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Economic Evaluation of Videoconference Group Acceptance and Commitment Therapy and Behavioral Activation Therapy for Depression Versus Usual Care Among Adults With Chronic Low Back Pain Plus Comorbid Depressive Symptoms

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Abstract: **Chronic pain and depression are frequently comorbid conditions associated with significant health care and social costs. This study examined the cost-utility and cost-effectiveness of videoconference-based group forms of Acceptance and Commitment Therapy (ACT) and Behavioral Activation Therapy for Depression (BATD), as a complement to treatment-as-usual (TAU), for patients with chronic low back pain (CLBP) plus depressive symptoms, compared to TAU alone. A trial-based economic evaluation (n = 234) was conducted from a governmental and health care perspective with a time horizon of 12 months. Primary outcomes were the Brief Pain Inventory-Interference Scale (BPI-IS) and Quality Adjusted Life Year. Compared to TAU, ACT achieved a significant reduction in total costs (*d* = .47), and BATD achieved significant reductions in indirect (*d* = .61) and total costs (*d* = .63). Significant improvements in BPI-IS (*d* = .73 and *d* = .66, respectively) and Quality Adjusted Life Year scores (*d* = .46 and *d* = .28, respectively) were found in ACT and BATD compared to TAU. No significant differences in costs and outcomes were found between ACT and BATD. In the intention-to-treat analyses, from the governmental and health care perspective, no significant differences in cost reduction and incremental effects were identified in the comparison between ACT, BATD, and TAU. However, in the complete case analysis, significant incremental effects of ACT (ΔBPI-IS = −1.57 and −1.39, respectively) and BATD (ΔBPI-IS = −1.08 and −1.04, respectively) compared with TAU were observed. In the per-protocol analysis, only the significant incremental effects of ACT (ΔBPI-IS = −1.68 and −1.43, respectively) compared to TAU were detected. In conclusion, ACT and BATD might be efficient options in the management of CLBP plus comorbid depression symptoms as compared to usual care. However, no clear difference was found in the comparison between the 2 active therapies regarding cost-effectiveness or cost-utility.**

Perspective: ***The economic evaluation of psychological therapies for the management of complex conditions can be used in decision-making and resource allocation. This study provides evidence that***

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ACT and BATD are more effective and involve a greater reduction in costs than usual care in the management of CLBP plus comorbid depressive symptoms.

Trial number: ***NCT04140838.***

Key words: *Chronic low back pain, Acceptance and Commitment Therapy, Behavioral Activation Therapy, Cost-utility, Cost-effectiveness*

Chronic low back pain (CLBP) and depression are both prevalent and disabling conditions associated with considerable health care and societal costs.[1–4] According to the Global Burden of Disease Study, CLBP is one of the most significant contributors to years of living with disability.[5,6] Globally, CLBP affects 4 to 20% of the population[7] and depression affects 12 to 72%,[4] with a co-occurrence of both conditions exceeding 60%.[1] Patients with this comorbidity are more resistant to treatment than those with only one of them.[4] In Spain, the estimated total annual cost of low back pain is around 8945 M€ (1,096 € patient/year), of which 75% corresponds to indirect costs (absenteeism and presenteeism)[8]; and for depression, the estimated cost is around 224 M€ (3,235 € patient/year),[9] 82% of which represents indirect costs.

Effective management of chronic pain and comorbid depression is a priority given their prevalence, resistance to therapy and economic burden.[10–13] For some years now, forms of cognitive-behavioral therapy (CBT) have demonstrated efficacy in the improvement of the quality of life and functional status of individuals with chronic pain, depression, anxiety, or stress.[12,14-16] In fact, there is evidence that Acceptance and Commitment Therapy (ACT) is effective in patients with chronic pain[17–19] and that Behavioral Activation Therapy for Depression (BATD) is effective in patients with depression.[20–23]

In Spain, a 12-month, multicenter, single-blind, randomized controlled trial (RCT), involving 234 patients with CLBP plus depressive symptoms, provided evidence for the efficacy of group and remote-delivered forms of ACT and BATD. Results indicated that patients receiving ACT and BATD showed significant improvements in pain interference, pain catastrophizing, behavioral activation, and psychological flexibility compared to those undergoing treatment-as-usual (TAU), with moderate effect sizes at post-treatment and follow-up.[24,25] Compared to the findings of other studies that evaluated the efficacy of ACT or BATD in patients with chronic pain or depression,[20,22,23,26-28] more modest results were obtained, suggesting that resistance to treatment associated with the combination of chronic pain and depression,[29–32] videoconference delivery,[33,34] or psychological impact generated by the COVID-19 pandemic[33,35–39] might have reduced treatment effects.[15,18,40,41]

Economic evaluations are fundamental for policy decision-making.[42–44] Economic resources for public health are limited, so it is necessary to prioritize among different interventions for different conditions.[45] The evidence for the cost-effectiveness of cognitive-behavioral approaches for individuals with CLBP and comorbid depression remains limited, especially when compared to the significant burden reflected in these combined conditions.[4,31,46] This article extends the evidence from the *Improving Pain and Depression with ACT and BATD* (IMPACT) study on the clinical efficacy of ACT and BATD in patients with CLBP and depressive symptoms[25] by conducting an economic evaluation from a health care and governmental perspective. This study examined, for the first time, the cost-utility and cost-effectiveness of both therapies, delivered via videoconferencing, compared to TAU. It was hypothesized that ACT and BATD, as add-on treatments combined with usual care, would lead to decreased pain interference, increased quality of life, and reduced costs compared to TAU. Based on previous results, no superiority of one therapy over the other was expected in the economic analysis.

Method

Design

This economic study was based on the data collected in the IMPACT study.[25] Details on the design and methods of the trial can also be found elsewhere.[24] The research was approved by the Ethics Committee of the Fundació Sant Joan de Déu (PIC-178-19) and the Hospital del Mar (2019/8866/I) and was performed by the 1964 Declaration of Helsinki.

Briefly, a 12-month, multicenter, single-blinded RCT was performed with random allocation (using a computer-generated randomization list) of patients to 3 arms: ACT + TAU (hereafter, ACT), BATD + TAU (hereafter, BATD), and TAU alone. All recruited patients signed an informed consent (explaining the purpose of the study and the confidentiality agreements) to participate in this RCT voluntarily and with no financial incentive. Data were collected at baseline, at post-treatment (2 months after baseline), and at follow-up (12 months after baseline).

Participants

After a multistage recruitment process, a total of 234 adult patients diagnosed with CLBP plus clinically relevant depressive symptoms were recruited from the Pain Unit of the Parc Sanitari Sant Joan de Déu (Sant Boi de Llobregat, Spain) or Hospital del Mar (Barcelona, Spain) between September 2020 and May 2021.

