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Implementing a Self-Management Intervention for People with a Chronic Compensable Musculoskeletal Injury in a Workers Compensation Context: A Process Evaluation

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Abstract *Purpose* Determining factors critical for an intervention's success, specifically for whom and under what circumstances, is necessary if interventions are to be effectively targeted and efficiently implemented. This paper describes a process evaluation undertaken to assess the implementation of a novel self-management (SM) intervention developed for those with a chronic compensable work-related musculoskeletal disorder seeking to return to work. *Methods* The process evaluation, assessing the 'Self-Management for Return to Work' intervention, examined data from program leader evaluations, telephone interviews with stakeholders (injured worker participants, vocational rehabilitation consultant program leaders and compensation insurance regulators), post-intervention focus group session feedback, attendance lists and researcher notes. *Results* The evaluation identified several challenges and barriers associated with conducting research within the VR environment and with the characteristics of those targeted i.e., injured workers with a chronic compensable condition. These issues were primary contributing factors to the modifications to the randomised controlled trial methodology and the trial's premature cessation. *Conclusions* Despite the difficulties encountered, high stakeholder acceptability suggests that the concept and theory underlying the targeted SM intervention were not flawed, though there is room for further tailoring to both the program method and its timing. The results of this process evaluation provide a useful platform for others considering the implementation of interventions within the vocational rehabilitation context or with individuals with chronic, compensated injuries.

Keywords Self-management · Occupational injuries · Return to work · Workers compensation

Introduction

This paper describes a process evaluation undertaken to assess the implementation of a novel self-management

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(SM) intervention developed for those with a chronic compensable work-related musculoskeletal disorder (MSD) seeking to return to work (RTW). Musculoskeletal conditions are common and costly for workers compensation (WC) systems, individual workers and societies. Preliminary Australian data (2010–2011) indicate that 42 % of all serious WC claims (i.e., minimum of one working week lost) were for sprains and strains of joints and muscles [1]. The estimated total economic cost of workplace injury and illness in Australia in 2008–2009 was in excess of $60 billion, with five percent of this borne by employers, 74 % by workers and 21 % by the community.[1] The key cost item for workers accounting for over 70 % of their costs is the estimated loss of future earnings (or human capital costs) [2]. Apart from the economic costs, those with chronic compensated work-related MSDs whose RTW is delayed have a lower likelihood of returning to work and are particularly impaired and disempowered [3–5].

The intervention program, 'Self-Management for Return to Work' (SMRTW), was developed to improve self-efficacy and RTW outcomes in the target population [6, 7]. The basis of the research intervention program is the widely used Stanford University's 'Chronic Disease Self-Management Program' (CDSMP) [8], which aims to enhance skills and self-efficacy to allow more confident management of the chronic condition. The six-week program features small group dynamics and skill attainment including problem solving and goal setting as key components. To tailor the program to those with a compensable MSD seeking to RTW, two additional modules focusing on facilitating participants' knowledge of and self-efficacy in navigating injury compensation systems and RTW processes were developed and presented in weeks seven and eight respectively [7]. Following preliminary testing of the new modules, the effectiveness of the SM intervention was to be assessed in a randomised controlled trial (RCT; registered with the Australia and New Zealand Clinical Trials Register, ACTRN12609000843257) [6]. Substantial recruitment challenges prevented the implementation of the RCT as planned. As a consequence the research scope was amended and a 'Phase II RCT feasibility study'[2] completed instead. This paper reports the process evaluation undertaken to better understand the challenges confronted in the study.

Process evaluations are concerned with assessing how and why interventions are/are not successful [9–11]. One definition views 'process' as the 'individual, collective or management perceptions and actions in implementing any intervention and their influence on the overall result of the intervention' [12, p. 214]. Such evaluations have different purposes and styles and employ a broad range of methods and measures. Various aspects of participation, delivery, implementation and receipt of an intervention, as well as the relevance and challenge of contextual issues can be assessed [11, 13, 14]. How feasible and acceptable a given intervention is, and in unfavourable circumstances whether there has been a failure of the intervention concept or underlying theory can also be analysed. As such, process evaluation findings can contribute to a better understanding of links between theory, program components and outcomes, assist with interpreting results and/or be used in future planning [9–11, 13, 15]. The purpose of this paper is twofold:

1. To explore the successful aspects of the SM intervention program, as well as reasons why it was unable to be implemented as initially planned; and
2. To gain insights into how the SM intervention program and/or implementation process can be improved.

