

Efficacy of Online Conscious Connected Breathwork in Reducing Symptoms of Anxiety: A Quantitative Study

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Additional Declarations: Competing interest reported. Prior to completing this research I practiced as a breathwork facilitator. However, I have not been engaged as a breathwork facilitator since I began this PhD research in December 2020.

Abstract

Amidst the growing prevalence of anxiety disorders and the limitations of existing treatments, this research paper posits that we need to expand treatment options rather than simply to include more people in therapy or on medication. The popularity of breathwork has grown enormously but is still in the process of creating a robust body of evidence to validate its utility. This research employs a true-experimental design to compare pretest and posttest measures of anxiety utilizing the Zung Self-Rating Anxiety Scale (ZAS) between a breathwork group and a control group. The breathwork group participated in six weekly group sessions, each lasting 90 minutes, while the control group was placed on a waitlist. The study's results are significant with a large effect size, as CCB reduced anxiety symptoms by a mean of 10.56 points on the ZAS compared to the control group's reduction of just 1.89. This substantial difference highlights the potential of CCB as an effective, low-cost, and accessible intervention for anxiety. Furthermore, this study pioneers the investigation of the effectiveness of CCB in an online environment, offering insights into the adaptability and potential broader application of breathwork therapies. This research supports the integration of CCB into mainstream mental health practices, addressing the increasing demand for effective mental health treatments.

Introduction

In an era marked by escalating mental health challenges, anxiety disorders have emerged as particularly pervasive. A recent report indicated that mental health is now the primary health concern in the U.S.¹ Anxiety disorders, affecting nearly 40 million adults in the U.S., are the most common mental illness.² A separate study examining the severity of anxiety revealed that 82.6% of people with anxiety experience mild or moderate anxiety, while the remaining 17.3% experience severe anxiety³. Traditional treatments, ranging from pharmacological to psychological interventions, are widely utilized but often have significant limitations, including accessibility barriers, questionable efficacy, high costs, and unwanted side effects.⁴⁻⁸ This scenario has fuelled a surge in interest in additional potential therapies that promise efficacy, accessibility, and cost efficiency.

Conscious connected breathwork (CCB) has garnered significant attention among these emerging therapies. Searches for the term breathwork have increased by more than 3,233% in the last 15 years⁹, particularly following the publication of the New York Times bestseller "Breath: The New Science of a Lost Art" by James Nestor.¹⁰ However, the effectiveness of CCB, especially in an online intervention, has not been explored sufficiently. This study endeavored to bridge this knowledge gap by rigorously examining the impact of online CCB sessions on anxiety symptoms.

The theoretical underpinnings of this study are rooted in the framework of mind-body interventions and their efficacy in mental health treatment. The literature on breathwork and its role in managing anxiety disorders provides a contextual foundation for this research. Employing a true-experimental design, this study compares anxiety levels, measured through the Zung Self-Rating Anxiety Scale (ZAS), between participants who engaged in six weekly online CCB sessions and those in a waitlisted control group.

The relevance of this research is underscored by the shift toward digital platforms for therapy, a trend accelerated by the COVID-19 pandemic.¹¹ By evaluating the effectiveness of online CCB, this paper contributes significantly to the discourse on accessible mental health solutions and potentially paves the way for new approaches to anxiety treatment. While this study only examined online CCBs, it is possible that CCBs could be an even more potent treatment for anxiety when performed in person.

Background

The Escalating Crisis of Anxiety Disorders

Anxiety is a natural response to stress, but when it becomes excessive, it may develop into an anxiety disorder. A study on the global disease burden revealed that 28.68 million years of healthy life are lost due to disability or premature death related to anxiety.¹² These disorders are characterized by persistent, overwhelming fear or anxiety about imminent or future events. Symptoms commonly include restlessness, fatigue, breathlessness, insomnia, and a pervasive sense of dread. The most frequently diagnosed anxiety disorders include specific phobias, social anxiety disorder, panic disorder, agoraphobia, generalized anxiety disorder, and separation anxiety disorder.¹³

