Patient impression of change: how does it relate to other patient-reported outcome measures?

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Background

The ePPOC Patient Impression of Change (ePIC) is a patient reported outcome measure (PROM) that provides an overview of the degree to which participants perceive their condition has changed following treatment for chronic pain. The tool was introduced to routine collection in 2018 as part of the ePPOC version 2 data collection (ePPOC, 2018). Patients are asked two ePIC questions: first, how they would describe themselves *overall* now compared with before their treatment, and second, how they would describe their *physical abilities* now compared with prior to their treatment. Participants answer by indicating their response on a Likert scale from -3 = very much worse to +3 = very much better (see Box 1).

BOX 1 – Details of the ePPOC Patient Impression of Change (ePIC) overall question

Aims

This information series investigates how patient demographic characteristics and the patient reported measures of pain and physical, emotional, and cognitive functioning are individually associated with patient perception of change in *overall* health status (ePIC - overall) following treatment for chronic pain.

Methods

The criteria for inclusion in the analysis were adult patients (18 years and over) who:

- completed treatment at a participating pain service between 1 January 2018 and 31 December 2020;
- completed the patient questionnaire at referral to the service and end of treatment (end of episode); and
- provided a response to the ePIC Overall domain at the end of treatment (end of episode).

Patient characteristics were investigated using descriptive statistics (means, standard deviations, frequencies, and percentages as appropriate). Spearman's rank sum correlation was used to assess the strength of the relationships between ePIC Overall and the PROMs:

- Pain severity and interference – Brief Pain Inventory (BPI)
- Pain catastrophising – Pain Catastrophising Scale (BPS)
- Mood – Depression, Anxiety and Stress Scale (DASS-21)
- Pain self-efficacy – Pain Self-Efficacy Questionnaire (PSEQ)

Correlations were examined with PROMs scores at the end of the episode of care (post-treatment), and the changes in scores from pre- to post-treatment.

Results

A total of 48,988 episodes of pain treatment ended between 1 January 2018 and 31 December 2020, with 14,906 satisfying the criteria for inclusion in this study. Patients included in the study had a mean age of 48 years (standard deviation 14.2), were more often female (55%), overweight or obese (59%) and born in Australia (35%) or New Zealand (39%) (

Table **1**). Only 2% of patients required an interpreter, while 12% were hearing or sight impaired.

An initial investigation of the differences in ePIC ratings suggest that females more frequently rate their change since treatment commenced as 'improved', with females more likely than males to provide a positive ePIC score - 75% and 70% respectively (

Table **1**). Patients born in Australia tend to provide lower ratings, with only 69.9% of patients reporting an improvement compared to 75.3% of patients born in New Zealand and 73% of patients born elsewhere.

**Table 1 Cohort characteristics and distribution of patient impression of change (ePIC) scores**

Cohort characteristics			Patient impression of change (%)						
	n	%	-3	-2	-1	0	1	2	3
Sex									
Male	6,688	44.9	2.0	3.3	4.3	20.1	30.7	27.0	12.6
Female	8,191	55.0	2.1	3.1	4.0	15.9	28.3	31.2	15.5
Missing	27	0.2	-	-	-	-	-	-	-
Body Mass Index									
Underweight	164	1.1	5.5	4.9	6.1	12.2	29.3	28.7	13.4
Normal weight	3,222	21.6	1.3	2.6	3.7	16.7	29.8	31.2	14.7
Overweight	3,913	26.3	1.9	2.8	4.0	17.9	30.3	29.5	13.6
Obese	4,867	32.7	2.2	3.6	4.2	18.7	29.3	28.4	13.7
Missing	2,740	18.4	-	-	-	-	-	-	-
Country of birth									
Australia	5,218	35.0	2.6	4.1	4.7	18.6	31.6	27.2	11.1
New Zealand	5,779	38.8	1.3	2.7	3.7	17.1	26.5	31.4	17.4
Other	3,544	23.8	2.3	2.7	4.0	17.6	30.7	29.0	13.7
Missing	365	2.4	-	-	-	-	-	-	-
Interpreter required									
Yes	328	2.2	4.6	3.4	3.4	23.5	38.4	20.1	6.7
No	14,170	95.1	2.0	3.2	4.2	17.6	29.2	29.5	14.4
Missing	408	2.7	-	-	-	-	-	-	-
Hearing/sight impaired									
Yes	1,743	11.7	2.9	5.3	4.9	18.1	28.4	27.6	12.7
No	12,674	85.0	1.9	2.9	4.0	17.7	29.5	29.5	14.5
Missing	489	3.3	-	-	-	-	-	-	-
Socio economic status (level of disadvantage) - quintile									
1 – Lowest	2,642	17.7	1.7	2.8	3.5	17.4	30.2	29.9	14.4
2	2,862	19.2	1.9	2.9	4.4	18.1	29.4	31.0	12.4
3	3,004	20.2	2.2	3.0	4.6	18.8	30.2	28.3	12.9