Methods

Self-management Intervention

Participants were injured workers with an active WC claim[3] for a MSD of 3 months or more duration but less than 3 years. They were randomly allocated to the SM intervention or usual care group.[4] Three SM intervention programs were conducted over an 8-month period; each involving a single 2-h face-to-face session at the same time each week for eight consecutive weeks. All sessions were facilitated by two trained leaders: a lay leader with experience in leading CDSMPs and who suffered from or had had experience with a chronic condition (in both cases a musculoskeletal condition), and an appropriately trained vocational rehabilitation (VR) consultant[5] with knowledge

[1] This distribution was calculated using an ex-post method whereby the workers' compensation premiums paid by employers are considered a transfer cost to society rather than a cost to employers. Using an ex-ante approach it was estimated employers would have borne 16 % and the community 10 % of the total cost.

[2] Phase II clinical research may be defined as "exploring the dimensions of the therapeutic effect and making the necessary preparations for conducting a clinical trial... eventually [including] small-group cohort-control studies" [43].

[3] An active WC claim is defined as currently receiving some form of financial benefit from the Worker's Compensation Scheme, regardless of return to work status. Participants may be back at work part-time and still receiving benefits.

[4] The RCT, including its evaluation, was approved by Monash University Human Research Ethics Committee (CF11/2335-2011001328).

[5] VR consultants were trained to deliver the standard CDSMP program by licensed trainers, and the two additional modules by members of the research team.

Table 1 Process evaluation components

Component	Definition	Data source/collection method
Recruitment: context	Compensable injuries environment: system structures and stakeholders	Study project log and summary reports for funders
Recruitment: participants	Numbers of injured workers approached, participants and non-participants, and reasons for non-participation	WC regulator, 'decline to be contacted' form and telephone interviews
Maintenance	Numbers and reasons for participant dropout, and procedures used to encourage continued participation	Researcher notes, research team meeting minutes and participant follow-up
Reach	Proportion of eligible participants who completed the study and participants' characteristics	WC regulator data and telephone interviews
Implementation	Extent to which the SM intervention program was implemented as designed	Researcher notes and program leaders' evaluation/feedback forms
Dose received: exposure	Attendance and participation in key aspects of the SM intervention program	Attendance lists, researcher notes and program leaders' evaluation/feedback forms
Dose received: satisfaction	Participants' perceptions of the SM intervention program and of the program leaders	Outcome questionnaires, telephone interviews and post-intervention focus group sessions
	Program leaders', VR providers' and WC regulator's opinions of the program	Program leaders' evaluation/feedback forms and telephone interviews

of local compensation and health care systems and RTW processes. Individual participant and outcome data were provided by the WC regulator or collected via telephone interview at three time points: pre-intervention, immediately-post intervention and 6-months post intervention. Further details on the study design are available [6].

Evaluation Components

The analysis assessed key elements commonly evaluated in process evaluations [11, 16]. Table 1 outlines the components of the SM intervention assessed as well as data sources and/or collection methods.

Results

Recruitment Context

Development of the study protocol and an industry-based recruitment strategy began in early 2008 following consultation with an expert review panel including representatives from industry compensation regulators, insurers, VR providers, SM trainers and the research team. Study participants were to be injured worker clients of a national VR provider. Initially they were to be recruited locally (Queensland) after being identified and referred by the provider. Recruitment commenced in September 2009 after ethical approval from the institution's medical ethics committee. During the first 3 months it became apparent that the recruitment strategy was failing. Although potential participant numbers were assessed during planning, the provider's local client base proved to be largely incompatible with the study's inclusion criteria i.e. injuries were more acute. Despite supportive efforts by the VR provider (e.g., extending recruitment interstate) referrals to the study continued to be inadequate for study commencement.

Over the ensuing 12 months, whilst continuing to attempt to recruit through the VR provider, other options were explored. In an effort to expand the study population, negotiations were conducted with additional VR providers and various employer, government and insurer groups seeking their involvement. These organisations, while initially enthusiastic, were unable to follow through for a range of reasons, including resource constraints in relation to identifying eligible participants, legal barriers and concerns regarding their injured worker employees participating in a research intervention program.

In July 2011 discussions commenced with a state-based WC regulation authority in a different state (Victoria) to determine the viability of recruiting from their client base. This change in approach was subsequently adopted and from September 2011 the industry regulator commenced identifying and referring potential participants.