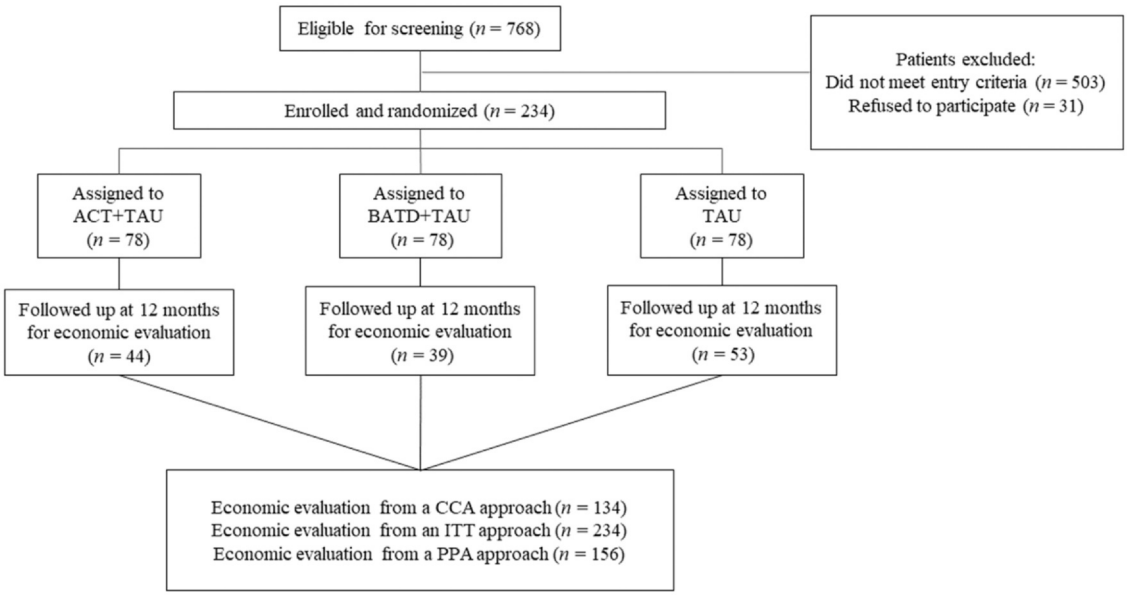

Figure 1. Trial flowchart describing the recruitment process of all 3 study arms.

Participant flow through the study phases is shown in Fig 1, including allocation into 3 study arms (1:1:1 ratio): ACT (n = 78), BATD (n = 78), and TAU alone (n = 78).

Inclusion criteria were aged between 18 and 70 years old; diagnosis of CLBP (ie, presence of tension, soreness, or stiffness in the lower back pain)[3] ≥3 months according to medical history; pain intensity > 4 points out of 10 points on a Numeric Rating Scale in the last week[47]; moderate-to-severe depressive symptoms (≥10 points out of 27 points) in the last 2 weeks according to Patient Health Questionnaire-9[48]; and able to understand Spanish language. Exclusion criteria were the presence of cognitive impairment, and/or diagnosis of severe psychiatric disorder or substance dependence/abuse according to medical history; previous (last year) or current participation in psychological therapy; radiculopathy; involvement in litigation with the health care system; and patients with scheduled surgical intervention, or inability to attend group sessions.

Procedure

Patients who met the eligibility criteria were scheduled for a first face-to-face interview at the hospitals with a trained clinical psychologist blind to intervention. This interview was conducted using the Research Electronic Data Capture (REDCap, REDCap Consortium, Nashville, Tennessee) web-based application. The assessments consisted of the administration of a battery of measures to assess sociodemographic (gender, age, marital status, living arrangement, educational level, and employment status) and clinical information (years of diagnosis, daily medication, and presence of a current depressive episode); primary (pain interference) and secondary outcomes (pain intensity, depressive/anxiety/stress symptoms, and pain catastrophizing); process variables (pain acceptance, behavioral activation, and psychological inflexibility); and quality of life and cost-related outcomes (use of clinical services, medication, and sick leaves, among others). Randomization of patients to arms was performed by a statistician (who was not involved in any other research procedures) upon completion of baseline clinical assessments.[28,49]

Psychological Therapies

ACT and BATD contents were based on the Vowles et al[50] and Lejuez et al[51] protocols, respectively. Both programs consisted of 8 weekly 1.5-hour sessions via a remote synchronous videoconferencing platform (ie, Zoom, Zoom Video Communications, Inc, San Jose, California) and included a homework document to reinforce the main concepts of the therapy. The therapies were administered in group format (range: 7–13 participants), and each group was run by a different properly trained ACT/BATD therapist.[25] Patients were asked to keep the prescribed medication regimen stable during the study. Patients randomized to TAU did not receive any psychological therapy during the study period.

Acceptance and Commitment Therapy

ACT is a form of CBT that adopts an acceptance-based approach to unwanted thoughts and feelings and a change-oriented approach in support of goal-directed values-based action. It is designed to be generally applicable to a wide range of conditions. The main direct focus of ACT is to improve people's psychological flexibility.[14,52–54] This psychological process is defined as "the ability to contact the present moment more fully as a conscious human being and to change or persist in behavior when doing so serves valued ends" (p. 140).[55] ACT is an empirically supported intervention for the chronic pain population[14,17–19,26,46] and the chronic pain population with comorbid depression.[25]

Behavioral Activation Therapy for Depression

BATD is an approach within CBT that was developed specifically to treat depression. The main aim of BATD is to help people improve their mood and quality of life through participation in meaningful and rewarding activities.[51] This psychological process is defined as "structured attempts to increase overt behaviors likely to bring patients into contact with reinforcing environmental contingencies and corresponding improvements in thoughts, mood, and quality of life" (p. 700).[56] There is strong evidence that BATD is an effective intervention for patients with depression.[20,23] It appears that the efficacy of BATD in individuals with CLBP and comorbid depression has only been explored in the RCT being further analyzed here.[25] Although the findings of this study indicate that this therapy is potentially beneficial in reducing pain interference, further evidence on the efficacy of BATD in the chronic pain population is needed.[57,58]

Treatment-as-usual

The usual care of chronic pain includes medication prescriptions (analgesics, antidepressants, anti-inflammatories, and/or opioids), education, and recommendations for aerobic exercise.[59] In this study, no changes were made to the usual care received by patients in routine clinical practice. For ethical reasons, participants assigned to the TAU arm were offered to participate in ACT groups via videoconferencing once the trial had ended.

Study Measures

Patients were assessed by in-person interviews at baseline, post-treatment, and 12-month follow-up. Responses to the battery of measures in this study were included directly in REDCap during the interviews.

Sociodemographic and Clinical Characteristics

A self-report questionnaire was used to obtain information about the patient's sociodemographic and clinical characteristics. In addition, the *Composite International Diagnostic Interview*, v3[60] was administered to evaluate the presence of a current depressive episode. Both questionnaires were administered only at baseline.

