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A Pilot Study Assessing the Feasibility, Acceptability and Potential Impact of an 8-Week Sophrology Intervention for People With Chronic Pain in the UK

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ABSTRACT

Rationale: Chronic pain is difficult to treat and pain medication is often ineffective and associated with side-effects. Thus, alternative treatments are frequently used. Sophrology is a method to improve wellbeing combining Western and Eastern practices. Widely used in French-speaking countries for over 40 years. Sophrology uses relaxation, breathing exercises, visualisations, and bodily movements. Benefits include reduced anxiety and depression, improved stress and pain management, as well as enhanced sleep quality. However, little is known of its effectiveness on pain management in the UK.

Aims and Objectives: This study assessed the feasibility and potential impact of an 8-week sophrology intervention among British adults living with chronic pain.

Methods: A pilot study using a randomised controlled trial design comparing individuals participating in an 8-week sophrology intervention with a control group was conducted.

One hundred participants were randomised into two groups and completed a baseline and 8-week follow-up assessment. Scales assessed levels of pain, disability, sleep disturbances, anxiety, depression, life satisfaction, resilience, pain catastrophising tendency and pain medication. Open questions were used to collect feedback on the intervention. Mixed analyses of variance were conducted to compare scores within- and between-subjects. Qualitative data were analysed using thematic analysis.

Results: 17 participants completed the intervention and follow-up questionnaire compared to 26 in the control (CG). Compared to the CG, the intervention group displayed significant reductions in pain medication usage, rumination, magnification, depression, anxiety and disability levels, sleep disturbances, as well as a significant increase in treatment satisfaction. There was no difference in life satisfaction and resilience scores between groups.

Conclusions: Sophrology can be an effective technique in improving wellbeing and reducing pain medication usage, which has implications for chronic pain management. A larger study is needed to assess sophrology's benefits and compare these to that of alternative treatments, as well as to explore the reasons for dropout rates.

1 | Introduction

1.1 | Background

Pain is the unpleasant sensory and emotional experience associated with actual or potential tissue damage [1]. Pain occurring

for over 3 months is defined by the International Classification of Diseases 11th Revision (ICD-11) as chronic pain. In the United Kingdom (UK), chronic pain impacts 43% of the population, with this figure increasing with age, suggesting the prevalence will increase alongside the ageing population [2].

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Evidence also suggests that since the COVID-19 pandemic, the prevalence and burden of chronic pain (new complaints and worsening of existing ones) have significantly increased [3].

Chronic pain can negatively impact upon quality of life [4, 5], level of disability [6] and mental health [7, 8]. Pain is a subjective experience, influenced by biological, psychological, and social factors [9], which makes it difficult to treat. Prescription pain medication such as non-steroidal anti-inflammatory drugs (NSAIDs) and opioids [10] are often used. However, these can result in increased tolerance and addiction, depression, and anxiety and even death due to overdose [10–12]. Furthermore, there is no clear evidence that such treatment is effective for chronic pain [12]. Opioids prescriptions in the UK increased by 400% in the past decade, which has led to experts warning that the UK is facing an opioid epidemic [13]. As such, the National Institute for Health and Care Excellence (NICE) 2020 guidelines suggest that NSAIDs and opioids should not be routinely prescribed for managing chronic pain [14]. Consequently, complementary and alternative (CAM) treatments are increasingly recommended for chronic pain management.

A recent systematic review of CAM interventions for chronic pain, including chiropractic care, acupuncture and physiotherapy, indicates positive shifts on pain intensity, interference with daily life, level of disability, and fear avoidance of pain [15]. This is similar to other studies that highlight the benefits of acupuncture on chronic pain sensations [16, 17] as well as that of mindfulness and yoga [17–19]. Others have also underlined the mental health benefits of CAM interventions on chronic pain [20]. However, the literature also suggests that improvements associated with CAM treatments can be short-lived and resources heavy in terms of the training and personnel they require [21], and that some of these associations are statistically weak [20].

1.2 | Sophrology

Another CAM intervention widely used in French-speaking countries and Spain is sophrology. Sophrology is a uniquely structured mind-body practice created by neuropsychiatrist Alfonso Caycedo in the 1960s [22], with the aim to develop self-awareness, integrating mind and body to lead a more harmonious and authentic life. Combining Western relaxation techniques with Eastern meditation practices, sophrology offers a structured method for self-development, enhanced performance and improved health and wellbeing. It focuses on strengthening the positive and fostering autonomy by increasing awareness and self-regulation. Sophrology is based on simple exercises that can be easily incorporated in everyday life including gentle movements, relaxation and breathing exercises, as well as positive imagery. It works through stimulating and establishing new neural pathways that are reinforced by regular practice [22, 23]. Sophrology has been shown to improve mental health [24], stress management [25], stroke recovery [26], and athletic performance [27]. In the UK, sophrology has recently been endorsed by Macmillan as one of the mind-body therapies that help cancer sufferers cope with side effects, feel relaxed and improve their life [28].