Recruitment Participants

To comply with privacy regulations, the WC regulator identified those who met the study's inclusion criteria. Over an 8-month period, between December 2011 to July

2012, these potential participants (N = 476) were mailed an information pack by the regulator containing a study brochure, detailed study information, a consent form and a 'decline to be contacted' form. The injured workers had 2 weeks to decline should they wish not to be contacted by the researchers. Of those who opted out (n = 122), 45 individuals provided a reason. The most commonly reported reasons were feeling overwhelmed by their condition/situation, being too busy or having English language difficulties. Others reported feeling let down by the WC system or that they were about to RTW. This resulted in a database or 'approach list' of potential participants (n = 376).

Upon initial phone contact 90 of those on the approach list declined, 50 were unable to be contacted and 19 were assessed as ineligible. Of the 90 declines 85 provided a reason. The majority reported not being interested in participating (31 %), being too busy (16 %) or having a language barrier (13.5 %). Other than language issues, and including the transportation barrier (see below), these are very similar to reasons for non-participation often cited in relation to RCT studies in the field [17]. The general sentiment expressed was that individuals had already tried many different approaches to facilitate their recovery without much success, and/or that they were frustrated with the system. A further 95 were either undecided but agreed to future follow-up, or consented but did not participate as they were not allocated to one of the study groups (due to location/transport barriers). The main reasons given for requesting a later follow-up (i.e., those not ready to commit to participation, n = 74) included being too busy (e.g., looking for work, health care appointments) or that they were overwhelmed by their condition/pain/medication issues. When subsequently contacted these potential participants often gave the same reasons for their continued non-participation.

At the end of recruitment a sample of 122 remained. An independent organisation randomly allocated participants to the SM intervention (n = 62) or usual care group (n = 60). Figure 1 provides a flow diagram of participant recruitment.

Maintenance

Maintaining involvement of the participants in the study was challenging. Of those allocated to the intervention group (n = 62), 28 withdrew after group allocation but prior to commencement of the SM intervention program. Reasons given for withdrawal included being too busy to justify the required time commitment or having a preference for allocation to the usual care group. Others (n = 13) could not be contacted (passive withdrawals).

Of the remaining 34 participants, two had returned to work prior to commencement of the SM intervention program (and thus were ineligible) and five commenced the program but failed to meet attendance criteria (i.e., minimum of five of the eight sessions with at least one of the first two sessions attended and attendance at both sessions developed for the study). Those not meeting the attendance criteria attended on average 3.4 of the eight sessions. Reasons given for not completing the SM program included anxiety and depression, exacerbation of physical ailments, feeling unwell and family issues. In addition, 10 were unable to participate due to residential location/transport barriers. In total, 17 participants completed the SM intervention program and 15 remained in the study at the 6-month follow-up point. Of the two participants who withdrew following completion of the SM intervention program, one was lost at the immediate-post interview stage (unable to be contacted) and the other at the 6-month post interview stage. Disregarding participants unable to attend due to residential location, this pattern of participant dropout/maintenance is very similar to that reported by other specialised and targeted SM programs such as the stroke self-management program, which had significantly greater maintenance when compared to a generic CDSMP offered to the same study population [17].

Of those allocated to the usual care group (n = 60), 11 withdrew prior to the pre-intervention interview with the majority of these (n = 8) not being able to be contacted (passive withdrawals). Only 30 of the usual care group were followed-up at 6 months due to the discontinuation of the study and the lack of remaining funds.

Various strategies were employed to encourage and maintain participant involvement, including offering taxi vouchers for those who had injuries preventing driving or using public transport, and follow-up and reminder calls before and after the first few intervention sessions. Intervention participants were also grouped according to their place of residence and efforts made to offer the SM intervention program at the most convenient location. Whilst offering the SM program at three different suburban locations is likely to have facilitated the attendance of some participants, there were still some (n = 10) unable to attend due to locational barriers.