4	2,636	17.7	2.1	3.5	3.5	16.2	28.9	29.9	15.9
5 - Highest	2,335	15.7	2.9	3.9	5.5	19.6	30.2	25.2	12.6
Missing	1,427	9.6	-	-	-	-	-	-	-
Entire cohort	**14,906**	**100.0**	**2.1**	**3.2**	**4.1**	**17.8**	**29.4**	**29.3**	**14.2**

Over two thirds (68%) of those who were living in an area of the highest disadvantage reported an improvement. However, this was lower than for living an area of least disadvantage (75%).

Older people were less likely than younger people to report improvement following treatment. While 78.6% of patients in the 18-24 age group reported an improvement this fell to only 61.3% and 49.9% in the 75-84 years and 85+ age groups respectively (Figure 1).

Figure 1 Distribution of ePIC scores by age group
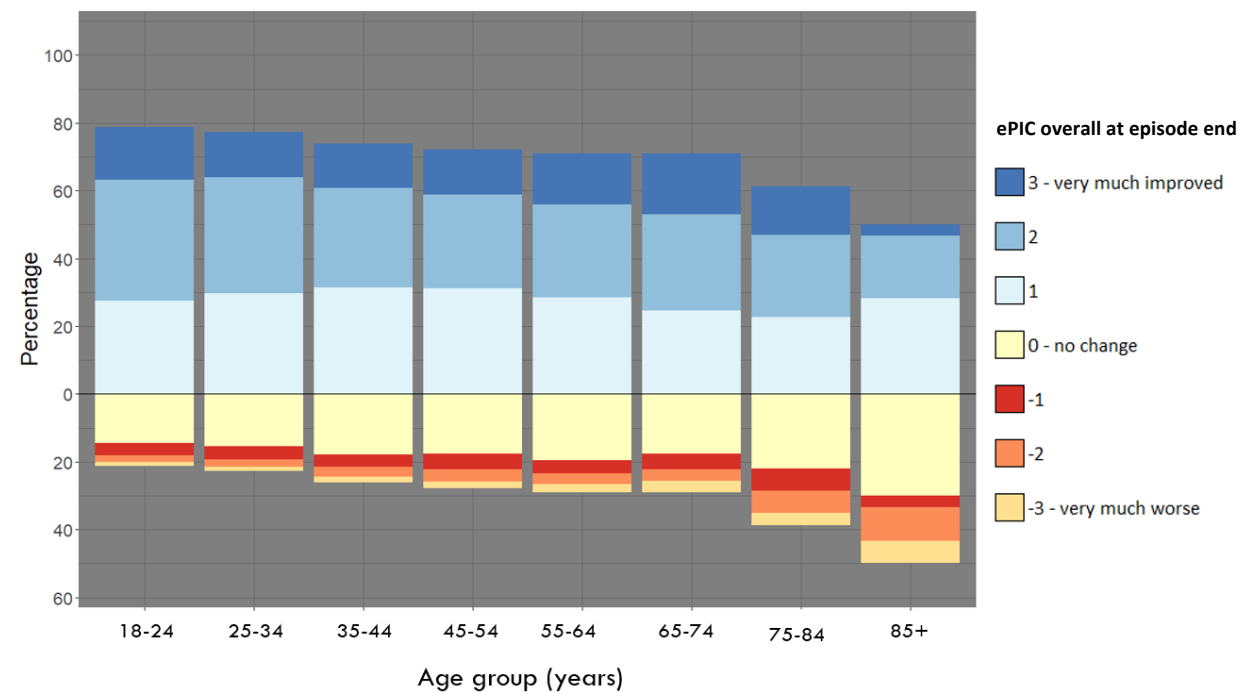
ePIC ratings also varied by site of main pain (Table 2). Patients whose main pain was in their head or groin were least likely to report and improvement (66.2% and 66.3% respectively), while those who reported pain in their feet had the highest incidence of improvement (77.7% positive ratings). The highest incidence of negative ratings (worse overall) were seen for those who listed the groin (13.4%) or hip (11.4%) as their main pain area.

A shorter pain duration was associated with higher perceptions of improvement. Of those patients who had pain for between 3 and 12 months, 80.2% reported an improvement, compared to only 65.3% of patients having pain for more than five years (Figure 2).

