

A descriptive analysis of factors associated with improvement or non-response following intensive, multidisciplinary pain management in individuals with a compensation claim

INTRODUCTION & OBJECTIVES

The Network Pain initiative allows compensable clients to access multidisciplinary Pain Management Programs (PMP) with the goal of improving their capacity to self-manage, return to meaningful activities, and achieve vocational goals (Daly, 2013). Unfortunately, some patients with an on-going compensation case do not benefit from multidisciplinary treatments. Past research has indicated that legal involvement and a compensation claim following an injury are associated with poorer outcomes from both a physical and psychological perspective (Murgatroyd et al., 2015). Thus, understanding prognostic factors associated with program receptivity may assist selection of appropriate treatment pathways for patients, improved service delivery and overall quality assurance.

METHODS

Following a MDT assessment, suitable patients were enrolled in a high intensity multidisciplinary PMP. Based on a cognitive-behavioural approach, the program involves 85 hours of concurrent treatment, primarily in group settings, twice a week over six weeks.

Outcome data was captured as part of the electronic persistent pain outcomes collaboration (ePPOC). Standardised questionnaires were administered at four time points: assessment (pre-program), discharge (post-program), follow-up 1 (6 weeks post-program) and follow-up 2 (6 months post-program). Data was captured between June 2015 and February 2018. Seven primary outcomes are generated from the ePPOC dataset: pain severity, pain interference, depression, anxiety, stress, catastrophizing and self-efficacy.

Baseline data was captured from 633 patients, of which a further 258 patients had post-program outcomes. Based upon post-program outcomes, two sub-groups were generated. Firstly, a group of program responders ($N=40$) who at minimum, demonstrated clinically significant improvement for all seven assessed outcomes. The 40 chosen for this group demonstrated the highest percentage change. Secondly, a group of program non-responders ($N=40$) comprised of patients who either failed to demonstrate clinically significant improvement in any outcome, and/or showed some instances of deterioration.

RESULTS

Table 1. Summary of differences in patient characteristics between program responders, program non-responders and all patients

Measure	Responders (N=40)	Non-Responders (N=40)	All Data (N=633)
Age	46.25	41.40	45.05
Male (%)	63	75	58
Female (%)	37	25	58
BMI	30.32	28.94	29.98
BMI Obese (%)	45	32.5	40.64
Born in Australia (%)	88	90	85
Requiring Interpreter (%)	0	15	7
Communication assistance (%)	0	21	10
Worksafe case (%)	80	75	70
TAC case (%)	13	10	20
DVA case (%)	3	5	3
Average health utilization (3 months)	18.63	17.95	17.86
Average number of pain areas	6.53	7.45	6.86
Lower back worst pain area (%)	22.22	46	41
Neck worst pain (%)	11.11	18	12
Average morphine equivalent	22.54	32.03	28.37
Pain Severity at baseline	6.22	6.26	6.08
Pain Interference at baseline	7.48	7.34	7.40
Depression at baseline	27.51	23.61	24.20
Anxiety at baseline	19.27	14.90	17.03
Stress at baseline	29.01	23.24	24.88
Self-efficacy at baseline	16.94	13.77	16.21
Catastrophizing at baseline	33.96	33.42	31.22

RESULTS (continued)

Table 1. Summarises pre-program characteristics of three groups: Patients who responded to program, patients who did not respond to program, and all patient data which served as a baseline. Comparing these groups, non-responding patients were more likely to be male, more likely to require assistance with communication, possess more pain areas, and were more likely to present with lower back and neck pain as their most severe pain area. Poor-responders also demonstrated higher opioid usage at baseline, and of interest, lower baseline severity in depression, anxiety and stress.