Sophrology involves elements of yoga, relaxation, mindfulness, Buddhist meditation, Japanese Zen, hypnotherapy, and positive

psychology. What makes sophrology unique is its structure and how exercises progress over time making it a very accessible method. It starts with connecting to bodily sensations, developing interoception and proprioception, before harnessing the power of the mind, including the capacity to become an observer. The practice leads to better regulation of one's internal state bringing mind and body into balance and lead to greater awareness of the self [22]. Furthermore, the method can easily be learnt and incorporated in daily life by participants in-between sessions.

Research into sophrology for pain management shows mixed results. Randomised controlled trials (RCT) comparing sophrology versus standard care showed positive results in reducing pain among women in labour [29], oncology patients undergoing radiology procedures [30] and patients with acute respiratory failure subjected to respiratory ventilation sessions [31]. However, another RCT conducted among women with fibromyalgia [32] found resistance training more effective in reducing pain than sophrology—although the initial trial yielded similar positive findings for both interventions [23]. However, in that study [32] some of the exercises were conducted lying down with background music, resembling more relaxation therapy, whereas sophrology is usually practiced sitting down or standing up and does not require any equipment. Another RCT study on lower back pain also indicates that neither sophrology nor cognitive behavioural therapy benefited patients, and that anxiety had increased in both groups, possibly because individuals are asked to focus on their pain sensations [33]. Overall, these findings indicate that sophrology may be beneficial for pain management. However, further research is warranted, particularly in the UK where it is less known, to ascertain whether a sophrology intervention would be feasible and acceptable to chronic pain sufferers and yield health benefits. Feasibility studies are deemed most appropriate to determine whether a protocol is suitable for a full-scale trial and/or requires adjustment [34]. These questions are most effectively explored through RCT design [34, 35]. Furthermore, given that much of the literature on sophrology uses RCTs, a similar design was used in this study. As such, the aim of this pilot study was to assess the feasibility, acceptability and potential impact of an 8-week sophrology intervention among British adults living with chronic pain, using a RCT design.

2 | Methods

2.1 | Design

A RCT comparing individuals participating in an 8-week online sophrology intervention versus a control group was conducted. Participants were assessed at two-time points: baseline and post-intervention and all data were collected online. The study adhered to the Consolidated Standards of Reporting Trials (CONSORT).

2.2 | Participants

Online interventions generally have high attrition rates [36, 37]. Furthermore, as sophrology is relatively un-known in the UK, it was deemed necessary to over-recruit. Altogether, 100 participants were recruited via British chronic pain support groups

and social media. The inclusion criteria included: being over 18 years old, living with chronic pain, and being willing to participate in the intervention. Contra-indications to sophrology include epilepsy and major psychotic disorders. Therefore, participants suffering from those were excluded from the study.

2.3 | Procedure and Materials

Individuals were directed to a secure website (Qualtrics.com), where they were presented with an information sheet about the study and the intervention before providing their consent. They were then screened for eligibility before completing the baseline questionnaire, which took approximately 15 min to complete. They were then randomly assigned (by Qualtrics) to either the intervention (IC) or control (CG) group.

The IG took part in the 8-week intervention while the CG was asked to 'continue as normal'. All participants were sent a follow-up questionnaire after 8 weeks. Those in the CG who completed the follow-up questionnaire were offered the 8-week intervention.

2.3.1 | The Intervention

The protocol consisted of eight sessions, lasting 1 h and delivered weekly. In the first session, the practitioner presented sophrology and how the intervention was going to work. Most sessions were done sitting down with some dynamic relaxation exercises carried out standing. Participants could adapt the movements/exercises to their needs and capabilities and lie down if needed. At the start of the sessions, the practitioner explained the exercises before guiding them. At the end, participants were given the option to share their experience, as is customary in sophrology.

The first three sessions focused on helping participants reconnect with their body (i.e. paying attention to bodily sensations) by promoting relaxation and the release of tensions as well as enhancing the discovery of positive sensations through guided imagery. Techniques such as body scan, tense release and breathing awareness were used alongside dynamic relaxation exercises and positive visualisations. The following two sessions were focused on restoring emotional balance, helping participants to distance themselves from challenging sensations or situations. In addition to body scan, tense release and slightly more energetic dynamic relaxation exercises, techniques such as object contemplation, counted breathing and inner capacities stimulation were used. Sessions six and seven included specific pain management protocols. One session focused on substituting a sensation for another, the other one was more visual, focusing on objectifying the pain and changing it. The final session included an exercise designed to generate new sensations through vibrations and sounds, with the aim of bringing greater wellbeing.