Reach

Of those identified as potentially eligible (i.e., the study population, N = 476) 17 % (n = 83) completed the baseline interview. Of these, 61 participants (16 intervention and 44 usual care) completed the immediately post-intervention interview (13 %) and 45 (15 intervention and 30 usual care) the 6-month post-intervention interview (9.5 %). Time since injury for the final sample (n = 44 of

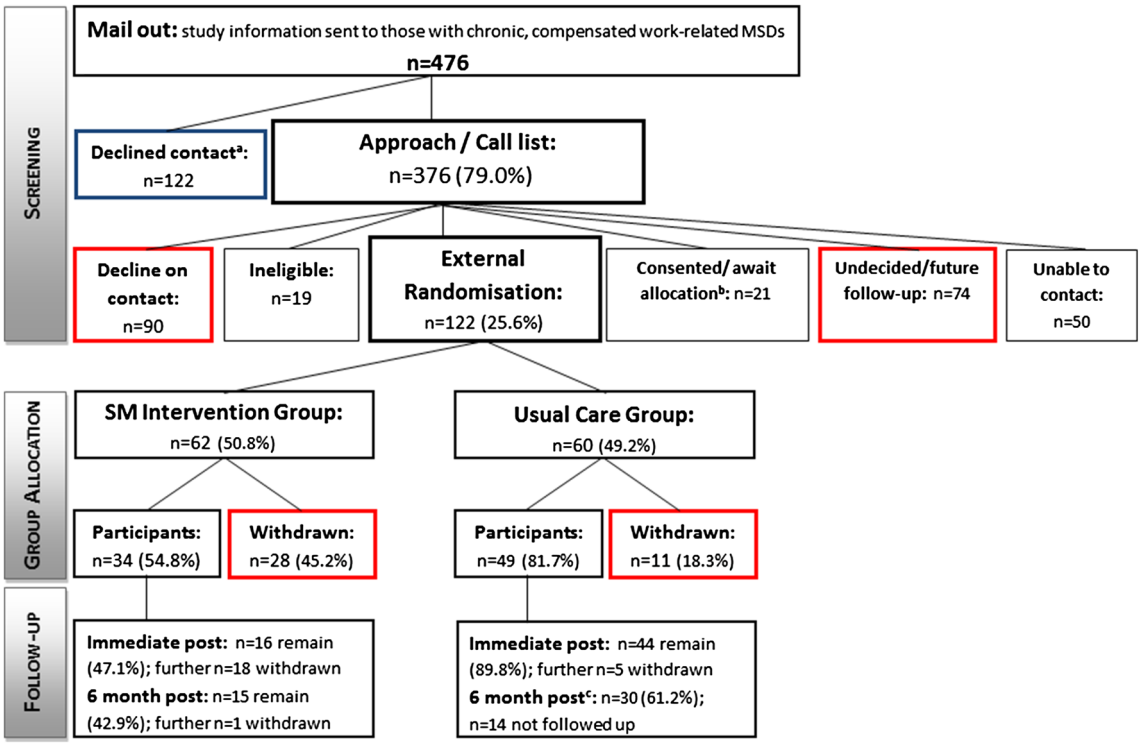

Fig. 1 Participant recruitment flow chart. [a]The discrepancy of additional potential participants who returned decline forms at this first stage of recruitment is due to the 22 decline forms received after 2 weeks; these individuals were added to the call list but also subsequently included in the 'decline on contact' numbers. [b]Consenting individuals awaiting group allocation once a suitable 'local' venue was scheduled for the SM intervention. [c]A random selection of participants in the usual care group was not followed up for the final interview due to the downscaling of the study

45)[6] was 20.1 months[7] (SD = 8.0), which was similar to that for the SM intervention group sample (n = 14 of 15)[6] at 20.0 months (SD = 7.4) post-injury.

The representativeness of the participants could not be assessed. Standard socio-demographic data on those eligible for the study (N = 476) were not available due to privacy constraints. Only some limited comparisons can be made between those who completed the SM program and remained in the study at the immediate post-intervention stage (n = 16, see Fig. 1 or Table 2) and those who withdrew from the intervention group (n = 33) [including those who withdrew prior to the SM program's commencement (n = 28) and those not meeting attendance criteria (n = 5)]. Table 2 presents demographic data and other variables of interest for these two groups. Apart from age and gender, data on the other variables for those who either did not start the SM intervention program or who failed to complete the pre-intervention interview (n = 17) are lacking.

There was little difference between those who completed the SM intervention program and those who withdrew, for measures of mean age, general health, pain, comorbid medical issues and confidence in returning to work. However, there were apparent differences in terms of gender and education. There was a higher percentage of males in the sample who withdrew from the intervention group. For those who did complete the SM intervention program there was also some indication that they had a higher level of education on average and a lower participation in trades; perhaps driven by the apparent gender difference.