Limitations of Conventional Treatment Approaches

Pharmacological interventions are often the first treatment primary care physicians and general practitioners offer for anxiety.¹⁴ However, many patients do not tolerate these drugs well and have side effects, including insomnia, diminished sexual interest, and suicidal ideation.⁴ An increase in anxiety during the first two weeks of treatment often leads to poor compliance.^{4,5} Additionally, withdrawal symptoms can be severe, causing people to either stay on them longer than needed or avoid starting them altogether.^{6,7} Researchers continue to debate whether medications have any effect compared to placebo.⁸ High relapse rates after stopping medication further highlight the need for better treatments.⁴

Talk-based psychotherapy is the next most popular treatment for anxiety.¹⁵ However, not everyone can access this treatment, and its efficacy is also questionable. Reynolds et al.'s meta-analysis revealed that effect sizes for anxiety were small to moderate when Cognitive Behavioral Therapy (CBT) was used and not significant for non-CBTs.¹⁶ Loerinc et al. reviewed 87 trials and reported that, on average, only 49% of participants responded to CBT.¹⁷ This means that fewer than half of the participants had significant reductions in anxiety. Additionally, CBT has a high relapse rate of 48% after treatment is stopped.⁴ Access issues are exacerbated by a shortage of approximately 8,000 behavioral health providers in the U.S.¹⁸

The length of time needed to achieve results in psychotherapy is another issue. Some studies suggest that people need up to 20 sessions to see a breakthrough.¹⁹ However, this statistic relates to people seeing therapists for any reason, not specifically anxiety. Nonetheless, this high number of sessions leads to 20% of people leaving therapy prematurely.¹⁹ The U.K. National Health Service (NHS)

sometimes offers only five patient sessions, leading to incomplete treatment.²⁰ This study sought to determine whether six sessions of CCB were sufficient to reduce anxiety symptoms.

Conscious Connected Breathwork (CCB)

CCB is an umbrella term that covers the techniques used by several breathwork schools, such as Holotropic Breathwork, Breath Guru, Transformational Breathwork, Rebirthing Breathwork, Shamanic Breathwork, and Therapeutic Breathwork. It is also called by various names, including high ventilation breathwork (HVB), super ventilation breathwork, faster than normal breathing, extended connected breathing, hypercapnic/hyperventilation, and prolonged voluntary hyperventilation.²¹

The word hyperventilation simply means overbreathing.²² People may read this and think of it as a pathology, such as chronic or acute hyperventilation. However, CCB, prolonged voluntary hyperventilation, and hypercapnic/hyperventilation are different from acute, chronic, and involuntary hyperventilation and do not carry the same risks. This is evidenced by the findings of both this study and the study by Eyerman, which included 11,000 participants who had practising CCBs more than 12 years prior, with no significant adverse events reported.²³

Mechanisms of action of CCB

It is believed that CCB has a variety of mechanisms of action that help treat several different causes of anxiety. CCB has effects on both human physiology and psychology. The physiological effects can be explained by changes in carbon dioxide and oxygen ratios, blood pH levels, vagal nerve stimulation, cortical blood flow, and neurotransmitter release.²⁴ Psychological effects often relate to adaptive emotion regulation strategies, stress reduction, and mystical experiences.^{25,26} There are numerous causes of anxiety; hence, treatment that addresses many of these causes is highly helpful for reducing the prevalence of anxiety.

Anxiety often stems from maladaptive emotion regulation strategies such as avoidance and suppression of emotions.²⁷ Research by Rhinewine and Williams²⁸ indicates that CCB may assist individuals in confronting these suppressed emotions. Their review of the neurophysiological and psychological aspects of CCB suggested that the technique, particularly the voluntary overbreathing involved, could help reduce avoidance behaviors, thereby promoting therapeutic progress. Rhinewine and Williams suggested that CCB induces a state of transient hypofrontality in the brain that leads to the release of suppressed

Autonomic nervous system dysregulation is another factor related to the development of anxiety disorders.²⁹ Under normal circumstances, psychological stressors stimulate the hypothalamic–pituitary–adrenal (HPA) axis to support coping with these external stressors. However, when the HPA axis is overly taxed, it leads to dysregulation of the autonomic nervous system and emotional

dysregulation.³⁰ Aideyan et al.³⁰ suggest that breathwork is a tool that can assist in regulating the HPA axis and the autonomic nervous system and lead to reduced anxiety. There may also be sources of anxiety that are not related to even the mind or body.