Throughout the intervention, specific techniques were used. A list of techniques is available in Table 1.

2.3.2 | The Questionnaire

Baseline and follow-up questionnaires comprised nine scales. All are widely used in pain research and display high internal reliability. The *Numeric Pain Rating Scale* [38] was used to measure participants' current level of pain, level of pain over the

previous week, and over the previous 24 h, using a 11-point scale (0 = no pain to 10 = worst possible pain). *Pain Management* was assessed using a composite of the Quantitative Analgesic Questionnaire [39] and the Brief Medication Questionnaire [40]. It measured the pain medication (dosage and frequency) used in the previous week. *The Pain Catastrophising Scale* [41] was used to measure negative cognitive-affective responses to pain. Comprising 13 statements rated on a 5-point scale (0 = not at all to 4 = all the time), it has three subscales—rumination, magnification of pain and helplessness (in managing pain)—and an overall score. The *Pain Disability Index* [42] was employed to assess the level of disruption pain had on participants' life across seven categories (e.g. social activity and self-care), using a 0–10 scale (0 = no disability to 10 = worst disability). *Sleep disturbances* were measured using the Pittsburgh Sleep Quality Index [43], which comprises 10 items evaluating 7 aspects of sleep over the previous month (e.g. sleep quality, sleep duration). The *Patient Health Questionnaire 9-item* (PHQ-9 [44]) was used to measure depression via nine items rated on a 0–3 scale (0 = not at all to 3 = nearly every day). To assess anxiety, the *Generalised Anxiety Disorder* (GAD-7 [45]) was utilised via seven items also rated on a 0–3 scale (0 = not at all to 3 = nearly every day). *Life satisfaction* was measured using the *Satisfaction with Life Scale* [46], comprising 5 items rated on a 7-point scale (1 = strongly disagree to 7 = strongly agree). Finally, the *Brief Resilience Scale* [47] was used to assess participants' resilience levels, using six statements rated on a 5-point scale (1 = strongly disagree to 5 = strongly agree).

The baseline questionnaire also contained demographic questions and questions related to participants' chronic pain (e.g. parts of body involved, pain duration). These were not repeated at follow-up. The follow-up questionnaire contained the same nine scales. For the IG, questions about the intervention (e.g. helpfulness, likelihood to continue practising sophrology) were included alongside several open questions: any positive/negative changes experienced since the intervention, what they liked most/least about it, and any other comments on sophrology.

2.4 | Analysis

Data were analysed using SPSS, version 26. Responses between groups were compared using chi-square and *t*-tests analyses. Mixed Analysis of Variance (ANOVA) was used to measure differences in baseline and follow-up responses within and between groups to assess the intervention's effectiveness. Effect sizes were estimated using partial eta squared (η_p^2), with the thresholds of 0.01, 0.13 and 0.26 for small, medium and large effect size [48]. Open questions were analysed using thematic analysis [49]. The qualitative data were analysed using Thematic Analysis, following the six phases of analysis recommended by Braun and Clarke [49]: data familiarisation, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and report writing. The coding framework was devised by the first author, discussed within the team and refined further accordingly.

2.5 | Ethics

Ethical approval for the study was granted by the University of West London Research Ethics Committee. The study was

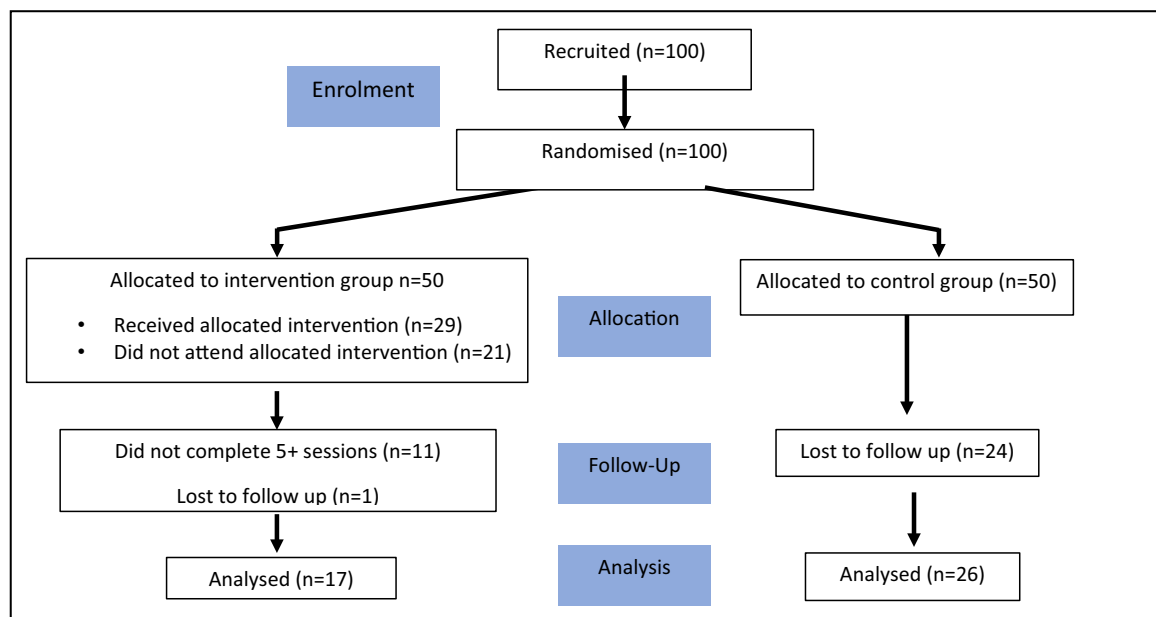
TABLE 1 | Techniques used during the intervention.