EuroQol Questionnaire

The *EuroQoL Questionnaire (EQ-5D-5L)* was used to evaluate health-related quality of life.[61] The EQ-5D-5L consists of 2 parts: 1) the individual's difficulties in 5 domains (ie, mobility, self-care, usual activities, pain/discomfort, and anxiety/depression) and 2) the current state of perceived health. The first part is answered on a 5-point rating scale (EQ-5D) ranging from 1 ("*no problems*") to 5 ("*extreme problems*"), with higher scores indicating greater individual difficulties. The combination of the answers given in the 5 domains results in 3,125 (5^5) different health states. The second part is assessed by a Visual Analog Scale (EQ-VAS) ranging from 0 ("*worst imaginable health*") to 100 ("*best imaginable health*"), with a higher score representing greater perceived health. The EQ-5D-5L (ie, EQ-5D and EQ-VAS) was administered at baseline, post-treatment, and 12-month follow-up. For the economic analyses conducted in this study, only baseline and 12-month follow-up information were used.

In this study, EQ-5D utility values were calculated using the Spanish tariffs of EQ-5D-5L.[62] The EQ-5D utility scores were used to calculate the quality-adjusted life years (QALYs) during the follow-up period (12 months), adjusting the duration of time affected by the health outcome by the value of the utility. In terms of QALYs, a year of perfect health is worth 1 and a year of less than perfect health is worth < 1.

Brief Pain Inventory-Interference Scale

The *Brief Pain Inventory-Interference Scale (BPI-IS)* was used to evaluate pain interference during the last week.[63,64] The BPI-IS is composed of 7 items (ie, general activity, mood, walking ability, normal work/housework, relations with other people, sleep, and enjoyment of life), which are answered on an 11-point rating scale ranging from 0 ("*does not interfere*") to 10 ("*completely interferes*"). Higher mean scores (from 0 to 10) indicate greater pain interference. Internal consistency in the general sample of the RCT was good (Cronbach's alpha [α] = .86). The BPI-IS was administered at baseline, post-treatment, and 12-month follow-up. For the economic analyses conducted in this study, only baseline and 12-month follow-up information were used.

Client Service Receipt Inventory

The *Client Service Receipt Inventory* (CSRI) was used to collect retrospective information on medication consumption and service receipt.[65] Information on pain-related medications (ie, analgesics, anti-inflammatories, opioids, muscle relaxants, anxiolytics, and antidepressants) was recorded from the patient's daily medication prescriptions; specifically, the name of the medication, dosage, total number of prescription days, and daily dose consumed was registered. Data were also collected on total visits to accident and emergency departments; total days of general hospital admission; the number of diagnostic tests administered; and total visits to health professionals (general practitioner, nurse, social worker, psychologist, psychiatrist, group psychotherapy, and others), specifying in each case if the public or private sector provided these services. The CSRI was administered at baseline and 12-month follow-up, both referring to the previous 12 months.

Statistical Analyses

STATA (v17) (StataCorp, College Station, Texas) and SPSS (v29) (IBM, Armonk, New York) were used to compute the analysis. The economic evaluation of this study is reported following the Consolidated Health Economic Evaluation Reporting Standards statement[66] and adheres to the Good Research Practices for Cost-Effectiveness Analysis Alongside Clinical Trials.[67] The

Consolidated Health Economic Evaluation Reporting Standards checklist is available in Supplementary Table 1.

Description of the Costing Procedure

Costs were estimated from the point of view of government and health care. For this purpose, the previous year (last 12 months) was considered as the time frame for each economic evaluation (baseline and follow-up) in this RCT. From the governmental perspective, the direct (without considering those associated with private insurance) and indirect costs related to productivity losses (based on absenteeism) assumed by the Spanish government were quantified; and from the health care perspective, only direct health costs were examined.

Direct costs. Direct costs were calculated by adding the costs of primary health care services, specialized health care services, medical tests, and pain-related medications (ie, analgesics, anti-inflammatories, opioids, muscle relaxants, anxiolytics, and antidepressants). In the Catalan health system, patients have access to their medical records through a digital app ("La Meva Salut", Generalitat de Catalunya, Catalonia, Spain). This digital app allows them to access detailed information on the medication prescribed by specialists (name of the medication, daily dose, duration of treatment, etc). Retrospective information (last 12 months) on medication consumption and receipt of services was recorded at the CSRI. This information was collected by face-to-face interview (using REDCap) at baseline and at 12-month follow-up. During the interviews, patients were asked about the medications they had consumed in the past 12 months. This information was recorded from data reported by patients, who consulted the "La Meva Salut" to obtain accurate direct information and reduce the loss of relevant data.

The SOIKOS database of health care costs[68] was used as a source of unit cost data for the use of health care services and medical tests. The total cost of the interventions (ACT and BATD) considered the price per patient and group session for the health care professional who delivered the sessions. Attendance at sessions of both therapies was queried using the therapists' records. The cost of treatment sessions and resources was the same for all sessions and groups. As in previous studies,[69,70] the costs of both psychological therapies were adjusted according to the number of sessions attended by the patients. The cost of the medications was estimated by consulting the price per milligram in the Vademecum International (with data from 2022). The value-added tax was included in this estimate. Total medication costs were estimated by multiplying the price per milligram by the total daily dose consumed and the number of days the pharmacological treatment was administered.

Indirect costs. This study collected information on productivity loss based on absenteeism and presenteeism. However, because a high percentage of the sample was on sick leave, unemployed, or pensioner/retired and because a reduction in productivity due to presenteeism is less tangible, in the end, indirect cost analysis were based on absenteeism alone. Indirect costs (lost productivity based on absenteeism) were calculated from the human capital approach. The minimum daily wage in Spain for 2022 was multiplied by the number of days of sick leave declared by each patient in the CSRI. Finally, total costs were obtained by adding direct and indirect costs. As shown in Table 1, unit costs were reported in € based on 2022 prices.

Table 1. Unit Costs Used in the Calculations of Direct and Indirect Costs (Financial Year 2022; Values in €)

SERVICE (UNIT)	*COST (€)*
Health care (direct costs)	
General practitioner (per appointment)	44
Nurse/psychiatric nurse (per appointment)	41
Social worker (per appointment)	43
Clinical psychologist (per appointment)	54
Psychiatrist (per appointment)	54
Other medical specialists (per appointment)	52
Accident and emergency in hospital (per attendance)	118
Hospital stay (per night)	133
Diagnostic tests (range)	7 to 543
Pharmacological treatment (per daily dose)*	Various
ACT and BATD (per participant per group session)	54
Productivity loss (indirect costs)	
Absenteeism from work (minimum daily wage)	33

NOTE. The unit costs were applied to each resource used to calculate the total cost of the resources used by each participant. All unit costs were for the year 2022.
*The cost of prescribed medications was calculated by determining the price per milligram according to the Vademecum International (Red Book; edition 2022) and included the value-added tax.