Implementation

As stated the RCT was unable to be implemented as designed and initially intended. The changes instigated as a result of undertaking the Phase II RCT feasibility study rather than a full-scale Phase III RCT included reducing the number of SMRTW intervention groups conducted (three groups were run over 8 months instead of the planned 12 over 24 months). The content of the SM program was maintained and delivered as intended. That is: participants were randomly allocated to an intervention or usual care

[6] Missing data for date of injury for n = 1 intervention group participant.

[7] N = 1 usual care participant outlier for time since injury was brought back to 2.5 SDs above the mean.

Table 2 Intervention group characteristics

	Intervention completed (n = 16)	Intervention withdrawal (n = 33)[a]
Age (mean ± SD) years	45.8 (10.0)	45.5 (12.6)
Male (%)	50.0	67.0
Education[b]		
Low (%)	7.0	0.0
Medium (%)	29.0	50.0
High (%)	50.0	19.0
Trade/App (%)	14.0	31.0
Mean pain level[c] (SD)	5.4 (2.2)	5.8 (2.5)
Mean health[d] (SD)	6.7 (1.5)	6.8 (2.1)
Mean confidence RTW in 4 weeks[e] (SD)	2.3 (2.4)	2.9 (2.8)
Comorbid medical issues (%)	46.7	50.0

[a] Participant numbers do not include those allocated to intervention but deemed ineligible after returning to work (n = 2), or those still waiting for a suitable intervention venue at the conclusion of the study (n = 11). Missing data for variables other than gender and age included n = 1 of 16 of the intervention completed group; n = 17 of 33 of intervention withdrawal group

[b] Level education definition: Low level refers to primary school only; Medium refers to some secondary completed; High refers to completion secondary school and/or tertiary education; Trade/App refers to trade school or apprenticeship qualification

[c] 0 = no pain, 10 = pain as bad as it could be

[d] 0 = extremely poor, 10 = excellent

[e] 0 = no confidence; 10 = full confidence in RTW in 4 weeks

group, the intervention group received the eight-week SMRTW program, each session was facilitated by two trained leaders and the sessions were presented in the planned order. Although advised they could invite and bring a family member or friend to the sessions, none of the participants chose to do so. Data collection and entry occurred as planned; though as indicated, some usual care participants (n = 14) were not administered the 6-month post-intervention questionnaire. The 12-month follow-up was not conducted.

Dose Received: Exposure

Intervention participants who met the attendance criteria (n = 17) missed less than one session on average and attended 89.7 % of intervention program sessions.

The program leaders and research coordinator (who attended all sessions) observed each program from the beginning of the first session. They noted that those undertaking the SM intervention program participated in key components of the program i.e., group discussions, peer interactions and goal setting. Participants were enthusiastic about sharing information with their peers in both paired exercises, and open group discussions. Over the course of the program participants learnt to set achievable goals relevant to their personal injury recovery, RTW and health maintenance. They practiced goal setting each week for the entire program, so the notions of goal setting and goal adjustment based on confidence ratings were adopted. Program leaders commented that it generally took 3–4 weeks before participants were able to identify and then attain achievable goals. Group discussions and brainstorming sessions around goal setting and adjustment helped reinforce their skills, as did their (apparent) improved self-efficacy that was likely related to achieving their goals.

Dose Received: Satisfaction

Intervention participants' perceptions of the SM program were sought immediately post-intervention during telephone interviews using the health education impact Questionnaire (heiQ^{TM}) program evaluation questions [18]. Perceptions were largely positive (Table 3) with participants reporting their intention to tell others that the "program was worthwhile" and that "attending was worth their time and effort". Their responses approached, on average, 'strongly agree' for most items. The slightly lower mean rating score and higher variance for the statement 'setting goals that are reasonable and within reach' perhaps suggests that some participants did not score this as highly as other aspects of the program.

Fifteen intervention participants also took part in optional researcher-conducted focus groups held on the concluding day of each program. There was agreement that attending the program was beneficial. Aspects of the program most frequently reported as valuable were meeting as a group and the training in setting realistic and achievable goals. Participants commented that a group setting in which everyone was in a similar situation was particularly therapeutic and helpful. They also warmly regarded the input of the program leaders and research project personnel. For example one participant commented that "The group leaders were very caring, sympathetic and patient …". Other feedback largely echoed the findings of the heiQ program evaluation questions highlighting the benefits of group settings, discussing shared problems and meeting others in similar situations. For instance, it was often commented that by just being together in the same room they immediately felt less isolated. One issue raised repeatedly was that the program should have been available much earlier in their injury journey, e.g. "a few months after the injury". Another suggestion was that more time should have been allocated to emotional issues such as depression and anxiety.

