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Clinical- and cost-effectiveness of intensive short-term dynamic psychotherapy for chronic pain in a tertiary psychotherapy service

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Abstract
Objective: The objective of this study is to assess the clinical- and cost-effectiveness of intensive short-term dynamic psychotherapy (ISTDP) for patients with chronic pain.
Method: A sample of 228 pain patients was drawn from a larger naturalistic study of ISTDP. They received an average of 6.1 sessions delivered by 31 therapists. Psychiatric symptoms and interpersonal problems were assessed at three time points. Healthcare data from baseline year and three years following treatment came from independent governmental databases.
Results: Multilevel models indicated significant reductions in symptoms and interpersonal problems during treatment, including a moderate to large pre-post effect size ($d = 0.76$) for somatization. Further, the sample had successive reductions in yearly healthcare costs, reaching the normal population mean two years post-treatment.
Conclusion: Within the limitations of the uncontrolled design, our study suggests that ISTDP may be both clinically effective and cost-effective for patients with chronic pain.

Keywords: chronic pain, cost-effectiveness, naturalistic, short-term dynamic psychotherapy

Introduction

Chronic pain is a complex condition associated with considerable psychiatric comorbidity and burden to the patient, the healthcare system and society as a whole.[1,2] The emerging research suggests that developmental factors such as adverse childhood experiences,[3] insecure attachment,[4] and dysfunctional emotional processing[5] may predispose individuals for chronic pain. Such factors also likely contribute to the persistence of symptoms and may affect treatment response.[6] Thus, there is a need to research psychosocial interventions that specifically target these factors.

One approach is an emotion-focused, psychodynamic treatment model known as intensive short-term dynamic psychotherapy (ISTDP).[7,8] In ISTDP, pain is conceptualized as a result of anxiety and defensive processes including somatization and conversion.[9] These are driven by unconscious emotions related to attachment ruptures, which may be activated in new relational contexts (including the therapy relationship). Rather than being experienced directly, the painful emotions are blocked and the body's nervous system is activated, leading to altered autonomic, endocrine, and immune system activity.[5] In ISTDP, the therapist helps individuals attend to, experience and express their emotions directly, as well as work through associated links between their current and past experiences. This process overrides the anxiety and somatization contributing to pain symptoms.

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Table 1. Sample characteristics ($n = 228$)

		n	%
Gender	Female	172	75.4
	Male	56	24.6
Age (years)	19–24	19	8.3
	25–60	196	86.0
	>60	13	5.7
Residence	Urban	182	79.8
	Rural	46	20.2
Income	First quartile	48	21.9
	Second quartile	57	26.0
	Third quartile	57	26.0
	Fourth quartile	57	26.0
Psychiatric comorbidity	Major depressive disorder	81	35.5
	Any anxiety disorder	128	56.1
	Any personality disorder	128	56.1

Intensive short-term dynamic psychotherapy has a growing evidence base for complex psychiatric conditions, including pain.[10] Recent randomized controlled trials found ISTDP more efficacious than treatment-as-usual controls, superior to mindfulness-based stress reduction (MBSR) and equally effective as cognitive-behavioral therapy (CBT) for medically unexplained pain.[11–13] Still, there is a need for further research, including evaluating its effectiveness in regular practice and possible impact on long-term healthcare costs, which is the aim of the present study.

Methods

The sample of 228 patients meeting DSM-IV criteria for pain disorder was drawn from a large naturalistic study[14] at a tertiary psychotherapy service at Dalhousie University, Halifax, Canada (see Table 1). The original study was approved by the local hospital ethical review board and registered in ClinicalTrials.gov (identifier number NCT01924715). Methodological details are described elsewhere.[14]

Two well-validated self-report instruments, the *brief symptom inventory* (BSI)[15] and the *inventory of interpersonal problems* (IIP),[16] were distributed at intake, after the initial therapy interview and at termination. The BSI measures the patient's experience of symptoms during the last week using 53 items rated on five-point Likert scales ranging from 0 (*not at all*) to 4 (*very much*). The total score reflects overall symptom load and the instrument includes nine subscales. The internal consistency (i.e. Cronbach's α) of the total score and the subscales ranged between 0.86 and 0.97. The IIP has 32 self-rated items on five-point Likert-scales of interpersonal difficulties ranging from 0 (*not at all*) to 4 (*very much*). There are eight subscales and the sum of all items comprises a measure of overall interpersonal distress. Cronbach's α for the subscales and total score ranged between 0.71 and 0.89.

