI/D in Australia. This includes secondary medical complications

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(e.g. fatigue, chronic pain), which may limit opportunities for entering employment.⁶ Discriminatory attitudes and practices in the workplace, lack of accessible and affordable transport and difficulties accessing flexible work arrangements can also limit workforce participation.⁷ The pathway to employment can be more arduous for those living in regional, rural and remote communities, who are likely to become isolated because of their impairment and distance from metropolitan-based specialist services.⁷⁻⁹ Psychological barriers are also problematic. For instance, a significant minority is susceptible to depression.^{10,11} Mental health has a reciprocal relationship with social functioning,¹² including employment,¹³ as demonstrated in the general population of job-seekers.¹⁴ For those with SCI/D, low mood may also be perpetuated by work expectations, including a lack of confidence in managing workplace experiences (an aspect of self-efficacy) and pessimism about job opportunities.^{5,7-9} Notably, these structural and individual barriers are present at different

stages of employment, including re-entering the workforce (e.g. return-to-work opportunities, recruitment processes) and retention (e.g. initial workplace experiences, managing disability issues in the workplace).¹⁵

In this context, cost-effective and accessible methods of vocational service delivery for Australians with a SCI/D are needed. One promising avenue is the use of the Internet as a tool to supplement face-to-face contact in rehabilitation services. Significant and positive gains in participants' health knowledge and general coping skills have been demonstrated with on-line learning.¹⁶ Moreover, consumers are receptive to, and satisfied with, media-based service delivery.^{17,18} To date, however, little is known about the role of on-line learning in vocational rehabilitation for persons with SCI (see Roels *et al.*,¹⁹ and Treneman *et al.*,²⁰ for recent reviews).

Pilot data for individuals diagnosed with Multiple Sclerosis (MS), a chronic neurodegenerative disorder, suggest that targeted job information delivered via email may impact work behaviors and attitudes in a positive way.²¹ The objective of the current study was to establish if this would also be the case for persons with SCI/D. It was expected that only minor amendments to the established targeted job information program, developed for those with MS, would be needed to tailor the program for persons with SCI/D. It was hypothesized that the program would positively impact self-efficacy expectations about return-to-work and, potentially, work attitude. Of secondary interest was whether the program might improve vocational attitude, mood and general optimism.

Methods

Program content

Work and SCI was adapted from an original 7-module package developed as a consumer-based support resource to help adults with MS better understand their employment/career goals.²¹ The content of *Work and SCI* is based on established principles of successful vocational rehabilitation, including the need to improve general employment-related knowledge (i.e. recognizing one's transferable vocational skills/interests) alongside targeted job seeking and job retention skills (e.g. interviewing and resumé skills, clarification of functional limitations, job networking strategies).^{3,5,9} The introductory and six learning modules contain hyperlinks to job resources, video footage with employed peers, written case scenarios and optional homework assignments (Table 1). Participants select the modules that are appropriate to their work situation and then use the material.

Table 1 Overview of *Work and SCI*.

Module	Topics covered
1. Introduction	<ul style="list-style-type: none"> • Introduction to <i>Work and SCI</i>
2. Job facts	<ul style="list-style-type: none"> • Contact details of moderator • Facts and figures about employment and SCI • Managing potential employment barriers • Psychological factors and work • Facilitators of employment • Legal rights
3. Finding work	<ul style="list-style-type: none"> • Determining job fit • Job search strategies • Registration with vocational services • Further study or training options • Case study
4. Resume writing and interview preparation	<ul style="list-style-type: none"> • Structure and content of cover letter and resume • Disclosure of disability • Interview preparation
5. Interview dos and don'ts	<ul style="list-style-type: none"> • Strategies to improve interview success • Understanding employers' needs • Interview follow-up
6. Maintaining work	<ul style="list-style-type: none"> • Management of physical and psychological health • Management of workplace environment • Case study
7. Career development	<ul style="list-style-type: none"> • Maintaining and developing work skills • Networking • Benefits of a mentoring relationship • Case study

Peer review

Recruitment

The *Work and SCI* resource was trialed with a small group of adults with SCI, including two peer counselors, recruited from Paraquad SA—a lead disability advocacy and support agency within South Australia.

Procedure

Data were collected from individuals answering questions either via telephone interview ($n = 1$) or email ($n = 4$).

