

Incremental Cost-effectiveness of Pharmacotherapy and Two Brief Cognitive-Behavioral Therapies Compared With Usual Care for Panic Disorder and Noncardiac Chest Pain

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Abstract: The aim of this study was to assess the incremental cost-effectiveness ratios (ICERs) of two brief cognitive-behavioral therapy (CBT)-based interventions and a pharmacological treatment, compared with usual care, initiated in the emergency department (ED) for individuals with panic disorder (PD) with a chief complaint of noncardiac chest pain. A total of 69 patients were followed up to 6 months. The primary outcome variables were direct and indirect costs of treatment and PD severity. Panic management (PM) had an ICER of \$124.05, per the Anxiety Disorders Interview Schedule for *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*, severity score change (95% confidence interval [CI], \$54.63–\$314.57), compared with pharmacotherapy (paroxetine), with an ICER of \$213.90 (95% CI, \$133.51–\$394.94), and brief CBT, with an ICER of \$309.31 (95% CI, \$151.27–\$548.28). The pharmacological and CBT interventions were associated with a greater clinical improvement compared with usual care at posttest. PM presented a superior ICER, suggesting that it may be a promising treatment option to implement in EDs.

Key Words: Incremental cost-effectiveness, panic disorder, noncardiac chest pain, emergency department, cognitive-behavioral therapy, pharmacotherapy

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Chest pain is the second most common motive for consultation in emergency medical services (Kontos et al., 2010; Fass and Achem, 2011). More than half of individuals who consult for chest pain are diagnosed with noncardiac chest pain (NCCP; Eslick and Talley, 2008; Kontos and Jesse, 2000). Despite receiving this diagnosis and a favorable prognosis, most individuals with NCCP continue to experience chest pain; to fear the development of a heart disease; to seek medical care; and to experience social, occupational, and functional impairment (Dammen et al., 2008; Fleet et al., 2003; García-Campayo et al., 2010; Leise et al., 2010).

Panic disorder (PD) is a mental disorder with symptoms that resemble those of NCCP (e.g., chest pain, accelerated heart rate, difficulty breathing). Between 14% and 56% of patients with NCCP have PD (Dammen et al., 2006; Fleet et al., 1996; Jonsbu et al., 2009; Yingling et al., 1993). Among emergency department (ED) patients who present NCCP, between 17% and 32% also have PD (Fleet et al., 1996; Foldes-Busque et al., 2011b; Yingling et al., 1993); in contrast, the lifetime prevalence rate of PD in the general population is

estimated at 4.7% (Kessler and Wang, 2008). Evidence-based treatments for PD consist of psychotherapy, pharmacotherapy, and combined psychotherapy and pharmacotherapy. Pharmacological treatments with demonstrated short-term effectiveness include selective serotonin reuptake inhibitors (SSRIs), tricyclic antidepressants, monoamine oxidase inhibitors, and benzodiazepines, although benzodiazepines should be used as second-line agents only (Canadian Psychiatric Association [CPA], 2006). Where psychotherapy is concerned, the only evidence-based treatment of PD is cognitive-behavioral therapy (CBT; CPA, 2006; McHugh et al., 2009; Mitte, 2005; Sánchez-Meca et al., 2010).

Individuals with PD with or without agoraphobia frequently use health care services, including visits to general practitioners and specialists, visits to the ED, psychiatric care, testing, medication, and hospitalization. Patients with PD use these health care services more frequently than the general population does and have the highest rate of ED use of all patients with a mental disorder (Davidoff et al., 2011; Katon et al., 1992; Yates, 2009; Zane et al., 2003).

When a patient presents at the ED with a complaint of chest pain, ED staff focus on excluding and treating potentially lethal conditions, such as a myocardial infarction (Esler and Bock, 2004; Kontos et al., 2010). In general, when no organic cardiac cause for the chest pain is identified, no specific treatment is offered. The patient is informed of his/her test results and NCCP is diagnosed. However, a diagnosis of NCCP is often insufficient to relieve patients' anxiety and apprehensions; many continue to believe that they have an undetected physical problem, prompting them to consult repeatedly (Dammen et al., 2006; Leise et al., 2010; McDonald et al., 1996). Despite the elevated prevalence of PD in ED patients with NCCP, in more than 94% of cases, medical personnel do not identify or diagnose PD (Coley et al., 2009; Dammen et al., 1999; Foldes-Busque et al., 2011b).