Subjects were all Nova Scotian residents and their yearly healthcare service usage was recorded in provincial administrative databases. An independent data linkage unit provided aggregated data for physician and hospital costs. Data were extracted for a year prior to the start of psychotherapy (baseline) and one, two, and three years afterward. Since only aggregated sample data were released, we could not perform statistical tests; hence, we report observed means and SDs for each year below.

We used multilevel modeling (MLM)[17] to investigate changes in BSI and IIP (including subscales) over time. Multilevel modeling uses all available data and handles nested data structures inherent in repeated-measures designs. The models were estimated with random intercepts and slopes, and an unstructured covariance structure was assumed. Time was coded 0 for baseline, 0.25 for the second point, and 1 for termination. Since there was a large portion of missing data, models were fitted with maximum likelihood estimation which provides unbiased estimates provided missing data are missing at random (MAR).[18] Only 61 patients (26.7%) had complete data from all three assessment points on both BSI and IIP, but 136 (59.6%) completed at least one assessment and could be included in the MLM estimations. Possible reasons for missing data included that many patients traveled from long distances, and therefore, only undertook the initial interview. Others included patients' unwillingness to fill in measures, treatment dropout, or therapeutic resolution of problems. Given the variety of possible reasons for missingness, we assume that MAR holds.

The study was exploratory; hence, Bonferroni correction was not used. Pre-post effect sizes were calculated using the observed means and SDs, controlling for the pre-post correlation.

Results

The ISTDP treatments started with a two to three hours long initial therapy interview followed by weekly 50-minute sessions. Treatments were not time-limited; rather, termination was mutually agreed upon by therapist and patient. The sample attended a mean of 6.1 ISTDP sessions (SD = 11.0; range 1–100) provided by 31 different therapists. Therapists had variable levels of training but attended weekly small-group video supervision led by an experienced ISTDP trainer. Videos were rated in 54 cases and averaged 3.4 (SD = 0.68) out of 4, suggesting a reasonable level of adherence.

Table 2. Descriptive statistics, slope estimates, and effect sizes for self-report measures

		Intake		*Termination*		*Effect of time*[a]			*Effect size*	
Scale	***Subscales***	***M***	***(SD)***	***M***	***(SD)***	***Estimate***	***SE***	***t***	***Pre-post r***	***Cohen's d***
BSI	Total score	1.68	(0.79)	1.14	(0.88)	–0.43**	0.066	–6.46	0.726	0.87
	Somatization	1.79	(0.95)	1.20	(0.99)	–0.48**	0.080	–5.70	0.679	0.76
	Obsessive-compulsive	2.26	(0.94)	1.65	(1.09)	–0.48**	0.094	–5.11	0.574	0.65
	Interpersonal sensitivity	1.86	(1.15)	1.26	(1.06)	–0.47**	0.090	–5.19	0.650	0.65
	Depression	1.87	(1.06)	1.21	(1.36)	–0.51**	0.090	–5.63	0.630	0.63
	Anxiety	1.88	(0.99)	1.21	(1.07)	–0.50**	0.085	–5.86	0.656	0.78
	Hostility	1.37	(0.98)	0.92	(0.87)	–0.40**	0.073	–5.49	0.723	0.65
	Phobic anxiety	1.13	(1.04)	0.78	(0.91)	–0.21*	0.085	–2.55	0.623	0.41
	Paranoid ideation	1.38	(0.98)	1.02	(0.91)	–0.28**	0.075	–3.83	0.699	0.49
	Psychoticism	1.40	(0.94)	0.93	(0.86)	–0.36**	0.073	–5.06	0.654	0.63
IIP	Total score	1.55	(0.63)	1.13	(0.70)	–0.34**	0.059	–5.69	0.658	0.76
	Domineering/controlling	0.94	(0.88)	0.71	(0.82)	–0.16*	0.071	–2.34	0.648	0.32
	Vindictive/self-centered	1.03	(1.06)	0.82	(0.96)	–0.17	0.089	–1.87	0.563	0.22
	Cold/distant	1.33	(1.09)	0.95	(0.98)	–0.30**	0.082	–3.62	0.683	0.46
	Socially inhibited	1.67	(1.04)	1.22	(1.05)	–0.43**	0.102	–4.17	0.500	0.43
	Nonassertive	1.90	(1.07)	1.34	(0.91)	–0.49**	0.109	–4.51	0.352	0.50
	Overly accommodating	2.15	(0.98)	1.66	(1.04)	–0.46**	0.110	–4.19	0.439	0.46
	Self-sacrificing	2.05	(1.09)	1.53	(1.05)	–0.44**	0.105	–4.23	0.567	0.52
	Intrusive/needy	1.21	(0.99)	0.92	(0.80)	–0.19**	0.068	–2.90	0.680	0.41