Table 2 Main pain area and associated distribution of patient impression of change scores

Main pain area	n	%	Patient impression of change (%)						
			-3	-2	-1	0	1	2	3
Back	5,396	41.0	2.0	2.9	3.7	18.1	30.0	29.5	13.8
Arm/shoulder	2,093	15.9	1.4	2.7	3.4	17.1	27.7	32.3	15.4
Neck	989	7.5	2.1	3.2	4.6	16.2	35.2	26.6	12.1
Legs	985	7.5	1.6	2.2	4.0	16.0	27.8	30.7	17.7
Hips	847	6.4	2.2	3.9	5.3	19.4	28.2	25.6	15.3
Knees	700	5.3	2.3	2.9	5.4	16.0	26.0	30.0	17.4
Feet	661	5.0	1.7	2.6	3.5	14.5	28.6	29.3	19.8
Head	459	3.5	2.4	4.1	3.7	23.5	29.6	25.9	10.7
Hands	403	3.1	1.0	2.7	4.2	16.1	28.0	32.8	15.1
Abdomen	298	2.3	3.0	4.0	3.7	21.1	27.9	30.9	9.4
Chest	168	1.3	1.2	1.2	6.0	18.5	29.2	32.7	11.3
Groin	163	1.2	1.2	6.1	6.1	20.2	27.0	25.2	14.1
Missing	1,744	-	-	-	-	-	-	-	-

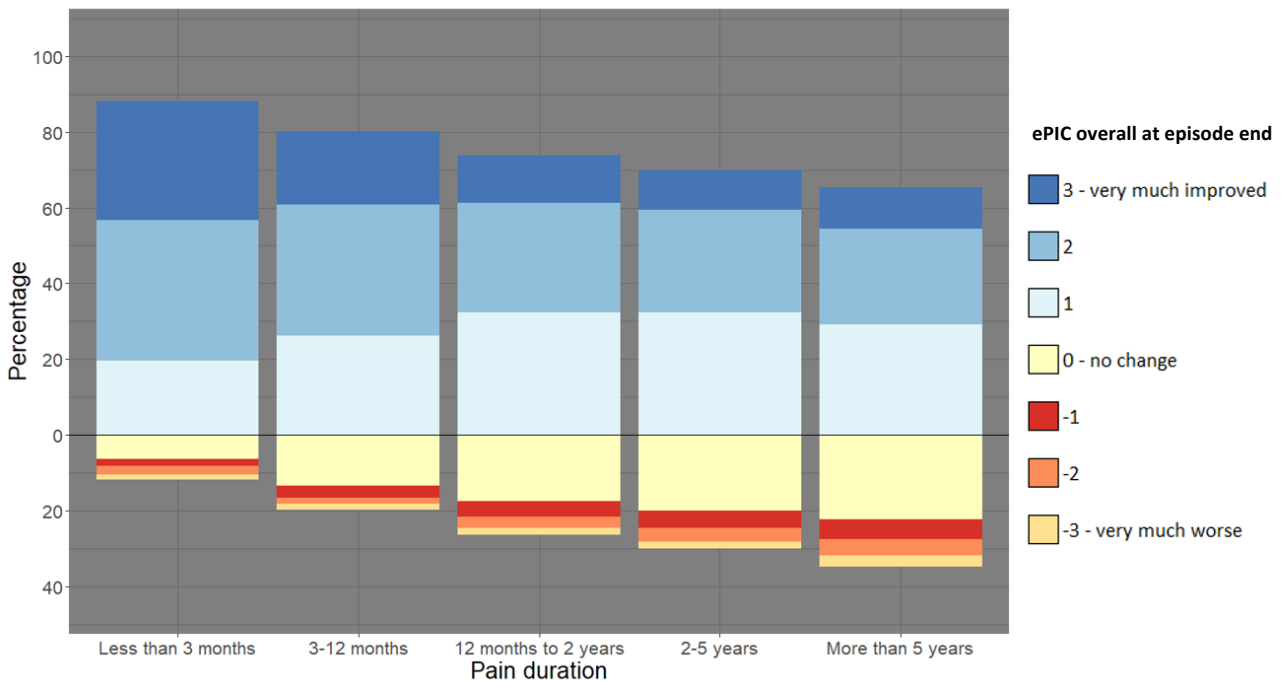*Figure 2 Distribution of patient impression of change scores by pain duration*

Table 3 presents the Spearman correlation coefficients between the ePIC-Overall and the other PROMs at episode end and with the change observed across the two time points. These correlations suggest that better scores and greater levels of improvement are associated with patients perceiving and rating their change more positively. While these results are statistically significant, the size of the correlations suggest only weak to moderate levels of association.