A number of studies have evaluated the efficacy of CBT for patients with NCCP (Esler et al., 2003; Klimes et al., 1990; Mayou et al., 1997; van Peski-Oosterbaan, 1999). The results of these studies often demonstrate that individual or group interventions with this population promote an increase in quality of life and a significant decrease in panic symptoms, functional limitations related to symptoms, health care services use, and medication use (Robertson, 2006).

Few studies have evaluated the efficacy of specific interventions for PD in ED patients with NCCP. One study (Swinson et al., 1992) demonstrated that a 1-hour individual intervention offered in the ED to patients presenting with panic attacks seemed to be more efficacious than was reassurance alone; the intervention consisted primarily of exposure training. Another study demonstrated that a pharmacological treatment (paroxetine) may be initiated by ED physicians and that this pharmacological treatment is more likely to improve symptoms and functioning at 3 months compared with usual care (Wulsin et al., 2002). These studies have methodological limitations; evaluation periods were often short and medications were not maintained for the optimal duration for therapeutic effectiveness.

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COST-EFFECTIVENESS STUDIES

Evaluation of the costs associated with certain health care interventions is now customary, particularly in this era of limited funding caused by health care reform. The resources of health care systems (e.g., money, personnel, space, technology) are limited, and economic feasibility studies address the challenges associated with the scarcity of resources by analyzing the costs and consequences associated with new treatments (Hoch and Smith, 2006). Cost-effectiveness studies are the most common type of economic evaluation (Drummond et al., 1997; Haby et al., 2004; Konnopka et al., 2009; O'Brien and Briggs, 2002). This type of study allows a comparison of interventions with similar objectives, using natural clinical units such as symptom frequency for a specific disorder, days of absenteeism, psychosocial functioning, and quality of life. Following this type of evaluation, incremental cost-effectiveness analyses can be conducted. The term *incremental* refers to the ratio of the change in costs to incremental benefits of a therapeutic intervention compared with a control group. This relationship demonstrates the benefits of a new intervention in comparison with a traditional intervention such as usual care (Briggs, 2004).

To our knowledge, only one study has evaluated the cost-effectiveness of combined CBT and pharmacological treatments for PD in primary care services (Katon et al., 2006). The results demonstrated that for PD, CBT plus pharmacotherapy (SSRI) was more effective and more cost-effective than was usual care. The treatment in this study combined psychoeducation; brief CBT (six sessions in 3 months, six 30-minute follow-up calls in the 12 months after treatment); and, where applicable, consultation with a psychiatrist to maximize the benefits of pharmacological treatment. When only mental health and medical costs were included, the average cost of the intervention was \$473 more expensive than was usual care. However, when all direct and indirect costs were taken into consideration, the intervention condition yielded a cost savings of \$276. Other studies on the cost-effectiveness of interventions for PD have been conducted in specialized anxiety disorder clinics (Marchand et al., 2004; McHugh et al., 2007; Otto et al., 2000; Roberge et al., 2008; van Roijen et al., 2006). They compared different modalities of treatment such as individual, group, and brief CBT or pharmacotherapy with usual care. The results show that all those modalities are more cost-effective than is usual care in the long-term (Poirier-Bisson et al., 2010).

The present study is part of a larger project designed to examine the effectiveness of four different interventions for ED patients

with NCCP who also met the diagnostic criteria for PD (Lessard et al., 2011; Pelland et al., 2011). The objectives of the larger study were to use various measures to compare the effectiveness of the following treatment modalities: CBT limited to panic management (PM; one 2-hour session), brief CBT (seven 1-hour sessions), a pharmacological treatment (paroxetine, 40 mg per day for 6 months), and usual care. The present study was conducted to investigate the cost-effectiveness of each specific treatment modality, in comparison with usual care. This study was also designed to explore changes in the use of general health care services and mental health care services after treatment.