Table 3 Mean scores on the heiQ™ program evaluation questions

Questions about the program	Mean Rating (SD)
I intend to tell other people that the program is very worthwhile	5.4 (0.6)
The program has helped me to set goals that are reasonable and within reach	4.8 (1.7)
I trust the information and advice I was given in the program	5.2 (0.7)
Course leaders were very well organised	5.5 (1.0)
I feel it was worth my time and effort to take part in the program	5.5 (0.8)
Difficult topics and discussions were handled well by my program leaders	5.3 (1.7)
I thought the program content was very relevant to my situation	5.2 (0.6)
I feel that everyone in the program had the chance to speak if they wanted	5.6 (0.6)
The people in the group worked very well together	5.6 (0.5)

The above questions were scored using the standard heiQ™ Likert responses from 1 = strongly disagree; 6 = strongly agree

Participants' opinions of the two new modules were also ascertained. One worker explained how '[Module 7] on navigating the WC system and entitlements … really helped with some of the questions I had', and yet another said he felt that the last 2 weeks of the program "were a waste of time". This likely reflects that the information regarding RTW and navigating the system may have been better offered sooner after the worker's injury/claim.

After completion of each program, program leaders were invited to provide written feedback on the program and its (perceived) value for injured workers. One-on-one telephone interviews were also conducted on completion of the three programs with a representative from the WC regulator, two managers from VR organisations involved in the research and the VR consultants trained as program leaders. The interviews were undertaken to explore their perceptions, experiences and understandings regarding the impact and acceptability of the program.

All four program leaders provided feedback (written and/or verbal interview). A consistent general perception was of the great potential for injured workers to benefit from the SM intervention, but also that the injured workers should have been given access to the program earlier. They considered the program was still useful but felt an earlier introduction of SM principles would have been of greater benefit. One leader commented "I found it difficult at times as it was obvious that the participants would have benefitted far more if they had done the program earlier in their rehabilitation". More specific content-related feedback indicated that the material from the new modules would have been better received if delivered earlier in the program. The leaders questioned the program's duration suggesting that 8 weeks was too long but that at least 6 weeks were required to enable demonstration and uptake of skills.

Lastly, it was the regulators' view that SM training may have potential within the WC system and they were keen to see evidence of its effectiveness and value. If shown to be efficacious they suggested that SM training might become a newly funded service. The VR managers reported that their organisations' participation had resulted in an increased administrative load and the loss of employee time (for training and delivering the SMRTW program). They also commented that the difficulties in recruiting participants may be attributable to the disempowered and disengaged nature of (many) injured workers in the compensable system. In addition, one manager also suggested that the training should occur earlier in the life cycle of a person's claim: "So I mean, one of the problems with any … program, whether it's a structured activity and cognitive behavioural therapy or pain management or SM, is that they're usually delivered way too late in a person's claim cycle".

Discussion

The literature indicates that process evaluations of RTW [15, 19–21], work disability prevention [22, 23] and SM programs [24–26] are being undertaken increasingly. Such evaluations play a critical role in informing the development of future interventions by highlighting both positive and negative issues, some specific to the respective intervention, others of broader relevance. This process evaluation was conducted to explore why a Phase III RCT for compensated injured workers was unable to be implemented as planned. Its primary purpose was to explore the reasons underlying the insurmountable issues of recruitment and also the barriers specific to conducting research within the WC and VR environments. Secondary to this, it was of interest to gain insights into how the SM intervention program and/or implementation process could be improved. It is also essential to evaluate the results of the *effectiveness* of this tailored SM intervention (to be published separately) in the context of this process evaluation.

The recruitment issues challenged the research at two levels; a system level, and in relation to the characteristics

of the participants themselves. Even after establishing a seemingly viable recruitment strategy, recruitment and retention problems were still paramount. The findings highlight the challenges surrounding the recruitment of participants in the VR context, with a success rate of only 25 % from mail-out through to consent and external randomisation. This dropped to 10–15 % following group allocation. The extent of disability of individuals with chronic compensated work-related MSDs was underestimated; together they represent a vulnerable and complex, heterogeneous group with marked physical, pain and psychosocial issues combined with low self-efficacy in the areas of RTW and management of their condition.