Descriptive Analyses

Descriptive analyses were calculated for continuous variables (means and standard deviations) and categorical variables (frequencies and percentages). According to the Consolidated Standards of Reporting Trials recommendations, it is not necessary to include as covariates the possible baseline differences identified in the sociodemographic and clinical characteristics.[71]

Between-group Analyses of Costs and Outcomes

Direct and indirect costs were not normally distributed in this sample. However, after calculating the analyses with a nonparametric test (Kruskal-Wallis), it was determined that the conclusions obtained in the comparisons between the 3 groups (ACT, BATD, and TAU) yielded similar results at baseline and follow-up. Since no differences were detected between parametric (analysis of variance) and nonparametric (Kruskal-Wallis) tests, the parametric analyses were preferred. A generalized linear mixed model (GLM) was used to explore costs and outcomes. This is consistent with the

methods used in the analyses of clinical outcomes for this trial.[25] An advantage of using GLM is that it allows modeling relationships between variables that do not follow a normal distribution. By incorporating random effects, GLM helps to examine the correlation between observations within groups, which is common in longitudinal data. Supplementary Table 2 shows the results of the parametric (analysis of variance) and nonparametric (Kruskal-Wallis) tests.

A restricted maximum likelihood regression was calculated.[72] Therapy effects on costs and outcomes were assessed using these models, considering within-patient correlations between repeated measurements. The GLM included the random intercept adjusted for baseline score, as well as time and the interaction between "Group × Time." Regression coefficients (β) and 95% confidence intervals were estimated for the "Group × Time" interaction between groups (ACT vs TAU, BATD vs TAU, and ACT vs BATD) at the 12-month follow-up. The criteria for estimating effect sizes (Cohen's d) were as follows: very small (.10), small (.20), medium (.50), large (.80), very large (1.20), and huge (2.00).[73] Finally, differences between groups (ACT and BATD) regarding the therapy costs were explored by applying the t-test. The threshold for statistical significance was set at $P < .05$.

Cost-utility and Cost-effectiveness Analyses

Cost-utility and cost-effectiveness are approaches to examine the relationship between the resources used (ie, costs) and the health outcomes (ie, effects, in terms of utilities, or benefits, in terms of effectiveness) of an intervention. Cost-utility analyses examine the specific association between the resources used and the effects of an intervention (typically measured according to QALYs), whereas cost-effectiveness analyses assess the resources used and the benefits of an intervention (measured according to the primary outcome, which in this study was the BPI-IS). These analyses naturally complement each other and are widely used for public health decision-making.[42–45]

For the cost-utility analyses, response to therapy was defined as an improvement in the QALYs mean scores (regarding the interpretation, an increase in QALY scores means that an intervention is beneficial); and for the cost-effectiveness, as an improvement in the BPI-IS mean score (regarding the interpretation, a reduction in BPI-IS scores means that an intervention is beneficial). It appears that there are no evidence-based cut-off points for considering clinically relevant changes according to the QALYs. The criterion recommended by the Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials for defining clinically relevant changes consists of a 1-point reduction in the BPI-IS between pre-post or pre-follow-up scores.[74] The incremental cost-utility ratio and the incremental cost-effectiveness ratio were examined, these being the ratios between incremental costs and incremental effects measured on QALYs and BPI-IS, respectively.[75]

Table 2. Description of the 4 Scenarios for Each Intervention

INTERVENTION	*SCENARIO*
ACT	1. ACT costs less and is more effective than the alternatives (TAU and/or BATD). 2. ACT costs more and is less effective than the alternatives (TAU and/or BATD). 3. ACT costs less, but is less effective than the alternatives (TAU and/or BATD). 4. ACT costs more, but is more effective than the alternatives (TAU and/or BATD).
BATD	1. BATD costs less and is more effective than the alternatives (TAU and/or ACT). 2. BATD costs more and is less effective than the alternatives (TAU and/or ACT). 3. BATD costs less, but is less effective than the alternatives (TAU and/or ACT). 4. BATD costs more, but is more effective than the alternatives (TAU and/or ACT).
TAU	1. TAU costs less and is more effective than the alternatives (ACT and/or BATD). 2. TAU costs more and is less effective than the alternatives (ACT and/or BATD). 3. TAU costs less, but is less effective than the alternatives (ACT and/or BATD). 4. TAU costs more, but is more effective than the alternatives (ACT and/or BATD).

Abbreviations: ICUR, incremental cost-utility ratio; ICER, incremental cost-effectiveness ratio.
NOTE. For decision-making, the first 2 scenarios (1 and 2) show strong dominance; however, the other 2 scenarios (3 and 4) depend on the ICUR or ICER.

Four potential scenarios were considered for the comparison between the intervention groups (ACT, BATD, and TAU) in the frame of economic evaluation results.[76] A description of the 4 scenarios for each intervention is presented in Table 2.

For decision-making, the first 2 scenarios (1 and 2) show strong dominance; however, the other 2 scenarios (3 and 4) depend on the ICUR or ICER. The investment ceiling for cost-utility for an intervention in Spain is 25,000 euros per QALY.[42]

Incremental costs and incremental effects were explored using Zellner's seemingly unrelated regression (SUR) model.[77] The use of the SUR method to explore cost-utility or cost-effectiveness involves using a bivariate system of regressions that includes both costs and outcomes (QALYs or BPI, depending on the model considered) as dependent variables of the 2 separate equations. Therefore, the cost and outcome regressions are part of 2 regressions on the intercept arm assignment (ie, ACT, BATD, or TAU) plus an additional set of control variables (measured at baseline): gender, age, marital status, living arrangement, educational level, employment status, year of diagnosis, current episode of depression, costs, and outcomes.[42,76] Estimates of incremental cost and incremental effect values using the SUR method were obtained with 1,000 bootstrap replicates to address possible skewness in the distribution of the dependent variable.

The cost-utility and cost-effectiveness of the interventions were evaluated by considering 1) main analysis, intention-to-treat (ITT), 2) sensitivity analyses, complete case analysis (CCA), and 3) per-protocol analysis (PPA). In the ITT, missing values at 12-month follow-up were imputed using multiple imputation methods with the chained equations approach.[78] The imputation model incorporated all major sociodemographic and prognostic variables associated with the outcome variables and the other variables containing missing values. Data were assumed to be missing at random. Regarding the CCA, only patients who were evaluated at both baseline and 12-month follow-up were included. The PPA was estimated on a sample that included only patients who completed the interventions (ie, who attended at least 6 of the 8 therapy sessions). In this study, there were no missing baseline data on any of the measures. Missing data in the follow-ups corresponded to dropouts registered during the RCT.

Results

Sample Characteristics

As shown in Table 3, most patients were middle-aged women who had completed at least primary school. All patients spoke Spanish and resided in Catalonia (Spain). They mostly lived with their partner and were in paid employment. According to the *Composite International Diagnostic Interview* diagnostic criteria, most of them (76%) had a current episode of depression. The mean time with diagnosed chronic pain was > 10 years.

Costs and Outcomes

Table 4 presents descriptive statistics and between-group analyses (ACT, BATD, and TAU) for costs and outcomes according to the ITT approach. In total, 58% and 51% of the participants completed the ACT and the BATD videoconferencing sessions, respectively. Mean attendance for ACT sessions was higher than for BATD sessions (M = 4.65 vs 4.08), but this difference was not statistically significant.