Pilot study

Recruitment

Of 33 national organizations listed as disability support and employment agencies, targeted to SCI/D (available from: <https://docs.employment.gov.au>), 19 agreed to promote the study. A link to the online survey was posted in e-newsletters and/or social networking pages (e.g. Facebook, Twitter) of 14 recruiting organizations, with five organizations requesting fliers. Eligibility criteria required that participants be community dwelling adults (≥ 18 years) with an acquired SCI or SCI/D who were currently seeking work. This included individuals who were not currently employed in addition to those who were employed but seeking alternative work options. This broad-based recruitment was necessary given that both finding and maintaining employment are critical issues for those with a physical disability.²² Additional eligibility requirements included access to a computer and English language literacy (at least 6 years of formal education).

Procedure

Once participants had completed the baseline survey, they were emailed the *Work and SCI* modules. Four weeks later, the same participants were emailed a follow-up survey. Five participants agreed to an open-ended interview conducted by telephone, with an additional six providing feedback via email.

Measures

In addition to self-reported socio-demographic and SCI/D details, standardized self-report measures of functioning were administered prior to, and one month after participants had accessed *Work and SCI*. Baseline measures included an index of disability, Craig Handicap Assessment and Reporting Technique (*CHART*),²³ and perceptions of the quality and accessibility of vocational services (*Service Satisfaction Scale*²⁴—adapted with permission). Primary outcome

measures focused on vocational identity - defined as stable and clear vocational goals and interests (*My Vocational Situation Scale*, *MVS*²⁵), and confidence in one's ability to perform the skills involved in seeking employment (*Job Procurement Self-efficacy Scale*, *JSES*²⁶); both administered pre- and post- intervention. Secondary pre- and post- outcomes included depressive symptomatology (*Patient Health Questionnaire*, *PHQ-9*^{27,28}) and optimism (*Life Orientation Test-Revised*, *LOT-R*²⁹). For each measure, higher scores indicated greater levels of the domain examined (i.e. functional independence, service satisfaction, self-efficacy, depressive mood, optimism). Good internal consistency was demonstrated across all measures (alpha range = .83 to .94). These quantitative data were supplemented with two open-ended questions ('Are there any comments you would like to make about this project? Is there anything you liked about the modules or that could be improved?'). The opportunity to provide this feedback via telephone interview with a research assistant (EP) was additionally offered.

Compliance with ethical standards

Ethical approval was granted by the University of Adelaide Human Research Ethics Committee (project no. H-2015-078). This project is registered on the Australian New Zealand Clinical Trials Registry (no. ACTRN12616000812493).

Analyses

Descriptive statistics and non-parametric analyses provided a general overview of the sample. This included group comparisons between intervention completers ($n = 16$) and study withdrawals ($n = 8$) on baseline measurements (i.e. time since SCI/D, *CHART*, psychological measures) using the Mann Whitney *U* test. Differences in primary measures were also examined for the two job-seeker subgroups recruited for this study: those not employed ($n = 9$) and those employed but seeking alternative work ($n = 7$).

The pilot nature of this study precluded meaningful analysis of pre- and post-comparisons, therefore the reliability of individual level change was examined.³⁰ This was based on the formula described by the Center for Clinical Informatics,³¹ which utilises an alpha of 0.05 (corresponding to the 95% confidence interval or reliability change index (RCI) of 1.645; (See: <https://www.psychoutcomes.org/> Accessed 8 March 2017). Delivery-related outcomes (e.g. attrition rate, implementation costs) were also evaluated to determine the feasibility of *Work and SCI* and areas for improvement. Quantitative data were supplemented with interview data which were

Table 2 Demographic and injury characteristics of final sample (*N* = 16).

Variable	<i>N</i> (%)	<i>M</i> (SD)	<i>Mdn</i> (IQR)
Age (years)	16 (100)	46.4 (11.4)	45.0 (37.0, 56.7)
Time since injury (years)	16 (100)	18.2 (14.8)	13.0 (6.2, 27.0)
CHART (physical independence subscale)	16 (100)	79.1 (23.3)	83.5 (75.3, 96.4)
Sex			
Male	9 (56.2)		
Female	7 (43.8)		
Neurological level			
Tetraplegia (C1-C6)	9 (56.2)		
Paraplegia (C7-T11, 2 congenital paraplegia)	7 (43.8)		
SCI severity *			
Complete	5 (31.3)		
Incomplete	2 (12.5)		
SCI/D aetiology			
Motor vehicle/motorbike/bicycle accident	6 (37.5)		
Fall	3 (18.7)		
Sports-related	2 (12.5)		
Congenital	2 (12.5)		
Vascular	1 (6.3)		
Neoplastic	1 (6.3)		
Infective	1 (6.3)		
Education			
Some high school	1 (6.3)		
High school completion	2 (12.5)		
Trade certificate	3 (18.7)		
Tertiary degree or diploma	4 (25.0)		
Postgraduate	6 (37.5)		
Relationship status			
Married/partnered	8 (50.0)		
Single/widowed	8 (50.0)		
Employment status (past)			
Paid work	12 (75.0)		
Full-time	9 (56.3)		
Part-time/casual	3 (18.7)		
Student [†]	3 (18.7)		
Not employed	2 (12.5)		
Pension	2 (12.5)		
Employment status (current)			
Paid work	7 (43.8)		
Full-time	1 (6.3)		
Part-time/casual [†]	6 (37.5)		
Self-employed	3 (18.7)		
Unpaid work (i.e. volunteering) [†]	4 (25.0)		
Not employed	7 (43.8)		
Unemployed	6 (37.5)		
Pension	1 (6.3)		