Key techniques		
Body scan	The aim is to focus on different parts of the body in turn	In the first few sessions, the focus was on releasing as many tensions as possible, later the focus was on increasing the feeling of presence
Sophro negative displacement	The aim is to tense the body/release tensions	It was used from Week 2 to Week 8. It was guided either as a progressive muscle relaxation exercise (asking participants to breathe in, hold the breath while tensing the body, and breathe out) or with no restriction on the breath but with the intention of releasing tensions on the outbreath
Sophro vital harmonisation	The aim is to visualise the right amount of energy circulating in the body and helping balance vital functions	It was used in the second part of the intervention (between Weeks 4 and 8)
Dynamic exercises		
Dynamic exercises	Comprising gentle body movements, the aim is to increase body awareness through focusing on interoception and proprioception, and release tensions held in the parts of the body that are activated	Dynamic exercises were included in each session from Week 1 to Week 7. Participants were invited to do the following movements, either focusing on bodily sensations alone or using an intention
Head and neck movement	The exercise invites participants to move their head up and down, from side to side and in circles	This exercise was done in Week 1 and Week 6
Forearms exercise	This exercise synchronises breath and arms movements, so that on the inbreath hands rise to the shoulders and on the outbreath, hands come back down	This was done in Week 2 with intention of bringing something positive on inbreath
Half and whole body stretch	This exercise involves stretching each side of the body and then the whole body	This exercise was done in Week 3
Shoulder pump	The exercise involves lifting the shoulders up and down while holding the breath. The participants were given the option to do circular movements and not hold the breath	The exercise was done in Week 4 and in Week 7 (with intention of releasing tensions through the hands)
Tratak	The exercise involves bringing the arm with thumb up in front and then bringing the thumb towards the eyes while looking at it. It is used to close the eyes and turn the focus inwards	This exercise was done in Week 4
Bellows breathing	The exercise involves brisk abdominal breathing, pushing stomach inside with each outbreath	This was done in Week 5
Breathing exercises		
Breathing exercises	The aim was to help participants reconnect with their breathing and ultimately encourage abdominal breathing which was explained in the later sessions	Breathing exercises were included in each session. Sometimes they were combined to visualisations or to dynamic movements
Breathing awareness	Exercise to focus on the breath without changing anything to it	This was used in Week 2
Sophro Synchronised Breathing	The aim is to imagine breathing in a positive element and letting it spread inside the body on the outbreath	This was used with the element of calm in Week 1
Box breathing	The aim is to find a count close to individuals' normal breathing pattern and try to repeat a cycle, if possible, in a square pattern (breathing in/breathing out/holding for equal time)	This exercise was done in Week 5
Visualisations		
Positive visualisations	The aim was to help participants build and connect to positive resources	

(Continues)

TABLE 1 | (Continued)

Safe place	Exercise where a person imagines themselves on their own wherever they would like to be, activating their senses	This was used in Week 2
Object contemplation	Exercise involving contemplating a neutral object for a few minutes	This was done in Week 4
Sun energy	Visualisation to go towards the sun and capture its energy	This was done in Week 4
Capacity	Exercise to connect to an inner capacity or strength, connect to it, make it stronger and project the rest of the day with it	This exercise used in Week 5
Sophro-sensorial substitution	Visualisation focused on a painful area of the body and aiming at replacing the sensation of pain with another one (e.g. heat or cold)	This was used in Week 6
Objectify-modify visualisation	Visualisation focused on a painful area of the body and imagining it as a knot or block and trying to alter and reduce it	This was done in Week 7

**FIGURE 1** | Sample progression flow chart.

conducted in accordance with the British Psychological Society codes of ethics [50]. As chronic pain can be a sensitive topic, a debrief sheet containing the contact details of support organisations, e.g. Pain UK, Action on Pain, and the Samaritans was provided.