METHODS

Participants

A total of 69 adults with NCCP and PD were recruited from three EDs in Quebec (Canada): Sacré-Cœur Hospital in Montreal, the Montreal Heart Institute, and Hotel-Dieu Hospital in Lévis. The sample included 31 women (45%) and 38 men (55%), 19 to 81 years old (mean, 41.81; SD, 13.21). The inclusion criteria were: a) 18 years or older; b) primary diagnosis of PD; and c) diagnosis of NCCP or chest pain with very low risk for heart disease (benign electrocardiogram results, negative troponin test, normal findings from pulmonary radiography, nontraumatic), without clear medical origin. Potential participants were excluded if they met one of the following criteria: a) CBT in the past 6 months; b) new anxiolytic, antidepressant, or other psychotropic medication in the past year (participants were eligible if their medication had been stable for the past year); c) cognitive deficit or other physical problem with the potential to interfere with therapy; and (d) substance or alcohol abuse.

The participants were recruited when they presented at the ED with chest pain. The participants diagnosed with NCCP were approached by a member of the research team, who explained the nature of the study and obtained informed consent. All participants were evaluated by graduate students in psychology using a test battery and a semistructured interview. Of 99 eligible patients, 28 refused treatment and 2 did not complete baseline assessment. A total of 69 patients were included in the study and assigned to one of the following conditions: PM ($n = 24$), pharmacology ($n = 11$), CBT ($n = 19$), or usual care ($n = 15$) (see flow chart; Figure 1). For feasibility reasons, a cohort design was used. Each sequence of treatment condition was randomized before the study, each cohort maintained for

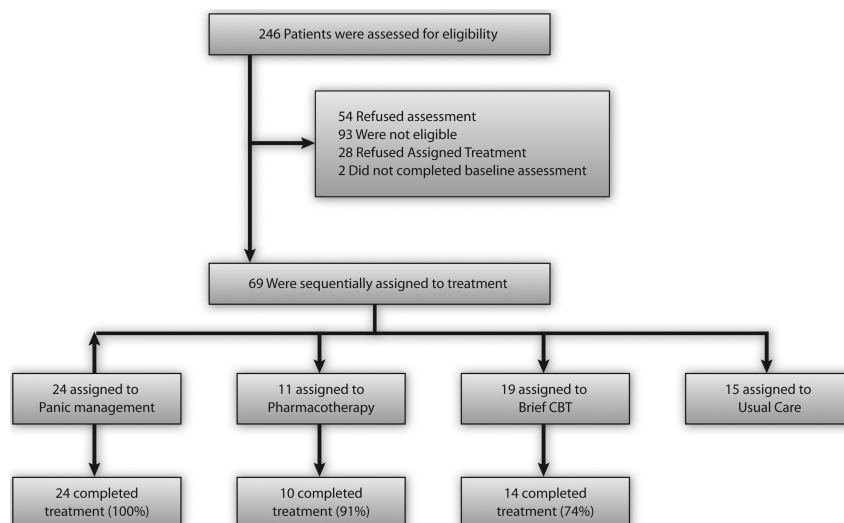


FIGURE 1. Participant flow chart.

a 4-month period, and the order was maintained throughout the recruitment period, which lasted from November 2005 to December 2009. In addition to the initial evaluation, the participants were re-evaluated at posttest, 3-month follow-up, and 6-month follow-up.

Measures

Clinical Evaluation

The Anxiety Disorders Interview Schedule for *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; ADIS-IV; Di Nardo et al., 1994)*, was used to evaluate the presence and the intensity of PD. The intensity of PD was used to determine a change score representing treatment efficacy on a scale of 0 to 8 (posttest and pretest, 3-month follow-up and posttest, and 6-month follow-up and 3-month follow-up). The score rating from 0 to 8 indicates the degree of distress and interference in functioning associated with each diagnosis (0, none, to 8, very severely disturbing/disabling). The threshold for a formal *DSM-IV* diagnosis is a score of 4 or higher (Di Nardo et al., 1994). The ADIS-IV was also used to evaluate other anxiety and mood disorders that are frequently comorbid with PD. The change score on the ADIS-IV was used to determine the effectiveness of the treatment for is high clinical significance.

Evaluation of Costs

A semistructured interview was administered to evaluate the direct and indirect costs of treatment and health care services use in the last 3 months (Roberge et al., 2007). All costs were calculated in Canadian dollars (CAD). The baseline assessment included 3 months before the study and follow-ups for the 6-month period after the end of treatment.