Undertaking collaborative research with an industry partner and/or within an industry setting can create various challenges such as different priorities, agendas and expectations (to those of the research team) [27]. Contextual issues are crucial to an intervention's success or failure [28]. As the research team found during the Phase II RCT feasibility implementation, negotiating the various pragmatic hurdles that can arise was challenging and time consuming. However, the benefits of industry and academic collaborative research remain particularly attractive, and include, e.g. increased generalizability and external (and ecological) validity of the results [29], as well as fast-tracked/easier translation of findings into policy and practice.

System-related barriers including corporate restructuring and priorities, legal constraints and a lack of (industry-specific) exposure to research processes impeded and shaped this research. Others have reported similar issues [29, 30]. These obstacles extensively delayed RCT commencement to the point that its viability was in question. Notwithstanding extensive efforts, recruiting a sufficient number of eligible participants through individual organisations proved a non-viable option for this study. A potentially feasible recruitment strategy was only established after an industry regulator enabled access to a much larger population base. Thus, a strong recommendation arising from this process evaluation is that any RCT requiring a large sample from within a VR environment, must have the support of the WC or compulsory third party insurance regulator or equivalent within a disability support scheme/system to aid identifying eligible participants. This may help to avoid complications encountered at the VR provider and/or employer level.

The revised recruitment strategy overcame previously encountered system-related referral barriers and offered a seemingly more-than-adequate population base from which to recruit the study sample. Nevertheless further recruitment problems arose. As have been recognised by past research [4, 5, 31], the characteristics of the population were such that their various negative emotional states, e.g. frustration, apathy, anxiety, fear of pain and feelings of inadequacy and hopelessness created a resistance to participation. Any additional issue, however small, such as transport to the venue, a sick friend or relative or child care (as often reported by those who chose not to participate or who withdrew from the study) was enough to make the barriers to participation seem insurmountable. The uncertainty of randomised group allocation also created problems for those with strong preferences for participating, or not, in the SM intervention program. Thus, despite the injured workers generally recognising the potential value of the program and having good intentions, lower than anticipated recruitment and retention rates eventuated. Other practicalities involving the need to offer programs sequentially in different regions to facilitate participation, compounded the challenges and forced a reduction of the project scope and premature cessation of the trial.

Other features, i.e. the 'dose received: satisfaction' component, suggested consideration of further tailoring of the SM program for this population. With refinement, reducing the length of the program may be possible. Stakeholder feedback suggested that the program should allocate more time to emotional issues such as depression and anxiety, and wide-ranging group discussions. A recent study has adapted the CDSMP in just this way; Detaille et al. [32] incorporated material that was directly relevant to improving self-efficacy at work for workers with chronic disease into the existing six-week structure. Such tailoring of the CDSMP content to their sample showed promising results in terms of its efficacy in improving physical health and attitudes toward SM at work. With regard to our sample, being part of a WC system and having been off work for a relatively lengthy period clearly added further layers of complexity to their already challenging situations. As such, the adaptation, modification or tailoring of the generic CDSMP content (where licensing and copyright allow) may be crucial if we are to see the intended benefits for such impaired and complex groups of individuals.

Participants' satisfaction scores indicated that further work may be required to ensure that goal setting tasks are always perceived as beneficial. According to our results, some participants gained more from this core component of SM training than others. This again may reflect the variation in participants' stage of recovery (average time since injury of 20 months). Those at a stage at which they accepted some personal responsibility for managing their chronic MSD may be more likely to participate in goal setting in a way that it could potentially be of benefit to them. That being said, the 'dose received: exposure' component data indicated that all intervention participants reported to have joined in and benefited from the key components of the SM intervention program. This included active participation in problem solving, goal setting, the setting of confidence ratings and goal review.

Overall, the 'satisfaction' component data perhaps highlight the major strength of the SM intervention process. That is, the program was judged as having high acceptability by the injured workers, program leaders and, in principal, the WC regulator. Feedback was generally positive, especially in regards to the face-to-face group component. In addition, and as discussed further below, if researchers are able to better target the stage at which such interventions are administered (i.e. earlier in the injury recovery phase and depending on need) it is anticipated that there would be a much improved recruitment rate and further strengthening of acceptability and perhaps outcomes.

Finally, due to the lack of relevant data, the reach of the SM intervention was unable to be adequately assessed, and as such should be considered a weakness of this process evaluation. An understanding the 'reach' of an intervention is critical to examine the generalizability of the outcomes of the intervention, and whether specific adaptations of the intervention and/or its implementation may be required to meet the needs of targeted subgroups [11]. Representativeness is also especially important for studies with low sample size. While the similarity of those who completed the SM intervention program and those who withdrew goes some way to establishing representativeness, this is recognised as a limitation of this process evaluation.