Costs

ACT yielded a significantly greater reduction in total costs ($\beta = -2387.65$, $P = .032$) compared to TAU at 12 months follow-up. In ACT an average reduction in total costs of €1,329 was observed. In contrast, TAU incurred an average increase of €1,059. BATD showed a greater reduction in indirect costs ($\beta = -2915.88$, $P = .004$) and total costs ($\beta = -3266.69$, $P = .004$) compared to TAU at 12 months follow-up. Specifically, in BATD an average reduction in indirect costs of €1,775 and total costs of €2,208 was reported at follow-up compared to baseline. In TAU there was an average increase in indirect costs of €1,141 and total costs of €1,059. No significant differences were found in the costs of primary care services, specialized health care services, medical tests, pain-related medications, and psychological therapies in the comparison between ACT and BATD.

Table 3. Baseline Characteristics of Participants by Treatment Arm

VARIABLES	ACT (N = 78)	BATD (N = 78)	TAU (N = 78)
Gender (women), n (%)	54 (69.2)	53 (67.9)	51 (65.4)
Region of residence (Catalonia), n (%)	78 (100)	78 (100)	78 (100)
Language spoken (Spanish), n (%)	78 (100)	78 (100)	78 (100)
Age, mean (SD)	54.9 (8.3)	54.9 (10.2)	53.8 (10.0)
Marital status, n (%)			
Single	9 (11.5)	12 (15.4)	6 (7.7)
Married/living with partner	49 (62.8)	50 (64.1)	53 (67.9)
Separated/divorced	14 (17.9)	12 (15.4)	17 (21.8)
Widowed	6 (7.7)	4 (5.1)	2 (2.6)
Living arrangement, n (%)			
Living alone	11 (14.1)	7 (9.0)	9 (11.5)
Living with partner	67 (85.9)	71 (91.0)	69 (88.5)
Education level, n (%)			
Illiterate	2 (2.6)	0 (.0)	1 (1.3)
Did not graduate from primary school	2 (2.6)	3 (3.8)	3 (3.8)
Primary studies	18 (23.1)	20 (25.6)	16 (20.5)
Secondary studies	42 (53.8)	46 (59.0)	43 (55.1)
University	14 (17.9)	9 (11.5)	15 (19.2)
Employment status, n (%)			
Homemaker	3 (3.8)	4 (5.1)	2 (2.6)
Paid employment	20 (25.6)	24 (30.8)	32 (41.0)
Paid employment but in sick leave	5 (6.4)	4 (5.1)	4 (5.1)
Unemployed with subsidy	14 (17.9)	10 (12.8)	4 (5.1)
Unemployed without subsidy	5 (6.4)	4 (5.1)	4 (5.1)
Retired/pensioner	9 (11.5)	12 (15.4)	14 (17.9)
Temporal disability	4 (5.1)	8 (10.3)	9 (11.5)
Others	18 (23.1)	12 (15.4)	9 (11.5)
Clinical variables			
Years of diagnosis, M (SD)	10.9 (7.9)	11.1 (8.7)	11.2 (8.0)
Current episode of depression, n (%)*	60 (76.9)	63 (80.8)	55 (70.5)
Daily medication, n (%)			
Analgesics	35 (50.7)	33 (50.0)	35 (50.7)
Anti-inflammatory	16 (23.2)	19 (29.2)	16 (23.2)
Opioids	15 (23.1)	18 (27.7)	12 (17.4)
Antiepileptic	11 (16.9)	15 (23.1)	13 (18.8)
Muscle relaxant	6 (9.4)	11 (16.9)	11 (15.9)
Antidepressants	19 (29.7)	24 (36.9)	29 (42.0)
Anxiolytics	12 (18.8)	11 (16.9)	13 (18.8)

Abbreviation: SD, standard deviation.
*CIDI, Composite International Diagnostic Interview.

Outcomes

The analyses yielded significant improvements in EQ-5D utility ($\beta = .11$, $P = .003$), QALYs ($\beta = .02$, $P = .017$), and BPI-IS ($\beta = -1.47$, $P < .001$) scores in ACT compared to TAU at 12-month follow-up, but not in the current state of EQ-VAS score. Meanwhile, significant improvements were obtained in BATD in EQ-VAS ($\beta = 7.80$, $P = .023$), QALYs ($\beta = .02$, $P = .036$), and BPI-IS ($\beta = -1.25$, $P < .001$)

Table 4. Summary Statistics of the Costs (Total and Disaggregated in Components) and Outcomes According to Treatment Arm (ITT Approach)

	ACT M (SD)	*BATDM (SD)*	*TAUM (SD)*	*ACT VS TAU*			*BATD VS TAU*			*ACT VS BATD*		
				D	*T (P)*	*B (95% CI)*	*D*	*T (P)*	*B (95% CI)*	*D*	*T (P)*	*B (95% CI)*
Cost												
Primary health care services*												
Baseline	217.88 (263.99)	206.14 (321.61)	218.48 (245.44)									
Follow-up	116.17 (171.70)	154.07 (223.67)	188.05 (272.53)	.28	−1.29 (.198)	−71.29 (−180.21 to 37.62)	.07	−.39 (.696)	−21.63 (−130.55 to 87.28)	.17	.90 (.370)	49.66 (−59.25 to 158.57)
Specialized health care services*												
Baseline	591.95 (1,091.89)	534.14 (583.86)	572.54 (668.34)									
Follow-up	407.86 (1,321.69)	369.46 (733.15)	534.22 (964.63)	.16	−.81 (.418)	−145.78 (−499.83 to 208.27)	.20	−.70 (.483)	−126.36 (−480.41 to 227.69)	.02	.11 (.914)	19.42 (−334.63 to 373.47)
Medical tests*												
Baseline	503.84 (669.87)	483.24 (587.78)	500.03 (580.60)									
Follow-up	319.96 (664.68)	385.09 (683.40)	552.28 (1,497.65)	.37	−1.40 (.163)	−236.13 (−568.68 to 96.42)	.26	−.89 (.374)	−150.40 (−482.95 to −182.15)	.13	.51 (.612)	85.73 (−246.82 to 418.28)
Pain-related medications*												
Baseline	208.26 (274.10)	212.89 (284.99)	219.38 (293.52)									
Follow-up	100.38 (204.12)	94.92 (195.64)	153.82 (303.23)	.15	−.79 (.429)	−42.32 (−147.52 to 62.87)	.18	−.98 (.327)	−52.41 (−157.60 to 52.79)	.04	−.19 (.850)	−10.08 (−115.28 to 95.11)
Direct costs*												
Baseline	1,516.89 (1,624.22)	1,444.90 (1,001.25)	1,505.59 (1,228.97)									
Follow-up	939.31 (1,975.38)	1,012.04 (1,460.22)	1,423.53 (2,435.95)	.34	−1.52 (.130)	−495.53 (−1,137.25 to −146.20)	.31	−1.08 (.283)	−350.80 (−992.53 to −290.92)	.11	.44 (.657)	144.73 (−496.99 to 786.45)
Indirect costs*												
Baseline	2,975.68 (4,924.51)	3,302.37 (5,302.61)	2,584.45 (4,131.37)									
Follow-up	2,224.29 (4,541.62)	1,527.22 (4,248.59)	3,725.19 (5,229.07)	.41	−1.91 (.057)	−1,892.12 (−3,844.27 to 60.03)	.61	−2.94 (**.004**)	−2915.88 (−4,868.04 to −963.73)	.20	−1.03 (.303)	−1,023.76 (−2,975.91 to 928.39)