3 | Results

3.1 | Dropout and Adherence Rates

Dropout (from the study) and adherence (to the intervention) rates were calculated. Of the 100 participants, 50 were randomised into each group. In the IG, 29 (58%) participated in the intervention and 21 did not (42% dropout). Of the 29 who

started the intervention, 18 completed at least 5 sessions—the threshold used for intervention completion (62% adherence). Of the 18 participants who completed the intervention, all but one completed the follow-up questionnaire (6% dropout). Therefore, the overall dropout rate for the IG at follow-up is 66% based on the total IG group ($n = 50$) and the adherence rate is 59% based on those who started the intervention ($n = 29$).

The dropout rate in the CG was lower. Of the 50 initial participants, 26 completed the follow-up questionnaire (47% dropout). The sample progression is displayed in Figure 1.

All scales displayed high internal reliability with Cronbach alpha values ranging between 0.76 for pain catastrophising (magnification) and 0.93 for pain catastrophising overall. Data were normally distributed expect for pain catastrophising

subscales (rumination and helplessness) and the anxiety scale. However, as *t*-tests and ANOVA are robust against violation of normality [51, 52] parametric tests were used to analyse the data.

3.2 | Baseline Data

3.2.1 | Sample Profile

Table 2 shows participants' profile at baseline. There were no significant group differences. The average age was 39 years old and both groups comprised mainly females (92%). Most participants (88%) had a diagnosis to the cause of their pain. The mean length of time participants experienced pain for was 14 years.

TABLE 2 | Demographic profile of the two groups at baseline.

	IG (<i>n</i> = 50)	CG (<i>n</i> = 50)	χ^2 <i>t</i> -test for age and years in pain
Age (Mean, SD)	39.90 (10.49)	39.64 (13.12)	0.11
Gender			
Female	92%	92%	0.53
Male	4%	6%	
Non-binary	4%	2%	
Marital Status			
In a relationship	64%	56%	9.09
Not in a relationship	34%	40%	
Other	2%	4%	
Children			
Yes	52%	48%	0.16
No	48%	52%	
Level of education			
Under/postgraduates	64%	66%	1.24
GCSE/A-level	34%	30%	
No qualification	2%	4%	
Work Status			
Employed	56%	34%	17.65
Unable to work	30%	40%	
Other	14%	26%	
Ethnicity			
White British	74%	80%	2.74
Other white background	16%	12%	
Other	10%	8%	
Religion			
Christian	52%	42%	5.92
No religion	38%	54%	
Other	10%	4%	
Diagnosis			
Multiple diagnosis	32%	46%	12.1
No diagnosis	18%	6%	
Complex pain syndrome	10%	14%	
Ehlers Danlos syndrome	18%	14%	
Fibromyalgia	18%	8%	
Other	4%	12%	
Years in pain (Mean, SD)	12.5 (11.45)	15.70 (13.80)	−1.24

p* < 0.05; *p* < 0.001; ****p* < 0.001.

3.2.2 | Pain and Wellbeing at Baseline

Reported pain levels were below 7 and thus deemed moderate [53]. Almost all participants (98% IG, 100% CG) reported poor sleep quality (scored > 5 [43]). Most reported moderately severe/severe depression (58% IG, 62% CG), moderate/severe anxiety (50% IG, 62% CG), low levels of life satisfaction (72% IG, 68% CG) and resilience (62% IG, 64% CG). No significant differences in baseline scores between groups were observed (See Table 3).

3.3 | Follow-Up Data

Comparisons were made between the profiles of participants who completed the follow-up questionnaire and those who did not. No significant differences were identified on any of the demographic, pain, and wellbeing variables.

3.3.1 | Pain and Wellbeing at Follow-Up: Effectiveness of the Intervention

Using mixed ANOVA, data were compared between baseline and follow-up for each group. The results are displayed in Table 4.

The results show a significant interaction between time and group assignment for: pain medication used, treatment satisfaction, level of rumination, magnification, helplessness, and pain catastrophising overall, disability level, sleep disturbances, depression, and anxiety. Scores for these variables, except treatment satisfaction, significantly decreased over time in the IG and to a significantly greater extent than in the CG. Scores for treatment satisfaction significantly increased over time in the IG, again to a significantly greater extent than in the CG, with differences of a medium effect size.

Despite pain levels not displaying any significant interaction, there was a large main effect of time ($F(1, 40) = 19.13$, $p < 0.001$, $\eta_p^2 = 0.32$). Both groups saw a significant reduction in pain levels over time, which was larger in the IG compared to the CG (−1.10 IG and −0.77 CG, respectively). Although not statistically significant, this difference might indicate that the intervention may be effective for reducing pain in the long-term.