Direct treatment costs included the costs for psychological and pharmacological treatments. Psychological treatment costs included remuneration for psychologists, based on the average hourly rate (\$80) reported by the Order of Psychologists of Quebec in 2009, and the number of sessions that the participant received. Pharmacological treatment costs included the cost of generic medications according to the patient's prescribed dose and the prices established by the Quebec government health care insurance *Régie de l'assurance maladie du Québec (RAMQ)*. Costs also included fees for physician's consultations; cost per visit (\$51.80) was based on the average cost of a consultation with a general practitioner, as per RAMQ. Use of health care services, both related and unrelated to mental health problems (e.g., consultations with general practitioners, specialists, or other health care professionals; medication), was based on self-reported data, and costs were calculated on the basis of RAMQ data. Classification of a given consultation as mental health related was based on the motive of consultation and the type of specialist consulted. Medication determined to be mental health related included anxiolytics, antidepressants, and antipsychotics.

Indirect costs included transportation costs and travel time, absenteeism, and decreased work productivity. The estimates of transportation costs were based on type of transportation, with an estimated 20-km round trip for each treatment appointment. Travel costs by car were calculated at \$0.43 per kilometer, a total of \$8.60 per appointment. Public transportation costs were determined according to the Montreal transit corporation fares in 2008 (\$2.50 one way, \$5.00 round trip). When taxis were used, costs were calculated on the basis of the city of Montreal taxi fare at the time, which was a base rate of \$3.30 and an additional \$1.60 per kilometer traveled (total of \$35.50 per appointment). Travel time was estimated at 60 minutes per round trip, and travel costs were added to treatment time; costs per hour were calculated at minimum wage (\$9.00).

Transportation costs and travel time costs were calculated for use of mental health care services, using the method reported above, and added to the calculations for absenteeism and decreased

productivity. Absenteeism was calculated by number of hours off work for mental health reasons (e.g., stress, anxiety, health problems, appointments with mental health care professionals). Number of hours of missed work was multiplied by the average salary in Quebec (\$22.55 per hour), as per the Director of Labour Information for the Quebec Labour Ministry. Productivity was determined by the participant's work status and his/her reported productivity. The average Quebec salary was used in calculations for the employed participants; minimum wage was used for the unemployed participants.

Treatments

The present study examined three treatment modalities. The first was a psychoeducative intervention based on CBT principles (PM, one 2-hour session) focused on PM; this intervention consisted primarily of psychoeducation designed to demystify symptoms, explain the development and maintenance of PD and NCCP, and teach PM strategies. The participants were also provided with an information manual. The second treatment modality was a brief individual CBT (seven 1-hour sessions) delivered by a psychologist and the same information manual received by the participants in the PM modality. The primary components of the brief CBT intervention were psychoeducation about PD and its symptoms, exposure, and cognitive restructuring. The material used to develop the PM and brief CBT protocols was derived from "Fear of Fear" (*La peur d'avoir peur*) by Marchand and Letarte (2004). The third treatment modality was the prescription of an SSRI (paroxetine) by an ED physician. The initial dosage was 10 mg per day, with a gradual increase to the maximum daily dose of 40 mg, which was maintained for 6 months. The participants were followed by a physician to evaluate side effects, and adherence to pharmacological treatment was evaluated using pill count at each medical follow-up.

Statistics

The sociodemographic data were compared at pretest with univariate analysis of variance (ANOVA) and chi-square analyses. To determine the effectiveness of the control and treatment conditions, repeated-measures ANOVAs and contrast analysis were conducted on the data for change in PD severity. According to the objectives, the first contrast compared the usual care with the combined treatments, then the three treatments were compared with each other (brief CBT and PM compared with pharmacotherapy, then brief CBT with PM). All participants who completed the baseline evaluation and were assigned to an intervention were included in the analyses (intention-to-treat analysis). Missing data were replaced using the last observation carried forward method.

The treatment conditions were compared with the usual care on their effectiveness and their costs with incremental cost-effectiveness ratios (ICERs). The equation used to calculate the ratios is $(\text{Treatment} - \text{Usual care}) / (\text{treatment effectiveness} - \text{usual care effectiveness})$, which gives a cost for each ADIS-IV severity score change.