Research has shown a direct correlation between spiritual well-being and anxiety.^{31,32} Four studies on CCB showed that it can elicit mystical experiences.^{23,25,33,34} Haveneth et al.²⁶ found that CCB-related mystical experiences lead to improved mental health in some people. While Haveneth's study is currently under review, it is the first to specifically find that CCB does this, whereas many studies show that psychedelic-induced mystical experiences also lead to improvements in mental health markers.³⁵

Additionally, research is emerging to support the idea that CCB is as powerful as psychedelics. Colasanti et al.³⁶ used an fMRI machine to show that CCB creates similar brain changes to those seen in psychedelic use. Furthermore, Uthaug³³ reported that CCB improved life satisfaction and stress levels to the same extent as did 5-MeO-DMT.

CCB and anxiety

Surprisingly, few studies have been performed directly on CCB and anxiety. The few studies that have been performed have had weak study designs that limit their conclusions. Nedumpillil³⁷ examined the effects of Holotropic breathwork on anxiety in patients with alcohol dependence syndrome. The study consisted of 30 patients treated at an alcohol recovery center in India. They used a pre- and posttest single-group design. The participants were instructed to perform 20 minutes of CCB followed by expressive drawing over a period of four weeks. Twenty minutes is the shortest duration of practice that I have come across in any study conducted on CCB, which creates questions about how much benefit could have been derived from the practice. Typically, CCB sessions last between 40 minutes and 2 hours. They found that CCBs produced statistically significant reductions in anxiety and helped prevent relapse into alcohol dependence. Given that this study was conducted in an alcohol dependence center, it is likely that these patients were receiving other complementary therapies, which are likely to have affected the results of this study. This study is further limited by the lack of a control group and small sample size.

Brewerton et al.³⁸ conducted a study with goals similar to those of Nedumpillil.³⁷ The researchers found that CCB helped to reduce symptoms of underlying anxiety in a case study of four alcohol-dependent people. Again, this case study has several confounding variables, as the participants also received a variety of other psychotherapies. A four-person case study is, of course, a very small sample size.

Puente et al.³⁹ conducted a pilot study with 11 subjects aged 30–47 years with no known mental disorders to determine the outcomes of a single CCB session. The participants' psychological data were collected before and after the CCB intervention using the State-Trait Anxiety Inventory (STAI). Physiological data were collected using a heart rate variability (HRV) device immediately before and 30

minutes after the intervention. HRV is a valuable measure of the nervous system's capacity to respond to stress or strain. The participants showed significant improvements in HRV levels and anxiety reductions measured by the STAI. The limitations of the present study were that only one session of CCB was used, the sample size was small, and no long-term measurements of the subject's well-being were taken.

Research Rationale and Objectives

This study represents novel research, as no study on CCB has been conducted on CCB online, nor has the ZAS been used to test for changes in anxiety symptoms. There has not been a study that has looked specifically at anxiety and CCB with a control group or on how online delivery might work. This could increase access to CCB. Online presentations are important, as many practitioners and therapists were forced to migrate online due to COVID-19. Surprisingly, the popularity of breathwork increased during the pandemic even though in-person sessions could not occur. Google Trends ⁹ showed that the popularity of the term “Breathwork” increased by 112% from before the pandemic in May 2019 to May 2022.

Methods

Participants:

Participants were selected from my community and included my existing client pool, Instagram followers and their communities, and followers of breathwork influencers whom I approached to promote the study. The study included two groups: a breathwork intervention group and a control group. Participants were randomly assigned to each group using a random number generator. The breathwork consisted of six weekly online CCB sessions, while the individuals in the control group were placed on a waitlist and given an opportunity to engage in 6 weekly CCB sessions after the initial 6 weeks were completed. All participants self-identified as suffering from anxiety but were excluded if they scored below 35 on the ZAS, which is the minimum score for a diagnosis of mild anxiety (n = 109). n = 55 for the breathwork group and n = 54 for the control group.