Regarding resilience, no effect of group assignment, $F(1, 40) = 0.17$, $p = 0.69$, $\eta_p^2 = 0.004$, nor any significant interaction, $F(1, 40) = 1.08$, $p = 0.31$, $\eta_p^2 = 0.03$ were observed, but there was a medium effect of time ($F(1, 40) = 6.6$, $p = 0.01$, $\eta_p^2 = 0.14$). Both groups saw a small increase in their resilience levels over time, but a positive impact of the intervention could not be demonstrated. There was no effect of time, ($F(1, 40) = 2.84$, $p = 0.1$, $\eta_p^2 = 0.07$) or group assignment ($F(1, 40) = 0.25$, $p = 0.617$, $\eta_p^2 = 0.01$), nor any significant interaction ($F(1, 40) = 1.49$, $p = 0.23$, $\eta_p^2 = 0.04$) for life satisfaction.

3.4 | Participants' Feedback on the Intervention

IG participants provided feedback on the intervention. Mean ratings for helpfulness of the intervention was 7.82 (out of 10), 7.47 for likelihood to continue practising sophrology, and 7.94 for likelihood to recommend sophrology to others. These results indicate that participants who engaged with the intervention rated it highly and were likely to continue practising.

TABLE 3 | Baseline comparison between groups on pain and wellbeing variables.

	IG (<i>n</i> = 50) Mean (SD)	CG (<i>n</i> = 50) Mean (SD)	<i>t</i> -value
Pain level (0–10)	6.09 (1.5)	6.44 (1.3)	−1.27
Pain medication taken	17.1 (10.7)	19.47 (9.2)	−1.13
Alternative treatments	4.39 (2.1)	4.58 (2.4)	−0.35
Treatment satisfaction (0–10)	3.88 (2.1)	3.72 (2.4)	0.36
Pain Catastrophising Scale—Total (0–52)	29.04 (11.17)	30.27 (11.89)	−0.53
PCS—Rumination (0–16)	9.70 (3.97)	10.24 (4.02)	−0.68
PCS—Magnification (0–12)	6.04 (3.00)	6.12 (3.28)	−0.13
PCS—Helplessness (0–24)	13.30 (5.69)	13.91 (5.63)	−0.54
Disability (0–70)	45.47 (11.00)	47.55 (10.80)	−0.95
Sleep disturbance (0–21)	13.62 (4.40)	13.66 (3.30)	−0.05
Depression (0–27)	15.32 (6.20)	16.4 (6.30)	−0.87
Anxiety (0–21)	10.18 (6.10)	11.9 (6.00)	−1.42
Life satisfaction (5–35)	16.02 (6.70)	16.92 (6.90)	−0.66
Resilience (1–5)	2.49 (0.90)	2.7 (0.90)	−0.95

Note: —Values in bold are deemed a concern: PCS: high (> 30); Sleep disturbance: high (> 5); Depression: moderately severe (15–19), severe (20–27); Anxiety: moderate (10–14), severe (15–21). Resilience: low (< 2.99).

p* < 0.05; *p* < 0.001; ****p* < 0.001.

TABLE 4 | Intervention effect.

Measures	Baseline		Follow-up		ANOVA 2 × 2 Group by time	
	IG M (SD)	CG M (SD)	IG M (SD)	CG M (SD)	<i>F</i> (1, 40)	η_p^2
Pain levels	5.81 (1.26)	6.33 (1.32)	4.62 (1.24)	5.56 (1.74)	0.89	0.02
Pain medication	13.29 (9.43)	16.85 (10.04)	8 (6.88)	17.73 (9.9)	5.31*	0.12
Alternative treatments	3.82 (2.9)	2.96 (3.05)	3.71 (2.64)	3.65 (3.15)	1.03	0.02
Treatment satisfaction	3.71 (2.14)	4.04 (2.38)	5.71 (1.90)	4.35 (2.38)	6.11*	0.13
PCS—Total	29.04 (11.17)	30.27 (11.89)	15.94 (9.79)	26.19 (16.69)	8.01**	0.16
PCS—Rumination	9.70 (3.97)	10.24 (4.02)	5.88 (3.71)	9.00 (5.04)	5.84*	0.13
PCS—Magnification	6.04 (3.00)	6.12 (3.28)	3.24 (2.56)	5.58 (3.84)	4.32*	0.10
PCS—Helplessness	13.30 (5.69)	13.91 (5.63)	6.82 (4.32)	11.62 (8.42)	6.76*	0.14
Disability level	45.23 (10.18)	48.19 (11.44)	39.01 (13.82)	48.77 (11.11)	9.90	0.19
Sleep disturbances	13.41 (4.69)	13 (3.26)	10.59 (4.43)	12.54 (3.9)	6.98*	0.15
Depression	22.59 (7.05)	25.12 (6.69)	17.24 (5.44)	23.62 (6.49)	10.05**	0.20
Anxiety	15.12 (5.87)	19.46 (5.66)	10.41 (2.98)	19.04 (6.52)	10.95**	0.21
Life Satisfaction	15.29 (5.84)	17.5 (7.8)	18.18 (6.36)	17.96 (7.49)	1.49	0.04
Resilience	2.41 (1)	2.65 (1)	2.80 (0.97)	2.83 (1.1)	1.08	0.31

Note: —Values in bold are deemed a concern: PCS: high (> 30); Sleep disturbance: high (> 5); Depression: moderately severe (15–19), severe (20–27); Anxiety: moderate (10–14), severe (15–21). Resilience: low (< 2.99).

p* < 0.05; *p* < 0.001; ****p* < 0.001.