To explore the health care services use, descriptive statistics were conducted. Given the nonnormal distribution of data, significant floor effects, and difficulty normalizing the data, nonparametric analyses were selected. The three treatment conditions were combined to increase the statistical power and compare with the usual care condition. Friedman's ANOVA analyses were conducted to determine change over time in the various categories of costs. The Fisher's exact test was used to identify significant differences in the presence or the absence of costs at each time point (dichotomous variable).

RESULTS

Sociodemographic and Clinical Characteristics

A total of 69 participants were included in the analysis: 54 were in one of the treatment conditions and 15 were in the usual care

TABLE 1. Sociodemographic and Clinical Characteristics

	PM (n = 24)	CBT (n = 19)	Pharmacotherapy (n = 11)	Usual Care (n = 15)	Statistic	p
Age	40.79 (13.73)	46.26 (13.60)	40.27 (12.81)	38.93 (11.97)	1.056 ^a	0.374
Women	11 (45.8%)	10 (52.6%)	4 (36.4%)	6 (40%)	0.298 ^a	0.827
Life partner	16 (66.7%)	12 (63.2%)	5 (45.5%)	7 (46.7%)	0.914 ^a	0.439
Annual income						
>\$60,000	8 (33.3%)	8 (42.1%)	3 (27.3%)	6 (40%)	0.458 ^b	0.928
Education						
>High school	12 (50%)	13 (68.4%)	5 (45.5%)	8 (53.3%)	1.728 ^b	0.631
Work						
Full time or part time	17 (70.8%)	12 (63.2%)	8 (72.7%)	11 (73.3%)	0.539 ^b	0.910
PD severity (of a possible 8)	5.42 (0.929)	5.53 (0.964)	4.91 (0.944)	5.20 (0.862)	1.204 ^a	0.315

^aANOVA.^bChi-square.

condition. There were no significant demographic or clinical differences between the interventions and the usual care condition at pretest (see Table 1).

Treatment Efficacy

For change scores on PD severity according to the ADIS-IV, a significant time effect ($F[2,130] = 34.12$, $p = 0.00$), no treatment effect, and a significant time by treatment effect ($F[6,130] = 2.72$, $p = 0.018$) were observed. Contrast analysis indicated a significant difference between posttest and pretest ($t[65] = 3.5$), indicating a significant reduction in PD severity at posttest but not at the other follow-up periods.

Costs of Treatment and Incremental Cost-effectiveness

Direct and indirect costs of treatments ranged from \$174.50 (SD, 0.67) for PM, \$510.41 (SD, 64.08) for pharmacotherapy, and \$558.03 (SD, 47.42) for brief CBT. The usual care condition had no specific treatment after the ED visit and therefore does not present direct or indirect costs. Table 2 displays the ICERs. The ICERs were evaluated at \$124.05 per ADIS severity score change for the PM condition, at \$213.90 per ADIS score change for the pharmacotherapy condition, and at \$309.31 per ADIS score change for the brief CBT. Confidence intervals (CIs) were estimated with nonparametric bootstrapping procedures. Those analyses lead to statistical inferences based on successive resampling of the original sample, which reduce uncertainty. This procedure was replicated 1000 times, and CIs were calculated (Briggs, 2004; Efron and Tibshirani, 1994; O'Brien and Briggs, 2002). The 1000 bootstrap replications

presented a 95% CI ranging from \$54.63 to \$314.57 for the PM condition, from \$133.51 to \$394.94 for the pharmacotherapy condition, and from \$151.27 to \$548.28 for brief CBT. Those CIs did not indicate significant differences between the treatment conditions. To better understand the impact of a treatment specific for PD, the three conditions were combined, and the ICER was \$187.67 per ADIS score change and had a 95% CI ranging from \$118.9 to \$360.38.

Health Care Services Use

The following cost categories were explored at each assessment period: direct costs for medication and consultations with health care professionals (general practitioners, specialists, and other health care professionals) and indirect costs, including costs related to absenteeism and decreased productivity related to mental health problems. Figure 2 illustrates the total costs for each condition.

Costs for the three treatment conditions during a 1-year period were as follows: \$819.60 (SD, 1145.06) at pretest, \$420.23 (SD, \$570.14) at posttest, \$414.71 (SD, \$528.14) at the 3-month follow-up, and \$363.79 (SD, \$412.87) at the 6-month follow-up. The costs associated with health care use in the usual care condition were \$728.60 (SD, \$758.88) at pretest, \$665.36 (SD, \$670.28) at posttest, \$886.87 (SD, \$1399.36) at the 3-month follow-up, and \$514.28 (SD, \$669.97) at the 6-month follow-up. Of all health care professionals consulted, general practitioners were consulted the most frequently, both in the usual care condition and in the three treatment conditions.