Intervention:

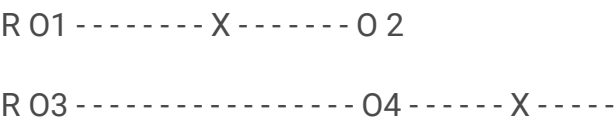
The six weekly online sessions of CCB lasted 90 minutes. Sessions were conducted by certified breathwork facilitators and included guided breathwork exercises designed to promote emotional release and physiological regulation. The CCB technique was designed by Alan Dolan.⁴⁰ The sessions started with a discussion about the technique, managing anxiety and any other questions related to the program. Then, a 5-minute introductory grounding practice was given. During this time, participants were instructed to lie down in front of their cameras, ensuring that their head, torso, and hands were in view. No one was permitted to participate without a camera or privacy. Evocative music was played using the WavePaths platform. Participants then underwent approximately 40 minutes of CCB. The session ended after approximately 5 minutes of stillness, during which only relaxing music was played, and the

participants were instructed to breathe normally. The facilitators then guided the participants back with grounding, body-oriented visualization. The remaining time was used for participants to share their experiences with the group or ask questions.

Measures:

The primary outcome measure was the Zung Self-Rating Anxiety Scale (ZAS), administered before and after the intervention period. The ZAS is a widely used instrument for assessing the severity of anxiety symptoms. The ZAS has a Cronbach’s alpha of .82.⁴¹ Although different forms of the ZAS have been created, participants were asked to complete the computerized inventory form as a self-reported measure of anxiety symptoms through Google Forms. For the analysis, the raw scores were used rather than the indexed scores that are sometimes used in the ZAS.⁴²

The study was a true pretest-posttest randomized control group with a crossover design. Specifically, the experiment may be described as follows:



Results

A repeated-measures ANOVA was performed through the GLM function in SPSS. The model-level tests indicated a significant difference between pre- and postbreathwork scores (Wilk’s Lambada = 0.582, $F(1, 107) = 76.777, p < .001$). There was also a significant difference in the interaction effect between treatment group and pre- or postbreathwork (Wilk’s Lambada = 0.742, $F(1, 107) = 37.208, p < .001$). Given that there were only two groups, post hoc tests were not performed. Table 1 shows the demographic data of our sample.

Table 1 *Demographic characteristics of the sample*

Variable	<i>N</i>	%
Gender		
Female	86	80.07
Male	22	20.3
Age range		
20–29	8	10.81
30–39	28	37.84
40–49	15	20.27
50–59	19	25.68
60–69	5	6.76
70–79	1	1.35
Ethnicity		
White	59	79.73
Black	5	6.76
Multiple ethnicities/other	5	6.76
Hispanic	4	5.41
Asian	3	4.05
Highest level of education		
High school	4	5.41
Undergraduate degree	42	56.76
Master's degree	24	32.43
Doctoral degree	6	8.11

The significant difference demonstrated that the CCB intervention reduced anxiety symptoms more than the control intervention. The treatment group had a mean reduction in ZAS score of 10.56 compared to that of the control group, whose anxiety symptom score decreased by only 1.89 (Table 2). The mean postbreathwork ZAS score reduction to 33.31 was so low that they would not even be eligible to join the study if it were run again, as the cutoff to be eligible for the study was 35. This also means that people who had clinically significant levels of anxiety, according to the ZAS categorization system, had their anxiety reduced so much that they would no longer be considered to have clinical levels of anxiety.

The significant interaction effect between the treatment group and pre- and postbreathwork scores further supported the efficacy of CCB. This interaction indicates that the changes in anxiety levels were not only due to the passage of time but also specifically related to the breathwork intervention.

Table 2
Pre- and Post-ZAS Scores for the Control and Intervention Groups

Variable	N	Pretreatment mean	SD	Posttreatment mean	SD	Change
Control	55	43	7.024	41.11	8.806	1.89
Intervention	54	43.87	7.761	33.31	6.928	10.56
<i>Note.</i> $n = 109$						

T test between the intervention and control groups on pretest ZAS scores

We ran an independent samples t test to determine how similar the control and intervention groups were in terms of ZAS score at time 1. The t test showed no significant difference between the groups at time 1 ($p = .540$). This similarity helps us in our experiment, as it shows that both groups started from a similar point and helps us see how much of an effect the two interventions had.