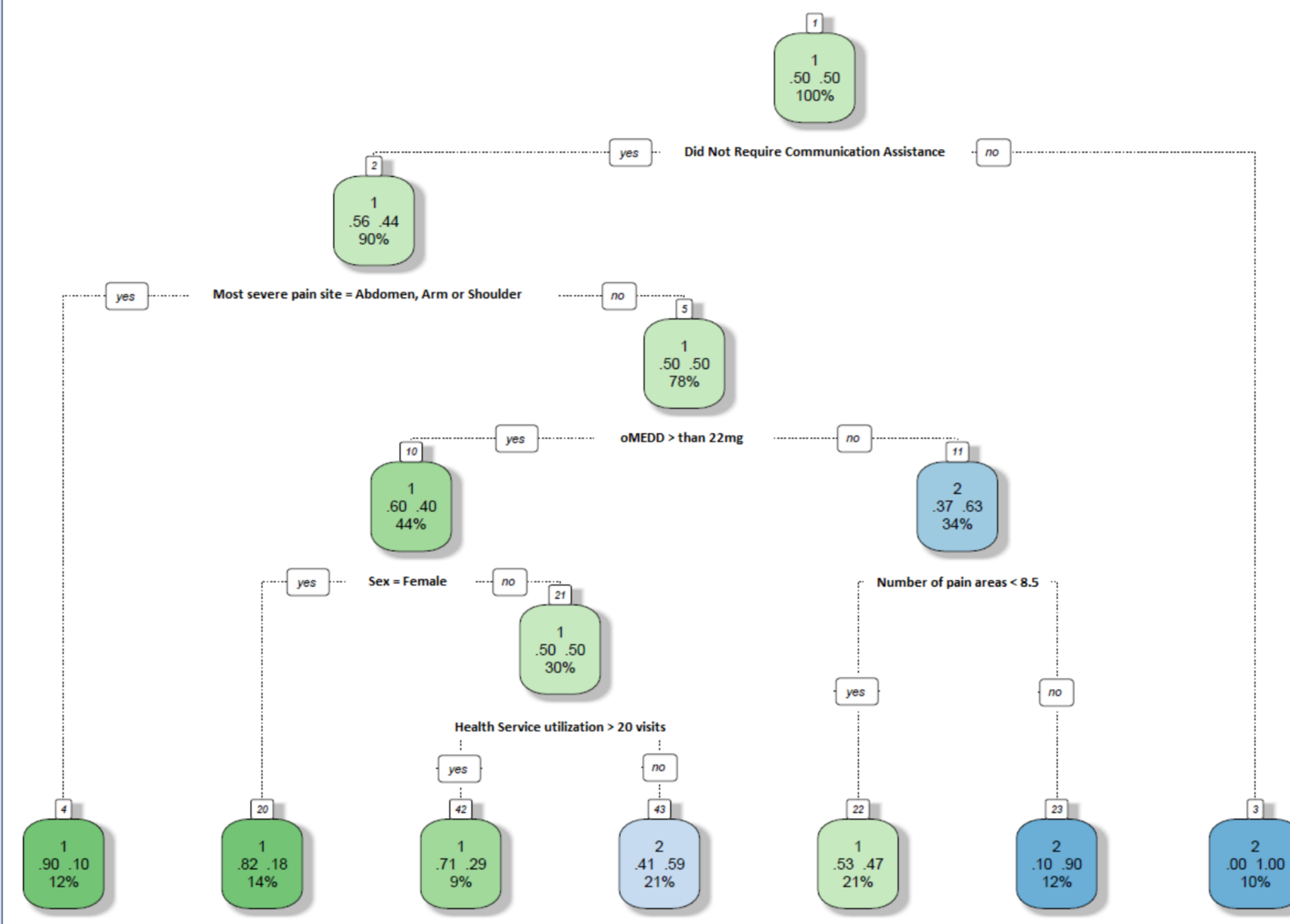


Figure 1. Decision Tree analysis depicting break-down of patient baseline characteristics predictive of program responsiveness or non-responsiveness. Although machine learning techniques such as decision trees require large sample size, herein we present it more for instructive purposes to guide analytics of the national data-set.