Friedman's analysis indicated significant differences over time for the three treatment conditions combined in direct costs ($\chi^2_2 = 28.92$, $p = 0.000$), indirect costs ($\chi^2_2 = 14.60$, $p = 0.002$), and total costs ($\chi^2_2 = 27.43$, $p = 0.000$). There were no significant differences

TABLE 2. Incremental Cost-effectiveness Analysis

Outcome Measure	PM (SD)	Pharmaco (SD)	CBT (SD)	UC (SD)
Direct costs, CAD\$ (therapist or medication)	160.0 (0)	395.91 (188.18)	442.11 (167.32)	0
Indirect costs, CAD\$	15.15 (1.22)	114.50 (40.76)	122.92 (43.53)	0
Total costs of treatment, CAD\$	174.50 (0.67)	510.41 (64.08)	558.03 (47.42)	0
Severity on ADIS-IV (score change between baseline and posttest)	2.88 (0.05)	3.64 (0.45)	3.47 (0.55)	1.07 (0.48)
ICER	\$124.05 (CI, 54.63–314.57)	\$213.90 (CI, 133.51–394.94)	\$309.31 (CI, 151.27–548.28)	
	More effective than UC but costs \$124.05 per ADIS-IV point	More effective than UC but costs \$198.45 per ADIS-IV point	More effective than UC but costs \$232.32 per ADIS-IV point	

CBT indicates cognitive-behavioral therapy; Pharmaco, pharmacotherapy; PM, panic management; UC, usual care.

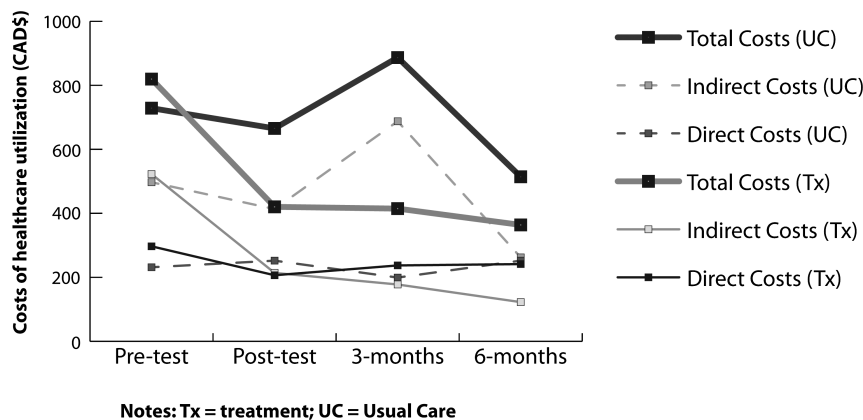


FIGURE 2. Total costs associated with health care use.

over time in any of the cost categories for the usual care condition. Significant floor effects prevented analyses on subcategories of direct and indirect costs. Fisher's analyses revealed significant differences between combined treatment and usual care condition in the presence or the absence of total indirect costs at each measurement point ($p = 0.046$). At posttest, 48% of the participants in the combined treatment condition were no longer incurring indirect costs, as compared with 20% in the usual care condition. At the 3-month follow-up, 56% of the participants in the treatment condition were no longer incurring any costs, as compared with 20% in the usual care condition. These results can be attributed to a decrease in costs associated with reduced productivity at posttest (67% of the combined treatment condition no longer reported any costs, as compared with 27% in the usual care condition) and a decrease in costs related to absenteeism at the 3-month follow-up (74% of the participants in the combined treatment condition no longer reported costs related to absenteeism, as compared with 40% in the usual care condition).

DISCUSSION

The primary objective of the present study was to explore the incremental cost-effectiveness of three treatment modalities over usual care for individuals who present to the ED with NCCP and who have PD. The participants who received a specialized treatment of PD reported a significant decrease in PD severity at posttest, as compared with the participants in the usual care condition, in terms of PD symptoms and interference with patient's functioning. Furthermore, the three treatment modalities demonstrated no significant differences in efficacy. The ICER revealed that the PM condition seemed to be the most cost-effective (\$124.05 [95% CI, \$54.63–\$314.57]), followed by the pharmacology condition (\$213.90 [95% CI, \$133.51–\$394.94]) and the brief CBT condition (\$309.31 [95% CI, \$151.27–\$548.28]); however there were no significant differences between the conditions.