Recommendations and Implications for Future Research

Considering the issues identified it is recommended that future researchers should not underestimate the cumulative effect of the physical, pain and psychosocial issues for those with chronic, compensated MSDs. Those issues combined with the barriers specific to participation appeared to make it easier for these individuals to choose not to participate. Indeed, other studies and process evaluations have also highlighted the challenges of recruiting participants with a chronic disease and/or those on sick leave due to a MSD [33–35]. Despite the injured workers recognising the potential benefits of the SM intervention program, this was not enough to overcome the perceived barriers. To minimise the impact of 'barrier accumulation', researchers should consider alternative implementation methods that overcome some of the intervention-specific barriers. For instance, despite the accepted benefits of the 'group' aspect of a SM program such as the SMRTW (i.e., see e.g., Harrison et al. [36]), a face-to-face group format SM intervention is likely to suffer from poor uptake with such a debilitated and vulnerable population. The enabling and therapeutic effect of socialisation, venting and not feeling as alone [36] could be achieved without requiring face-to-face group sessions, e.g. by delivery to individuals of SM support/health coaching by VR consultants paired with online support groups and interactive discussion boards. The effectiveness of several alternative SM delivery methods is just beginning to be empirically examined. One such program is an online chronic pain SM program with an interactive learning environment that also features a social networking component [37]. The inclusion of social networking and interactive learning techniques could potentially see some of the benefits associated with the group component of the more traditional SM programs. The value of online SM programs, however, seems to be not only in overcoming the barriers associated with physical attendance, but also in the flexibility of the programs to deliver individualised content based on preferences, personal profiles and circumstances. Although preliminary results are promising in terms of efficacy, further evidence is required before deciding whether any of these methods represent a more viable and still effective SM delivery method [37–39].

Another suggestion to improve intervention uptake and retention is to consider offering a more individually-tailored SM intervention earlier in the recovery cycle of injured workers; our intervention program participants were at the chronic stage at 20 months post-injury on average. The late state at which the SM intervention was offered was raised as a potential issue during interviews with several stakeholders, including VR managers, program leaders, and injured workers themselves. The actual process of targeting those who may benefit from the SM intervention at the most appropriate stage post-injury, however, requires some careful thought. Some individuals are likely to be more in need of SM training than others. A self-assessed screening measure, such as the Partners in Health (PIH) Scale [40] requires little training to administer and could be used by the VR practitioner to determine which injured workers may require, or benefit the most from, SM. Evidence also suggests that the psychosocial complexities and self-efficacy of individuals off-work due to occupational injury continue to worsen as time progresses [41], and as such, the most effective stage to implement such an intervention is likely to be early. Not only would earlier intervention have the potential to prevent the development or worsening of secondary psychosocial issues, it also captures individuals at a stage at which there is more likely to be some consideration of behavioural change in relation to managing their chronic MSD (i.e., the intermediate contemplation stage if one accepts the premise underlying behaviour change models). In addition, given the variability and complexity of chronic, compensated injured individuals, a more individually-tailored approach which aims to explore both personal barriers and motivators to change, while also taking into account secondary injury-related issues (e.g. pain

catastrophizing, fear of pain), social determinants, as well as mental and emotional health issues seems to be required. This more individual approach is certainly within the scope of a SM intervention.

As was pointed out by Lipsey and Cordray [42] almost 15 years ago, intervention programs are inherently difficult to implement, which is potentially one of the reasons that there are an increasing number of process evaluations accompanying the publication of RCT outcome evaluations [10, 12, 24]. When an intervention fails to achieve the desired outcome(s) it is important to know whether it was a failure of the intervention concept or theory, or its implementation [13]. In the case of our SM intervention, these evaluation results implicate the VR environment, the timing of the intervention and the perceptions, practical and mental health challenges facing chronic compensated injured workers as the main reasons why the planned RCT was ceased prematurely. Despite the difficulties encountered, high stakeholder acceptability indicates that the concept and theory underlying the targeted SM intervention were not flawed, though there seems to be room for some further tailoring. This could include the method and timing of the program's implementation, as well as adaptations that would allow for a more tailored approach to addressing an individual's barriers and motivators to change. The results of this process evaluation represent an important step forward for those considering the implementation of interventions within the VR context or with individuals with chronic, compensated injuries.

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