To further evaluate these patient differences, baseline characteristics were entered into a Decision Tree flowchart to evaluate predictors of program success (Figure 1). The dependent variable was program-responsiveness, a binary yes or no variable based upon the responder and non-responder groups. The predictors selected for this analysis were those which best differentiated responders from non-responders in Table 1; number of pain sites, most severe pain site, gender, whether patients required assistance with communication, number of times health services used and daily morphine equivalent. Data was partitioned 60:40 between test and training sets. Although machine learning techniques such as decision trees are typically used for large sample size predictive purposes, herein we present it more for instructive purposes to guide future analyses. These preliminary results suggest English as first language, pain not focused in the neck or lower back, being female and low opioid use were generally predictive of program responsiveness. Conversely, English as a second language, a high number of pain areas and pain focused in the lower back or neck were predictive of poor program receptiveness.

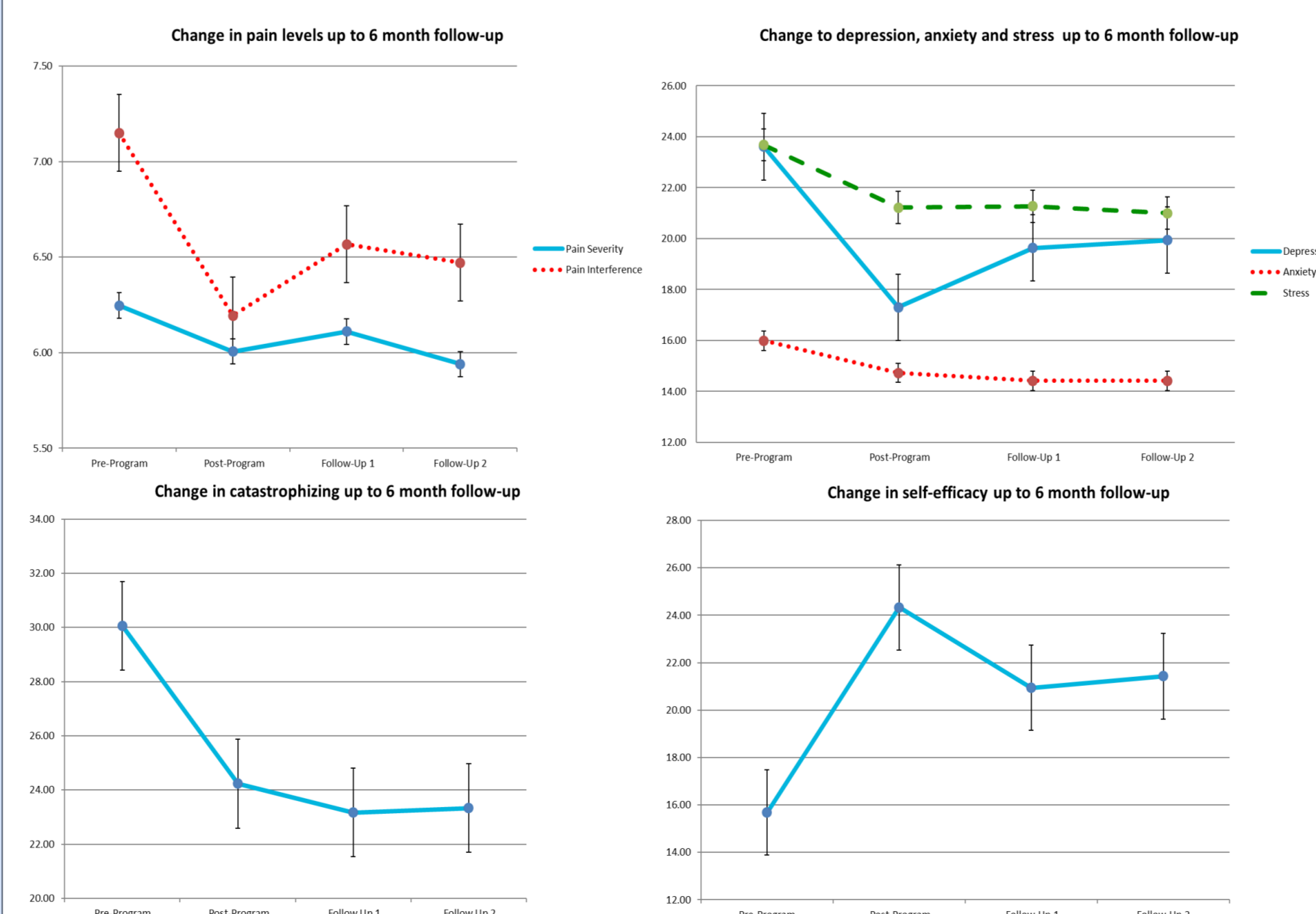


Figure 2. Average change per outcome for patients who completed all follow-up visits ($N=82$). The four time-points for which outcomes were collected were baseline, immediately post-program, one-month after completion and six months after completion.