The results demonstrate that a brief 2-hour PM treatment can significantly reduce PD symptoms in this population, with an ICER estimated at \$124.05 for each 1-point decrease in the intensity of PD on the ADIS scale of 0 (none) to 8 (very severely disturbing/disabling). This finding is congruent with the results of Swinson et al. (1992), which demonstrated that a 1-hour intervention delivered in the ED was more effective than was usual care. Recognized effective treatments for PD include CBT and pharmacotherapy, which are longer and more involved interventions with significant related costs (McHugh et al., 2009). Our results suggest that a brief and time-limited PM intervention for PD in the context of NCCP in the ED could be a compelling alternative to usual care. Our sample is based on individuals who had PD that interfered moderately to severely with their daily functioning, but, compared with a psychiatric population, they present fewer panic

symptoms, agoraphobic cognitions, and agoraphobic avoidance, and their sensitivity to anxiety is lower (Belleville et al., 2010). Treatments should therefore be adapted to this population in a context of medical setting, as we did in our study.

Given the primarily physiological nature of panic attack symptoms, most patients with PD present in the ED when their symptoms first appear. In 85% of cases, when PD symptoms (primarily NCCP) reappear, patients consult a general practitioner (Eslick, 2004). It may therefore be important to increase awareness of PD and NCCP among general practitioners. Further, the application of specialized PD interventions seems to decrease health care services use, a significant advantage that should be taken into consideration in ED health care service planning. Finally, given the low rate of PD identification and diagnosis by ED physicians, the development of effective PD screening instruments (Foldes-Busques et al., 2011a) is an important avenue to pursue; the use of such instruments could increase the rate of PD identification. However, appropriate treatment options would need to be explored further and implemented concurrently with the screening strategy.

We also explored health care services use in this population, as well as the impact of the interventions on the participants' subsequent health care services use. Direct and indirect costs decreased significantly for the individuals receiving a specialized treatment of PD during the 3-month follow-up period; in contrast, costs for the participants who received usual care did not decrease. The results suggest that specialized treatment of PD may have an influence on reducing indirect costs. Offering an effective treatment of individuals with NCCP is a promising avenue that produced an appreciable reduction in health care-related costs.

The collection of economic data alongside an existing clinical treatment trial, also called piggyback evaluation, has several advantages (O'Sullivan et al., 2005). The study design offered good internal validity because the data were collected in the context of a quasi-experimental study. Furthermore, the inclusion of economic evaluation measures in a pre-established clinical trial provided additional information about the population being studied, at a reduced cost compared with an independent cost-effectiveness study. Despite these advantages, several limitations of the present study must be acknowledged. First, the relatively small sample size may have affected the results. One hypothesis for the difficulty recruiting patients with NCCP and PD is that individuals who present at the ER with NCCP often resist psychological explanations for their symptoms. They remain vigilant for physiological symptoms and do not feel reassured by negative medical tests (White, 2010). Second, the variability in costs associated with health care services use was such that a large number of participants were necessary to conduct powerful

statistical analyses. Another limitation of the present study was the method of collecting data about health care services use. We used retrospective self-report, a method that may have induced biases related to, among other things, social desirability and recall bias (Drapeau et al., 2011). We tried to overcome the limitations related to retrospective self-report by taking measures every 3 months to reduce memory bias and by providing an exhaustive list of services that the participants may have used.

CONCLUSIONS

The results of the present study demonstrate that specialized treatments of individuals with NCCP and PD, delivered directly in the ED, can be effective. One 2-hour session and seven 1-hour sessions with a licensed psychologist, as well as pharmacotherapy with paroxetine, considerably decreased the intensity of PD and NCCP symptoms and reduced the costs associated with mental health problems. Although further research on the implementation of these specialized interventions in the hospital setting is necessary, the results of this study indicate that psychological and pharmacological interventions seem promising to improve the quality of care for patients with PD and NCCP in the ED.

DISCLOSURES

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The authors declare no conflict of interest.

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