M (SD), mean (standard deviation); *Mdn* (IQR), median (interquartile range; 25th and 75th percentiles); *N*, number of participants providing this data.

*Missing data.

[†] Overlapping data: studying/part-time work, volunteering/not employed, employed part-time/disability pension.

transcribed, and along with the written email data, examined for content by one researcher (ACH) and checked by a second (DD).

Results

Peer review

Participants

Four females and one male with a mean age of 46 years (SD: 11.4, range: 36 to 64 years) reviewed the *Work and SCI* resource. All had sustained traumatic-onset SCI (mean time since injury: 19 years, SD: 10.2 range: 2.5 to 27 years; paraplegic: *n* = 3; T4-T10; tetraplegic: *n* = 2; C6/7; incomplete lesion: *n* = 1).

Intervention

Readability, relevance to SCI, and useful hyperlinks were identified by peer review. Minor changes to wording were suggested and subsequently incorporated.

Pilot study

Participants

Thirty-one participants responded to the survey request. Incomplete survey data (i.e. > 90% missing) for seven participants were subsequently removed resulting in a sample of 24 participants. Of these, 16 participants completed both pre- and post-measures. Demographic and injury details for the final sample are provided in Table 2. Those who withdrew from the study did not significantly differ in age (age *Mdn* = 47.5; *U* = 61.5, *Z* = -0.15, *P* = 0.88), sex ($\chi^2(1) = 2.09$, *P* = 0.21), employment status (not currently employed: 63% withdrawals vs. 58% completers, *P* = 0.67, Fishers' exact test), or impairment ratings (CHART *Mdn* = 95.5; *U* = 48.0, *Z* = -0.97, *P* = 0.35) in comparison to participants who accessed *Work and SCI*. However, mean baseline differences in time since diagnosis and PHQ-9 ratings were noted: withdrawals were more likely to have a newly acquired injury (*Mdn* = 4.3 yrs; *U* = 27.5, *Z* = -2.23, *P* = 0.03) and to report low mood (*Mdn* = 13.0; *U* = 12.0, *Z* = -3.19, *P* < 0.01). Baseline differences in LOT-R scores were also noted among the 16 participants who accessed *Work and SCI*: those employed but actively looking for a new job were more optimistic about life (*Mdn* = 18.5), in general, than peers who were not employed (*Mdn* = 10.5; *U* = 24.0, *Z* = -2.77, *P* = 0.01).

Service satisfaction

Baseline ratings on the *Service Obstacles Scale* indicated general dissatisfaction with employment services (69%), including unavailability of services targeted to the needs of those with SCI/D (88%) and little confidence in the quality of vocational supports (75%). Participants also acknowledged having a limited knowledge of community resources (56%). Environmental barriers (i.e. limited work opportunities, accessibility and transport issues, negative attitudes and behaviours; 69%) to labour-force

participation, more so than SCI-related medical factors (i.e. general health, ageing; 23%) were identified in addition to a need for personal development of effective skill sets, such as communication (15%).

Work and SCI: Effects and feasibility

Six participants (37.5%) reported change that could be considered clinically significant on one or more psychological measures (i.e. mean change scores: JSES = 17.7; MVS = 3.7; LOT-R = 8.4; PHQ-9 = 3.2), with four participants reporting positive career thoughts, enhanced self-efficacy and/or optimistic attitudes and behaviours. Interestingly, two participants rated a lack of self-satisfaction about their vocational goals alongside a less favourable outlook on life after accessing the *Work and SCI* material. A fifth participant described a significant deterioration in mood (PHQ pre-post rating: 13 to 16) although, during interview, related this to a recent bout of physical illness requiring rehospitalisation. The broad distribution of responses to *Work and SCI* is highlighted by the interquartile ranges for each psychological measure (Table 3). Notably, there were no significant differences in pre-post change scores between job seekers that were employed but seeking new work and those not employed ($P \geq 1.0$). Moreover, both groups accessed similar module content, reading 4 of the 6 learning modules on average ($U = 26.0$, $Z = -0.67$, $P = 0.60$).