Twenty participants provided qualitative feedback on the intervention, almost exclusively positive (See Table 5). Four themes were identified: improved mental health, increased relaxation, taking back control of one's own life and pain management.

In terms of improved mental health, participants reported a reduction in negative emotions including anxiety and depression. For example, Participant 22 reported that the intervention helped *Reduce panic and anxiety attacks* while Participant 8 stated that the sessions 'have improved my depression'. An increased ability to have a more positive outlook on themselves

and their life was also identified: *overall outlook on my life and patience with myself has greatly improved* [since the intervention] (P 22).

The second theme related to increased relaxation and encompassed relaxation experience, stress reduction and sleep benefits. Most participants reported that the sophrology sessions were *calming* (P28), that they felt *more relaxed* (P44) and better able to *deal with stressful situations* (P22) as a result. Four participants also reported sleep benefits, including the ability to *get to sleep easier at night* (P48) and sleeping longer thanks to

TABLE 5 | Feedback on the intervention.

Themes	Quotations
Improved mental health	'Less depressed' (P8, P20) 'Less crying spontaneously' (P19) 'Reduce panic and anxiety attacks' (P22) 'Overall outlook on my life and patience with myself greatly improved' (P22)
Increased relaxation	'Calming' (P28) 'Relax my body' (P22) 'More relaxed following the intervention' (P44) 'De-stress method' (P50) 'Empty my mind of life's stresses and pressure' (P36) 'Sleeping better' (P44) 'Easier get to sleep' (P48)
Ability to regain control of one's life	'Equipped with lots of tools I can access when needed' (P22) 'Regaining a feeling of control' (P19) 'Ability to stop and take some time to myself' (P41) 'Accept my condition better and more capable to accept not all is right' (P12) 'Feeling more accepting of where I am and how things are' (P22)
Pain management	'Less stressed when in pain which makes it more manageable' (P49) 'At onset of pain I'm now able to do some of the breathing exercises' (P34) 'Better pain management' (P25) 'Reducing taking actual pain medication' (P48)

the intervention *I have managed to stay in bed an extra two hours a night* (P8).

The third theme conveyed the ability to take back control over their life. Participants reported feeling more in control of their condition and better equipped to recognise and address symptoms: *sophrology increased[my] capacity to recognize my own state and my needs and increased [my] capability to listen to my needs and answer them* (P19), which led to feelings of empowerment *regaining feeling of control*. Sophrology also enabled participants to focus on their health, providing them with the *ability to stop and take some time to myself* (P41). Acceptance of the condition was another reported benefit of the intervention: *I accept my condition better and am more capable to accept not all is right* (P12).

The final theme focused on pain management. Participants reported feeling better equipped to deal with their pain, particularly, the emotional side *[I am] able to deal with...pain flare ups with a calmer and objective point of view* (P22) and *getting less stressed when I'm in pain which makes it a bit more manageable* (P49). The techniques were seen as helpful in managing pain *when I get an onset of pain, I'm now able to do some of the breathing exercises and focus* (P57). Overall, the intervention had generally led to *better pain management* (P25) and Participant 48 also highlighted that they had *reduce[d] taking actual pain medication*.

Despite reporting no negative experiences, some aspects of the intervention were rated less favourably than others including: the online format—*a few internet probs* (P50); the lack of face-to-face interaction—*difficult to commit alone* (P19); the practice

between sessions—I *never liked homework* (P10), and the instructions—*a little tricky to understand* (P50).

4 | Discussion

This study aimed to assess the impact of an 8-week online sophrology intervention for British adults living with chronic pain. Results show that for those who engaged with the intervention, it was highly positively received and had significant benefits, including reducing pain medication usage, pain catastrophising (rumination, magnification, helplessness), pain-related disability, sleep disturbances, depression, and anxiety. Treatment satisfaction also increased. Both groups also experienced a decrease (greater in the IG) in pain levels and an increase in resilience levels over time, but there were no benefits on life satisfaction. Positive feedback on the intervention included improved mental health, relaxation levels, pain management, and regaining control over one's life.