Table 4 (*Continued*)

	ACT *M (SD)*	*BATDM (SD)*	*TAUM (SD)*	*ACT VS TAU*			*BATD VS TAU*			*ACT VS BATD*		
				D	*T (P)*	*B (95% CI)*	*D*	*T (P)*	*B (95% CI)*	*D*	*T (P)*	*B (95% CI)*
Total costs*												
Baseline	4,504.18 (5,572.49)	4,700.78 (5,710.52)	4,126.53 (4,548.60)									
Follow-up	3,175.21 (5,330.91)	2,492.78 (4,913.01)	5,185.21 (6,659.91)	.47	−2.15 (**.032**)	−2,387.65 (−4,573.88 to −201.43)	.63	−2.94 (**.004**)	−3266.69 (−5452.91 to −1080.46)	.15	−.79 (.429)	−879.03 (−3,065.26 to 1,307.19)
Outcomes												
EQ-5D utility (0–1)*												
Baseline	.57 (.22)	.57 (.22)	.57 (.26)									
Follow-up	.59 (.22)	.55 (.31)	.48 (.33)	.45	3.05 (**.003**)	.11 (.04–.18)	.29	1.86 (.064)	.07 (−.01 to .14)	.18	−1.10 (.274)	−.04 (−.11 to −.03)
EQ-VAS (0–100)*												
Baseline	55.90 (18.56)	55.68 (19.00)	55.90 (18.65)									
Follow-up	55.10 (19.97)	57.34 (15.97)	49.76 (23.44)	.29	1.59 (.113)	5.34 (−1.26 to 11.95)	.39	2.28 (**.023**)	7.80 (1.07–14.54)	.13	.70 (.483)	2.46 (−4.44 to 9.36)
QALY (0–1)*												
Baseline	.83 (.06)	.83 (.07)	.83 (.07)									
Follow-up	.84 (.07)	.83 (.08)	.81 (.08)	.46	2.40 (**.017**)	.02 (.01–.04)	.28	2.11 (**.036**)	.02 (.01–.04)	.15	−.24 (.811)	−.01 (−.02 to .02)
BPI-IS (0–10)*												
Baseline	6.71 (1.72)	6.46 (2.07)	6.49 (1.91)									
Follow-up	5.30 (2.42)	5.07 (2.36)	6.42 (2.16)	.73	−4.40 (**< .001**)	−1.47 (−2.13 to −.81)	.66	−3.65 (**< .001**)	−1.25 (−1.92 to −.57)	.01	.65 (.519)	.23 (−.46 to .91)

Abbreviations: B, regression coefficients; CI, confidence interval; d, Cohen's d as an effect size measure; SD, standard deviation.
NOTE. Baseline level of the variable was controlled. M and SD are not adjusted. The number of participants varied across assessment periods due to dropouts (see flow chart).
Significant values (*P < .05) are shown in bold.*
*Means that the baseline level of the variables was controlled.

Table 5. Incremental Cost, Effect, and Cost-utility Ratios From the Government Perspective (Total Costs)

	Incremental cost *M (95% bootstrap CI)*	*Incremental effect* *M (95% bootstrap CI)*	*Dominant treatment (ICER/ICUR)*
Main analysis (ITT)			
ACT vs TAU (n = 156)			
QALY (0–1)	−2,301.69 (−5,437.08 to 833.70)	.02 (−.02 to .06)	ACT dominant*
BPI-IS (0–10)	−2,302.34 (−5,398.89 to 794.20)	−.98 (−2.25 to .29)	ACT dominant*
BATD vs TAU (n = 156)			
QALY (0–1)	−1,983.38 (−4,390.40 to 423.64)	.02 (−.02 to .07)	BATD dominant†
BPI-IS (0–10)	−1,198.46 (−4,373.35 to 400.42)	−.69 (−1.92 to .54)	BATD dominant†
ACT vs BATD (n = 156)			
QALY (0–1)	−318.30 (−2,702.91 to 2066.30)	−.01 (−.06 to .04)	No dominant (ICUR = 59,719)‡
BPI-IS (0–10)	−315.88 (−2,678.89 to 2047.13)	−.29 (−1.92 to 1.34)	ACT dominant§
Sensitive analysis (CCA)			
ACT vs TAU (n = 95)			
QALY (0–1)	−3,134.57 (−6,397.40 to 633.37)	.02 (−.01 to .10)	ACT dominant*
BPI-IS (0–10)	−3,380.68 (−7,136.53 to −145.83)	**−1.57** (−5.53 to −.84)	ACT dominant*
BATD vs TAU (n = 91)			
QALY (0–1)	−1,129.88 (−4,963.58 to 2,081.59)	.02 (−.01 to .09)	BATD dominant†
BPI-IS (0–10)	−1,283.88 (−4,587.46 to 2,345.27)	**−1.08** (−5.44 to −.01)	BATD dominant†
ACT vs BATD (n = 82)			
QALY (0–1)	−2,004.69 (−5,332.05 to 1,325.84)	−.01 (−.11 to .05)	No dominant (ICUR = 359,565)‡
BPI-IS (0–10)	−2,096.80 (−5,483.52 to 1,556.56)	−.49 (−5.01 to .32)	ACT dominant§
Sensitive analysis (PPA)			
ACT vs TAU (n = 120)			
QALY (0–1)	−3,318.10 (−7,170.74 to 1,617.23)	.02 (−.02 to .22)	ACT dominant*
BPI-IS (0–10)	−3,547.83 (−7,676.82 to 719.42)	**−1.68** (−5.88 to −.30)	ACT dominant*
BATD vs TAU (n = 114)			
QALY (0–1)	−1,014.04 (−6,134.94 to 3,575.27)	.02 (−.04 to .21)	BATD dominant†
BPI-IS (0–10)	−1,151.70 (−5,964.10 to 3,355.96)	−.90 (−5.91 to 1.39)	BATD dominant†
ACT vs BATD (n = 78)			
QALY (0–1)	−2,304.06 (−7,213.87 to 2,482.64)	.01 (−.13 to .14)	ACT dominant§
BPI-IS (0–10)	−2,396.13 (−7,193.15 to 2,716.75)	−.78 (−10.92 to 1.86)	ACT dominant§

Abbreviations: ICER, incremental cost-effectiveness ratio; ICUR, incremental cost-utility ratio; CI, confidence interval.
NOTE. Significant values (*P < .05) are shown in bold.*
Covariates: gender, age, marital status, living arrangement, educational level, employment status, year of diagnosis, current episode of depression, and costs or outcome at baseline, depending on the equation considered. CCA (N = 134), ITT (N = 234), and PPA (N = 156). In terms of interpretation, an increase in the QALY score (positive values) and a decrease (negative values) in the BPI-IS score, respectively, means that the intervention is beneficial.
*Dominant because ACT costs less and is more effective or useful than TAU.
†Dominant because BATD costs less and is more effective or useful than TAU.
‡No dominant because ACT costs less than BATD, but BATD is more effective or useful than ACT.
§Dominant because ACT costs less and is more effective or useful than BATD.

scores when compared to TAU at follow-up, but not in EQ-5D utility score. No significant differences in any outcome were found when comparing ACT and BATD.