BSI, brief symptom index; IIP, inventory of interpersonal problems.

[a]Slope estimates from unconditional growth models fitted with maximum likelihood estimation on all available data.

**$p < 0.01$,

*$p < 0.05$.

All BSI subscales were significantly reduced over time and effect sizes ranged from small to large (d = 0.41–0.87, Table 2). Notably, change in the somatization subscale was moderate to large (d = 0.76). On the IIP, all subscales except the vindictive subscale were also significantly reduced over time and effect sizes were small to moderate (d = 0.22–0.76, Table 2).

At baseline, the physician costs were about twice the Nova Scotian 2007 population mean[19] and hospital costs were almost 4.5 the Canadian 2007 average[20] (Table 3). Between baseline and year one, physician costs fell by $154 (15.8%) and hospital costs by $2701 (43.7%). In the second year after treatment, physician costs fell by $389 (40.0%) and hospital costs by $4920 (79.7%), leaving both the average physician cost ($587) and hospital cost ($1257) in line with normal population means ($595 and $1389, respectively). The costs were further reduced between year two and three. Using the baseline year as reference, the average cumulative cost saving per patient was $14,061 over three years following treatment, which is about 20 times the estimated average per patient ISTDP treatment cost of $700.[14]

Discussion

This uncontrolled naturalistic study suggests that ISTDP may be both effective and cost-effective for patients with chronic pain. In addition to general symptom and interpersonal gains, we found moderate to large treatment effects on the somatization subscale (d = 0.76) reflecting reduced physical symptoms. The observed gains in interpersonal functioning may be particularly important for long-term effects given that pain symptoms may exacerbated in response to conflicts in close relationships.[21] Still, it should be noted that average termination scores on both BSI and IIP were still above normal population means. Chronic pain patients may therefore need longer treatments than the sample average of six sessions, especially for those with comorbid anxiety and low affect tolerance.

Corroborating the self-report measure gains, reduction and normalization of healthcare costs at follow-up suggests gains were maintained over time. The cumulative cost savings greatly exceeded the cost of the treatment, suggesting that the treatment was cost-effective.

Table 3. Mean (standard deviation) healthcare costs in 2007-equivalent Canadian dollars

	Pretreatment		*After termination of treatment*					
	Baseline year[a]		***Year 1[a]***		***Year 2[b]***		***Year 3[c]***	
Physician	976	(1195)	822	(1559)	587	(584)	529	(471)
Hospital	6177	(27,347)	3476	(20,539)	1257	(5614)	727	(2581)
Total cost	7153		4298		1844		1256	

[a] $n = 228$.

[b] $n = 192$.

[c] $n = 187$.

While promising, the study limitations are significant. First, there is no control group meaning spontaneous remission or regression to the mean could account for gains, though unlikely since the sample was tertiary and chronically impaired. Second, although the statistical modeling made use of all available data under the assumption of MAR, we cannot exclude that missing data affected outcomes. Third, we were only able to obtain aggregated sample data on healthcare costs and could therefore not perform any statistical tests. Finally, we also lack control over other treatments that may have been provided during the study, including medications. These and other limitations should be addressed in future studies.

Disclosure

The authors report no conflict of interest. The authors alone are responsible for the content and writing of the paper.

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