These findings support the sparse literature highlighting sophrology's benefits for pain management, particularly altering the pain experience and improving functioning [32] mental health and sleep quality [24]. They are in line with the underpinning of sophrology which aims to harness individual resources and develop positive outlook [22]. However, this study does not provide evidence of the benefits of sophrology above that of other treatments. There was no increase in life satisfaction. Assessing the impact of the intervention over a longer period may yield different results.

Contrary to the study by Serra et al. [33], there was no evidence in this study of increased levels of anxiety and physical dysfunction as a result of taking part in the intervention. However, it would be worth considering this before rolling out sophrology interventions. Given sophrology's focus on body awareness, it is not surprising that some participants might become aware of unpleasant physical sensations even if transient [33].

These results have practical implications. Although sophrology may not be for everyone, when individuals engaged with it, they were likely to adhere to and benefit from it. This is supported by the benefits mentioned by participants, their reported likelihood to continue to practise and recommend sophrology to others. The results also show that sophrology can reduce the pain experienced and improve the quality of life of people living with chronic pain, including their mental health. This is important given that the incidence of chronic pain is likely to increase due to the aging population [2]. It is also important considering the high prevalence of mental health issues in this group [7, 8] including an elevated risk of suicide [54].

The potential for reducing reliance on pain medication is also significant, particularly given the question marks about its effectiveness in treating chronic pain and severe side-effects [10–12]. Despite no significant decrease in pain levels, there was a significant decrease in pain medication used, suggesting that sophrology may alter individuals' pain perception and enable better pain management. This is in line with sophrology itself, as it does not aim to remove pain per se, but rather to reduce the physical and psychological tensions associated with it. Sophrology could, therefore, provide healthcare professionals with an alternative treatment for patients with chronic pain.

Finally, this study demonstrates that an online format is acceptable. Enabling individuals to complete the sessions in the comfort of their home may be beneficial as some individuals may struggle to attend in person appointments [55]. Furthermore, the use of telehealth has surged since the pandemic, a trend likely to be maintained [3].

The study has limitations. Although similar to other studies [36, 37], the dropout rate in the IG was high. Twenty one out of 50 participants in the IG chose not to engage with the intervention despite having consented initially. Whilst the reasons for this are unclear, it is possible sophrology being relatively unknown, people may have been reluctant to try an unfamiliar method. Furthermore, participants were recruited through support organisations. Thus, they already had access to support and may not have felt the urge to participate. Participants were not screened according to the severity of the pain, which was moderate. Recruiting clinical samples may yield different results.

In terms of adherence, 11 out of 29 participants discontinued 'treatment'. Again, there are no clear explanation for this, but it is possible that some participants may not have felt any immediate benefits from the intervention, not enjoying the sessions, or have difficulties with the online format. Further research would be needed to explore both drop out and non-adherence rates and the reasons for these. Further studies could also use intention-to-treat analyses, whereby all participants randomised are included in the final analysis regardless of non-adherence or withdrawal, to mitigate against attrition bias.

Another limitation is the use of two time points. People with chronic pain are likely to experience fluctuations in their condition. Consequently, assessments at more regular time-points and over a longer period could mitigate for these potential fluctuations. Performance bias also needs to be considered. Improvements seen in the IG may have been due to the knowledge that they were receiving an intervention they were told might be beneficial. Finally, the gender split was not representative of the British population in the UK with chronic pain. The sample was more female dominant than prevalence rates suggest [2]. One potential reason for this could be recruitment from online support groups, which women are more likely to join [56].

Despite these limitations, this study provides some valuable insights into a potential new treatment for chronic pain. The study used a RCT design minimising allocation biases and the impact of confounding variables, as evidenced by the similarity in profiles between the two groups at baseline. The study also assessed the experience of pain through nine variables, enabling for a comprehensive evaluation of the impact of the intervention. This is important since chronic pain influences many aspects of life (physiology, cognitions, lifestyle). The next step is to conduct a full-scale trial to ascertain the effectiveness of a sophrology intervention for chronic pain.

5 | Conclusion

Sophrology has the potential to be an effective method of pain management and improve the quality of life of people living with chronic pain. Results have shown that an 8-week online intervention reduced participants' pain medication use, pain catastrophising, pain-related disability, sleep disturbances, depression, and anxiety levels, as well as increased treatment satisfaction. Further research, however, on a larger scale is needed to assess the benefit of sophrology in managing chronic pain, against other treatment such as mindfulness and over a longer period of time.

Author Contributions

Charlotte Chatfield: conceptualization, methodology, data collection, data analysis and interpretation, writing – original draft. **Caroline Lafarge:** conceptualization, methodology, data analysis and interpretation, writing – further drafts, writing – review and editing. **Audrey Zannese:** intervention delivery, writing – review and editing. Authors have approved the final version of the article.

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Conflicts of Interest

The second author was a trainee Sophrologist at the time the study took place. The third author was employed as a qualified Sophrologist and delivered the intervention.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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