Cost-utility (QALYs as the Outcome) and Cost-effectiveness (BPI-IS Mean Score as the Outcome) Analysis

The results identified in the comparison between the 3 groups (ACT vs TAU, BATD vs TAU, and ACT vs BATD) are presented in Tables 5 and 6.

Although in the main analysis (ITT) less incremental costs and more incremental effects on BPI-IS and QALYs were observed in ACT and BATD compared to TAU, these differences were not statistically significant from a governmental (total cost) and health care perspective (direct costs). ACT demonstrated less incremental costs and more incremental effects on BPI-IS, but not on QALYs, compared to BATD; however, these differences were also not significant.

From the governmental (total cost) and health care (direct costs) perspective, in the CCA, a significant incremental effect on BPI-IS was observed in ACT (Δ = −1.57 and −1.39, respectively) and BATD (Δ = −1.08 and −1.04, respectively) compared to TAU, but not on QALYs. In PPA, only a significant incremental effect on BPI-IS was identified in ACT (Δ = −1.68 and −1.43, respectively) compared to TAU, although not on QALYs. No significant decrease in incremental costs was found in ACT and BATD compared to TAU in any of the sensitivity analyses (CCA and PPA). There were also no significant differences in incremental costs and incremental effects between ACT and BATD in these sensitivity analyses (CCA and PPA).

Table 6. Incremental Cost, Effect, and Cost-utility Ratios From the Health Care Perspective (Direct Costs)

	INCREMENTAL COST *M (95% BOOTSTRAP CI)*	*INCREMENTAL EFFECT* *M (95% BOOTSTRAP CI)*	*DOMINANT TREATMENT (ICER/ICUR)*
Main analysis (ITT)			
ACT vs TAU (n = 156)			
QALY (0–1)	−628.89 (−2,386.73 to 1,128.94)	.02 (−.02 to .05)	ACT dominant*
BPI-IS (0–10)	−629.22 (−2,385.55 to 1,127.12)	−1.01 (−2.22 to .21)	ACT dominant*
BATD vs TAU (n = 156)			
QALY (0–1)	−309.62 (−1,888.97 to 1,269.72)	.03 (−.01 to .06)	BATD dominant†
BPI-IS (0–10)	−308.85 (−1,890.41 to 1,272.71)	−.81 (−2.12 to .49)	BATD dominant†
ACT vs BATD (n = 156)			
QALY (0–1)	−319.27 (−1,577.14 to 938.59)	−.01 (−.06 to .04)	No dominant (ICUR = 25,641)‡
BPI-IS (0–10)	−320.37 (−1,577.56 to 936.83)	−.19 (−1.91 to 1.53)	ACT dominant§
Sensitive analysis (CCA)			
ACT vs TAU (n = 95)			
QALY (0–1)	−300.91 (−1,347.75 to 994.98)	.01 (−.01 to .13)	ACT dominant*
BPI-IS (0–10)	−231.53 (−1,260.69 to 1,031.73)	**−1.39** (−5.84 to −.47)	ACT dominant*
BATD vs TAU (n = 91)			
QALY (0–1)	−82.52 (−1,300.26 to 957.84)	.01 (−.01 to .10)	BATD dominant†
BPI-IS (0–10)	−28.08 (−1,111.09 to 993.48)	**−1.04** (−6.36 to −.01)	BATD dominant†
ACT vs BATD (n = 82)			
QALY (0–1)	−218.38 (−1,054.11 to 972.42)	−.01 (−.11 to .05)	No dominant (ICUR = 25,428)‡
BPI-IS (0–10)	−203.45 (−1,066.74 to 1,022.72)	−.35 (−5.01 to .56)	ACT dominant§
Sensitive analysis (PPA)			
ACT vs TAU (n = 120)			
QALY (0–1)	−585.78 (−1,581.49 to 285.17**)**	.02 (−.03 to .13)	ACT dominant*
BPI-IS (0–10)	−486.87 (−1,526.72 to 376.53)	**−1.43** (−6.54 to −.01)	ACT dominant*
BATD vs TAU (n = 114)			
QALY (0–1)	60.64 (1,002.88 to 1,108.33)	.02 (−.05 to .20)	BATD dominant†
BPI-IS (0–10)	134.09 (−914.92 to 1,095.52)	−.77 (−5.96 to 1.75)	No dominant (ICER = 173)[2]*
ACT vs BATD (n = 78)			
QALY (0–1)	−646.42 (−1,934.27 to 547.46)	−.01 (−.14 to .13)	No dominant (ICUR = 2,096,696)‡
BPI-IS (0–10)	−620.95 (−1,942.73 to 374.65)	−.66 (−8.24 to 2.00)	ACT dominant§

Abbreviations: ICER, incremental cost-effectiveness ratio; ICUR, incremental cost-utility ratio; CI, confidence interval.
NOTE. Significant values (*P < .05) are shown in bold.*
Covariates: gender, age, marital status, living arrangement, educational level, employment status, year of diagnosis, current episode of depression, and costs or outcome at baseline, depending on the equation considered. CCA (N = 134), ITT (N = 234), and PPA (N = 156). In terms of interpretation, an increase in the QALY score (positive values) and a decrease (negative values) in the BPI-IS score, respectively, means that the intervention is beneficial.
*The sign of the ICER has been inverted since the result is positive when the change is negative.
*Dominant because ACT costs less and is more effective or useful than TAU.
†Dominant because BATD costs less and is more effective or useful than TAU.
‡No dominant because ACT costs less than BATD, but BATD is more effective or useful than ACT.
§Dominant because ACT costs less and is more effective or useful than BATD.

Finally, Supplementary Fig. 1 to 3 show the degree of uncertainty around differences in costs and QALYs, and Supplementary Fig. 4 to 6 show uncertainty around differences in costs and BPI-IS scores between study arms from a governmental and health care perspective (ITT, CCA, and PPA, respectively).

Discussion

This study appears to be the first to document the cost-utility and cost-effectiveness of 2 forms of CBT (ACT and BATD) delivered via videoconferencing for the treatment of a population with a complex condition of back pain and clinically relevant depressive symptoms. The economic evaluation reported here extends the results obtained in the IMPACT study,[25] which demonstrated the effectiveness of both therapies for improving pain interference. Firstly, the differences in costs (direct, indirect, and total) and outcomes (QALYS and BPI-IS scores) between the 3 study arms (ACT, BATD, and TAU), and the 2 evaluation time points (baseline and 12-month follow-up) were explored. Then, cost-utility and cost-effectiveness analyses, calculated using QALY-based incremental cost-utility ratios and BPI-IS-based incremental cost-effectiveness ratios, were performed to identify the interaction between the economic and clinical benefits of one intervention over another.