RESULTS (continued)

Finally, we present data summarising results for patients who completed all questionnaires up to six-month follow up, for the period January 2017 to February 2018. Figure 2 depicts average improvement across all time-points. This shows a general trend toward greatest improvement at discharge, with either a plateau in scores or small inflection toward baseline at six-week and six-month reviews. Thus, positive changes were maintained, but to a lesser magnitude. Such results are consistent with previous outcome studies of PMPs (i.e. Jensen et al., 2007).

DISCUSSION

The data herein shows a number of traits associated with program outcome. The profile of patients less likely to respond includes more males with predominant neck or back pain, higher opioid use, a higher likelihood for English to be a second language and more areas of pain. Interestingly, such patients demonstrated lower levels of impairment on mood related outcomes. Gender does not typically account for differences in DASS scores (Crawford & Henry, 2003), which may suggest culture influences self-appraisal on this measure; a factor previously shown to influence self-appraisal on the DASS (Oei et al., 2013). Overall level of impairment and BMI did not appear to be associated with poor-program responsiveness, indicating such factors may be of limited importance to likelihood of improvement. Future directions should consider other factors associated with program performance such as presence of trauma, or socio-economic status.

The data presented is consistent with clinician observations that patients of non-English speaking background often report difficulties navigating the complexity of the compensation system. Although interpreters are provided for all treatment, it remains possible that delivering pain education that encompasses a biopsychosocial approach including in-depth discussion around multiple pain-sites may be less successful in this cohort. This may indicate a more tailored approach is required, allocating closer attention to the overlaying influence of trauma, pain and stress. These results are intended to be used to inform assessments and treatments, particularly more careful attention to pre-program support. Such strategies include reducing opioid use to increase overall program engagement, and more targeted pre-program assessments to identify "cure-focus" and overall readiness to engage with the self-management approach.

Finally, this data shows that meaningful improvement can be sustained up to six-months after program completion. Sustained improvement was most strongly observed for pain-specific outcomes (self-efficacy, catastrophizing and interference). Anxiety remains the least receptive outcome to change, which may owe to the uncertainties patients face in the compensable system. Positive six-month results encourage us that greater pre-program support for patients who rate highly on factors associated with poor-response may aid in reversing these trends.

REFERENCES

- Beales, D., Fried, K., Nicholas, M., Blyth, F., Finniss, D., & Moseley, G.L. (2016). Management of musculoskeletal pain in a compensable environment: Implementation of helpful and unhelpful Models of Care in supporting recovery and return to work. *Best Practice and Research Clinical Rheumatology* (30), 445-467.
- Crawford, J. R., & Henry, J. D. (2003). The Depression Anxiety Stress Scales (DASS): Normative data and latent structure in a large non-clinical sample. *British Journal of Clinical Psychology*, 42(2), 111-131.
- Daly, A. (2013). Do pain management programs keep working for compensable clients? A three year follow up. Australian Pain Society 33rd Annual Scientific Meeting.
- Jensen, M. P., Turner, J. A., & Romano, J. M. (2007). Changes after multidisciplinary pain treatment in patient pain beliefs and coping are associated with concurrent changes in patient functioning. *Pain*, 131(1-2), 38-47.
- Murgatroyd, D.F., Casey, .PP., Cameron, I.D., & Harris, I.A. (2015). The effect of financial compensation on health outcomes following musculoskeletal injury: Systematic review. *PLoS One*, 10 (2):e0117597.
- Oei, T. P., Sawang, S., Goh, Y. W., & Mukhtar, F. (2013). Using the depression anxiety stress scale 21 (DASS-21) across cultures. *International Journal of Psychology*, 48(6), 1018-1029.