Table 3 Spearman correlations between the ePIC the other patient reported measures at episode end and change over the episode

Tool	Measure	Correlation between ePIC Overall at episode end and:					
		measure at episode end (post-treatment)			change in measure between referral and episode end		
		rho	p-value	n	rho	p-value	n
Brief Pain Inventory (BPI)	Average	-0.514	< 0.0001	14,758	-0.412	< 0.0001	14,552
	Worst	-0.468	< 0.0001	14,803	-0.385	< 0.0001	14,658
	Now	-0.495	< 0.0001	14,756	-0.362	< 0.0001	14,525
	Least	-0.464	< 0.0001	14,748	-0.324	< 0.0001	14,538
	Pain Severity	*-0.536*	*< 0.0001*	*14,638*	*-0.445*	*< 0.0001*	*14,281*
	Sleep	-0.454	< 0.0001	14,808	-0.360	< 0.0001	14,641
	Activity	-0.495	< 0.0001	14,799	-0.403	< 0.0001	14,634
	Mood	-0.460	< 0.0001	14,798	-0.383	< 0.0001	14,626
	Walking	-0.409	< 0.0001	14,788	-0.309	< 0.0001	14,609
	Work	-0.471	< 0.0001	14,729	-0.401	< 0.0001	14,502
	Relations	-0.438	< 0.0001	14,776	-0.322	< 0.0001	14,554
	Enjoyment	-0.493	< 0.0001	14,782	-0.425	< 0.0001	14,580
	Pain Interference	*-0.531*	*< 0.0001*	*14,838*	*-0.471*	*< 0.0001*	*14,715*
Depression, Anxiety, Stress Scale (DASS)	Depression	-0.365	< 0.0001	14,722	-0.261	< 0.0001	14,482
	Anxiety	-0.256	< 0.0001	14,716	-0.175	< 0.0001	14,463
	Stress	-0.325	< 0.0001	14,712	-0.260	< 0.0001	14,438
Pain catastrophising scale (PCS)	Rumination	-0.384	< 0.0001	14,556	-0.298	< 0.0001	14,146
	Magnification	-0.323	< 0.0001	14,583	-0.227	< 0.0001	14,183
	Helplessness	-0.457	< 0.0001	14,461	-0.318	< 0.0001	13,948
	Total	**-0.429**	**< 0.0001**	**14,673**	**-0.327**	**< 0.0001**	**14,386**
Pain self-efficacy (PSEQ)	-	*0.530*	*< 0.0001*	*14,758*	*0.443*	*< 0.0001*	*14,564*

NOTE: p-values correspond to one sided tests

Summary

This information series examined relationships between adult patients' impression of change overall, following treatment, and their scores on other patient-reported outcome measures.

Patients born in Australia tended to report improvement less frequently, while females and younger patients tended to rate their improvement more favourably. Socioeconomic status was related to how patients rated their change, with people living in areas of least disadvantage tending to report improvement more frequently than those living in areas of most disadvantage. Shorter pain duration is associated with more positive ePIC scores, highlighting the importance of early diagnosis followed by timely referral for specialist pain management.

The ePIC is also associated with improvements across all patient reported domains at the end of treatment (episode end). The highest correlations were with pain severity, interference and self-efficacy. While none of the correlations with the PROMs were strong individually, this was not surprising and suggests that the ePIC overall is indeed a global measure of change across multiple domains.

Future ePPOC research aims to apply more sophisticated statistical techniques such as ordinal logistic regression and classification tree-based modelling to investigate how changes in these PROMs combine and interact to influence the patient's perception of change. The results from this future study could be enhanced by a qualitative study where patients are asked to complete the ePIC and then interviewed about the factors they took into consideration when determining the reported level of improvement.

Series List

2018

No.1 2018: *Normative data for patients referred for specialist pain management in Australia*

No.2 2018: *Normative data for children and adolescents referred for specialist pain management in Australia*

No.3 2018: *Carer-proxy and child self-reported ratings of pain and quality of life*

2019

No. 1 2019: *Socioeconomic disadvantage and referral to pain management services in Australasia*

No. 2 2019: *Proximity to specialist pain management services in Australia*

2021

No.1 2021: *Profile of adult patients referred for specialist pain management in New Zealand*

No.2 2021: *Characteristics and outcomes for individuals reporting low back pain*

2022

No.1 2022: *Body Mass Index and persistent pain in Australia: Patient characteristics and treatment outcomes*

No.2 2022: *Body Mass Index and persistent pain in New Zealand: Patient characteristics and treatment outcomes*

2023

No.1 2023: *Patient impression of change: how does it relate to other patient-reported outcome measures?*