The cost-effectiveness of *Work and SCI*, a key aspect of utility, is still to be determined. In this pilot phase, expenses incurred related to module development: \$AU 2500 for the production of video (peer) interviews and approximately \$AUD 9200 in personnel costs (two salaried staff, employed on a part-time basis over a 3 month period). It is premature to consider costs per

participant as, in this instance, none took up the offer of moderator support—a costing that needs to be considered in future trials (e.g. telephone contact time if delivered by a registered psychologist or vocational counsellor with expertise in SCI rehabilitation). It is anticipated that ongoing maintenance costs, including routine review of module content, will be considerably reduced once *Work and SCI* is fully operational.

Although reasons for withdrawal (33% attrition rate) were not readily provided, three participants did email the lead author identifying mitigating circumstances (i.e. medical or family/personal reasons). A fourth participant provided incorrect contact (email) details, hence was lost at intake. Importantly, participant feedback ($n = 11$) supports further development of the *Work and SCI* resource (Table 4). Readability and text comprehension were noted as positives. Specifically, the use of simple graphic elements (e.g. bulleted lists, numbered steps, short sentences) helped make the information visually accessible. Information quality (i.e. coverage, comprehensiveness), links to further information sources, ease of use and relevance to the SCI/D target group, were also endorsed: “*very informative, great resources to keep for use, very supportive platform, good specifics to SCI...*” (Female, 44 years, C5 tetraplegia)

Suggestions for improvement were offered. One participant commented that the information was ‘basic’ and underestimated the reading level of the target group, whilst another suggested that some of the content was negative in outlook (e.g. data on return-to-work rates following SCI/D). For the most part, however, a need for additional targeted information was identified. This included more anecdotal case studies to illustrate key points (“*...reading/ hearing of others experiences is very uplifting (even if it was a tough slog) as it helps one get your head around problems and knowing others have had to do it as well...*”; Female, 59 years of age, T7 paraplegia). Positive strategies to change attitudes and make a genuine impact on discrimination and stigma in the workplace were also highlighted: “*I am more than my disability. Stigma shuts down success.*” (Male, 40 years, T10 paraplegia).

Discussion

This single arm trial demonstrated that digitally distributing vocational information can address both generic (e.g. identifying employability skills) and specific (e.g. managing SCI/D in the workplace) needs of job-seekers with SCI/D, regardless of the different experiences and perspectives of the particular sample in this pilot study. The current findings, although preliminary, warrant further controlled research to

Table 3 Mean and median scores prior to, and after accessing, *Work and SCI*.

Measure	Pre			Post		
	M (SD)	Mdn (IQR)	N	M (SD)	Mdn (IQR)	N
MVS	12.4 (4.7)	14.0 (8.0–17.0)	15	11.2 (5.9)	12.5 (7.3–18.0)	16
JSES	64.7 (21.2)	65.5 (54.2–84.5)	16	67.0 (20.2)	69.5 (51.2–92.0)	16
PHQ-9	3.5 (4.1)	2.5 (1.0–5.5)	16	4.3 (4.6)	3.0 (1.0–6.5)	16
LOT-R	15.4 (5.1)	17.5 (10.7–19.7)	16	13.5 (4.5)	13.5 (11.2–17.7)	16

M (SD), mean and standard deviation; Mdn (IQR), median and interquartile range; N, number of participants providing this data. Measure abbreviations: JSES, Job Procurement Self-efficacy Scale; LOT-R, Life Orientation Test-Revised; MVS, My Vocational Situation; PHQ, Patient Health Questionnaire.

determine the contribution of *Work and SCI* to a supported employment approach for Australians with SCI/D.

As an email-based program, *Work and SCI* permits home-based learning, alleviating some of the return-to-work barriers faced by persons with SCI/D in accessing targeted and timely face-to-face work support.^{5,7,8} However, it is also important to actively engage persons with SCI/D in job-seeking and acquisition in line with evidence-based supported employment practices.³² For a job-seeking and job preparation resource, such as *Work and SCI*, to reach its full potential therefore requires active involvement of rehabilitation professionals who can assess and motivate the individual to consider return-to-work options.^{18,32} Indeed, *Work and SCI* would work well as a tool to supplement vocational discussion and guidance in persons with SCI/D more-so than a stand-alone intervention.