Between-group analyses indicated that ACT (added to TAU) and BATD (added to TAU) were associated with reduced costs compared to TAU. Moreover, a significant improvement in BPI-IS and QALYs scores was also found in both ACT and BATD compared to TAU. The effect sizes of these detected differences were moderate. No significant differences in cost and outcomes were detected between

ACT and BATD. The reduction of costs (direct, indirect, and total) is a priority objective in interventions aimed at the treatment of chronic pain and depression, considering their relevant contribution to the health economic burden.[79] As reported in other studies,[43,80] it appears that the cost reduction in the chronic pain population is related to the interaction between improvement of pain-related symptoms, increase in health-related quality of life, and return to work activities.

Cost-utility and cost-effectiveness analyses, explored from both governmental and health care perspectives, indicated that according to the main analysis (ITT), no significant differences in incremental effects were identified in the comparison between ACT, BATD, and TAU. However, it was found that in the sensitivity analyses the incremental effect on BPI-IS scores was significant in ACT compared to TAU alone, based on CCA and PPA, and in BATD compared to TAU alone, based on CCA, but not on QALYs. These differences could be related to the fact that in the chronic pain population, BPI-IS (based on pain interference) is generally the primary outcome, whereas QALYs (based on health-related quality of life) is a secondary outcome that is indirectly addressed in this type of intervention.

No significant differences were found in the comparison between ACT, BATD, and TAU in the incremental costs, based on BPI-IS and QALY, in the main analysis (ITT) and sensitivity analyses (CCA and PPA). Although according to these analyses, ACT showed some superiority compared to TAU and BATD, the differences observed were not significant in terms of higher costs and effects. The variance of the costs reported in this study was high, with a reduced sample power due to the high percentage of dropouts from the RCT,[81] which was conducted in restrictive phases of the COVID-19 pandemic and delivered by videoconference. These limitations may underlie the failure to detect statistically significant differences associated with increased costs.[82,83]

The results obtained in this study are consistent with the cost reductions observed in other studies in CBT-based psychological therapies compared to TAU.[42,75,80,84,85] Previous studies have provided evidence on the cost-utility and cost-effectiveness of ACT[42,86–88] and BATD[89,90] compared to TAU, both in populations with chronic pain[42,84] and other health conditions.[86,88] Specifically, ACT and BATD have been identified as effective in reducing emotional disturbances and improving quality of life, resulting in long-term health care cost savings.[88,90] In previous RCTs, ACT and BATD have consistently achieved a significant incremental effect,[42,86–90] but also higher incremental costs than TAU or active control conditions. In general, previous RCTs conducted to analyze the economic evaluation of ACTs and BATDs have had relatively small sample sizes to assess incremental costs and effects, limiting the scope for robust conclusions.[82] In sum, the available evidence highlights the therapeutic potential of these approaches for the management of chronic pain and/or depression.[15–23]

The study findings confirm a favorable increased clinical effect of ACT over BATD when compared to TAU, both from the governmental and health care perspective. However, no clear preference between ACT and BATD was identified from a cost reduction perspective. While ACT produced superior benefits in pain interference (priority intervention target in the chronic pain population)[91] compared with BATD, neither of these 2 psychological therapies significantly decreases costs compared to the other, nor compared to TAU. From a strictly clinical point of view, ACT is perhaps preferable for a population with chronic pain and comorbid depression, based on the greater number of responders identified in the RCT.[25]

Although the findings reported in this sample appear more favorable toward ACT, the choice of the most appropriate treatment for other populations should be based on ethical and practical considerations, as well as on the preferences of both the patients and the therapists.[86] In this context, the therapist-patient shared decision-making model promotes therapeutic adherence and improves outcomes by connecting the choice of therapies according to each patient's preferences and values.[92,93] As mentioned above, this is the first RCT to explore an economic evaluation in a population with both health conditions. Therefore, larger RCTs with cost-utility and cost-effectiveness analyses are needed to draw more solid conclusions.[43]

The current findings should be interpreted considering 5 main limitations. First, some sociodemographic data, such as race and ethnicity, and clinical data, such as the presence of insomnia, were not collected in this study, which could have provided valuable information for the analyses. Second, a considerably low follow-up rate (44% in ACT and 50% in BATD) resulted in considerable missing cost-effectiveness data at the 12-month follow-up assessment. Even though the regression models included bootstrapping with 1,000 replications to address the skewness of the data, the sample size in each arm of the study and the wide confidence intervals detected may have affected the robust estimation of effect sizes. The possible interferences generated by the COVID-19 pandemic (the context in which this RCT was developed) probably influenced the number of dropouts recorded. Third, a random intercept was included in the GLM to account for within-group variability; nevertheless, estimating this intercept in patients with a single data point could represent a risk of overfitting the model. Fourth, productivity loss related to presenteeism was collected in the RCT, but not considered in this study due to the challenges in measuring reduced productivity whilst at work via a self-report measure. Fifth, although some studies have provided evidence that self-reported data have the same validity as data collected by public registries in health and economic evaluation,[80,94] to obtain greater assurance around these results it is advisable to contrast the information reported retrospectively (last 12 months) by patients with public registries. However, due to limitations of accessibility to this information, it was not possible to perform this verification. Direct non-health costs (eg, out-of-pocket expenses, costs of paid and unpaid help, travel expenses, and the use of non-prescription medications and other treatments, among others) were not estimated.

Conclusions

The findings of this economic evaluation indicate that videoconference ACT or BATD for people with CLBP and clinically relevant depression symptoms are more effective and involve a greater reduction in costs than usual care. In public health care systems, there are many competing demands and limited resources to address these demands. These results suggest that investment in new forms of CBT delivered via videoconferencing for individuals with CLBP plus depression represents good value for money compared to usual care. Even though the results are promising, it is important to consider that the therapies were delivered in a pandemic context with high social restrictions. The unprecedented context of this study is relevant for the interpretation of the scope and limitations of the results. For this reason, it is recommended that future studies continue to seek evidence for the cost-utility and cost-effectiveness of these therapies administered in group format via videoconferencing in patients with CLBP and comorbid mental problems.

Disclosures

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Author Contributions

JPS-M: Data curation, Software, Formal analysis, Methodology, Visualization, and Writing the original draft. **FD**: Formal analysis, Methodology, and Writing – Review & editing. **EC**, **MF-F**, **SE**, **XB**, **LMM**, **AF-S**, and **AS**: Writing – Review & editing. **JVL**: Conceptualization, Funding acquisition, Investigation, Project administration, Supervision, Writing – Review & editing.

Data Availability

The data supporting this study's findings are available from the corresponding author upon reasonable request.

Appendix A. Supplementary Data

Supplementary data related to this article can be found at doi:10.1016/j.jpain.2024.01.337.

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