The findings also highlight a need to consider the motivating factors, or behavioral intent with respect to finding a job. Ideally, vocational discussion and guidance should commence during the sub-acute phase of SCI rehabilitation to help promote early, positive return-to-work expectations and realistic return to work goals.¹³ Within an Australian context at least, this would require a shift in the current vocational model, which relies on post-discharge care.^{5,8,9} One

option is to supplement *Work and SCI* with active moderator support via pro-active email prompts and opportunity for telephone consults. Based on established principles and techniques of Motivational Interviewing,³³ individuals would be supported in identifying their employment goals (and any ambivalence in the employment process) and learn self-motivational techniques to sustain employment. Preliminary results suggest that brief motivational work can help to support self-management and motivate adaptive health behavior change following SCI.³⁴

Another consideration for future *Work and SCI* trials is the screening process. Given that up to 60% of people with traumatic SCI have concurrent TBI, which often has not been diagnosed,^{35,36} and whilst a third have lowered cognitive capacity due to SCI complications (e.g. fatigue, pain, medication side-effects),³⁷ routine screening for cognitive impairment is important. Indeed, the self-management model of *Work and SCI* may be inappropriate for those with severe neuropsychological symptoms, such as apathy and difficulty in new learning³⁷; a cohort that responds better to a case-coordinated approach to vocational rehabilitation.³⁸ Future trials might therefore consider assessing for SCI sequelae and comorbidities.

Measures to minimize participant drop out should be incorporated in future trial designs. The high attrition rate in this study, although comparable to SCI cohort research³⁹ and internet-based interventions,⁴⁰ was characterized by a subset of individuals who reported diagnostic symptoms consistent with a depressive disorder (PHQ > 10). Future research might only enrol participants most likely to complete the study, determined by baseline mood status, although this then limits the generalizability of the findings to those who are symptomatic. Alternatively, participant burden could be minimized by morphing *Work and SCI* into an online platform; a visually appealing medium. Whilst online service delivery would require IT programming and maintenance (i.e. monitoring of web page and module content) it would allow wide dissemination of *Work and SCI*, helping to offset development costs. The possibility of adapting *Work and SCI* to an international audience also has appeal, although this would involve a review of the current content—most of which is specific to the Australian employment environment (e.g. legislation, registration with vocational services, further study/training options).

Conclusions

Early vocational intervention is critical to job retention for those with SCI/D. However, more investment into

Table 4 Participant feedback on *Work and SCI*.

Perceived strengths	Suggestions for improvement
<ul style="list-style-type: none"> • Clear and concise • Easy to read and understand • Good balance of visuals and text • Flowed well, sequential • Informative • Interesting • Comprehensive • Short length of modules • Ease of movement between modules • Information specific to SCI • Great resources regarding people and organisations to keep and refer back to as needed • Case studies highlighting what people have achieved • Checklist approach • Hyperlinks to online resources • Practical tips and ideas 	<ul style="list-style-type: none"> • More case studies • More information for people with tetraplegia • Positive tone – currently slightly negative and deflating • Emphasis on motivational aspects • Material on mental health, resilience, confidence, self esteem • Sophistication of material – currently fairly basic • Advice on discrimination and stigma during interview and selection processes • Information on where to go for independent advice on discrimination • Financial information (e.g. government subsidies) • How to access workplace assistance • How to manage carers at work • Advice and tips on time management

the services that assist them to remain employed is important. The current pilot data present a novel solution: the use of email-based information to promote vocational goals, interests and strengths among injured job-seekers. Randomized controlled trials which address the limitations of this study are required to determine the effectiveness of *Work and SCI* as a set of tools, information and linkages relating to vocational pursuits and career development.

Acknowledgements

The authors are very grateful for the cooperation of all participants and to the organizations that assisted with recruitment. Special thanks go to Vicky Machen and Graham O'Neil of the Paraplegic and Quadriplegic Association of South Australia (PQSA) for their assistance with the development of *Work and SCI*. We also wish to acknowledge Dr Stuart Howell, Senior Statistician, from the School of Public Health at the University of Adelaide.

Disclaimer statements

Contributors None.

Conflicts of interest P. Stewart (CEO) and S. Neeson (Manager, Support Services) are employed by PQSA, a participating organization in this project.

Funding This project was supported by a grant from the Lifetime Support Authority of South Australia (LSA-D000653).

Trial registration This project is registered on the Australian New Zealand Clinical Trials Registry (no. ACTRN12616000812493).

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