Discussion

The results illustrate the success of CCB as a therapeutic modality for those with mild to severe anxiety. The large effect size observed within the Breathwork group (Cohen's $d = 1.44$) strongly contrasts with the smaller effect (Cohen's $d = 0.24$) found in the Waitlist Control group. This large effect size is indicative of the intervention's potent impact. The treatment groups ranged from a pretreatment mean of 43.87 to a posttreatment mean of 33.31, which is below even a mild level of anxiety. As applied in our study, these theories hold that our independent variable, CCB, and time influenced the dependent variable, anxiety symptoms.

The adaptability of CCB to the online environment highlights its potential as a scalable and accessible mental health intervention. This study contributes to the growing body of evidence supporting the use of breathwork techniques in therapeutic settings, particularly for anxiety management. The results of this investigation provide compelling support for incorporating CCB into national healthcare systems and health insurance frameworks due to its significant therapeutic efficiency and swift impact. When benchmarked against standard care, CCB shows superior performance. In this study, the large effect size of CCB significantly exceeded the small effect size of talk therapy on anxiety, as identified in the meta-analysis by Reynolds.¹⁶ Remarkably, CCB facilitated clinical and statistically significant anxiety reductions within just six sessions, a sharp departure from the average twenty sessions typically required for measurable improvement in conventional talk therapy.¹⁹

Qualitative feedback was obtained during an exit survey. These surveys provide evidence that the mechanisms of action involved in CCB are related to increasing resilience through hormesis, processing maladaptively stored memories, mystical experiences and adaptive emotion regulation strategies. In relation to hormesis,³³ one participant wrote, "I am more resilient to stressful situations. I still have anxious thoughts, but they do not impact me as much. Practicing breathwork also helps me tap into painful feelings and bring them to the surface for a release". In relation to adaptive emotion regulation strategies,²⁷ wrote, "I noticed myself being able to express my feelings in an easier way, and I feel less anxious." Another participant shared that they had cried more in the past six weeks than at any other time in their adult life, which helped them to process emotions they had been avoiding and feel less anxious. In relation to processing maladaptively stored memories, a participant shared that the program gave them a "reduced anxiety level... despite the very increased connection with suppressed grief". This finding fits with De Wit's study, which reported remission of anxiety and PTSD from 8 CCB sessions.⁴³

While this study provides promising evidence for the efficacy of CCB as a therapeutic intervention for anxiety, it is important to approach its broad applicability with caution. Individual differences in response to therapy, including personal history, severity and type of anxiety disorder, and cooccurring mental health conditions, suggest that CCB, like all therapeutic interventions, may not be universally effective for all individuals. The assumption that a single therapeutic modality can meet the diverse needs of the wide spectrum of anxiety disorders overlooks the nuanced and complex nature of mental health treatment. However, further research is needed to explore how different populations respond to CCBs. These findings underscore the potential of CCB as part of a multifaceted approach to anxiety treatment, highlighting the importance of personalized care plans that consider the unique circumstances and preferences of individuals.

Limitations

Our study might be criticized for having a weak control method. An active placebo group could strengthen the study instead of using a waitlist group. When comparing CCB to cognitive behavioral therapy (CBT), as discussed, it is crucial to note that this was a single study on CCB, while the CBT comparison was a meta-analysis of 87 studies. To conclude, CCB is more effective than CBT, and additional studies with diverse populations are needed to validate these results.

Generalizability

The study's low heterogeneity limits generalizability, with participants primarily drawn from within the WEIRD category (Western, Educated, Industrialized, Rich, and Democratic) and 79.7% being white. Without replication in different settings and with varied participants, the findings are mainly applicable to the researcher's client pool and breathwork enthusiasts on social media. Selection bias further limits generalizability. The study also revealed a sex imbalance, with 80% women and 20% men. Despite an insufficient number of male participants to achieve statistical significance, it is noteworthy that men had greater average anxiety scores (13.25) than women did (10.04).

Future Research

The long-term effects and applications of CCBs across diverse populations warrant further exploration in future research. Direct comparisons between talk-based therapy and CCBs would help evaluate the effectiveness of CCBs compared to standard care. Replication of the results in various settings with different facilitators is necessary for validation as well. Additionally, investigating the effectiveness of CCB for other mental health conditions, such as depression or borderline personality disorder, and for specific types of anxiety, such as agoraphobia or generalized anxiety disorder, is crucial. Research into whether CCB benefits certain personality types more than others, such as introverts who may prefer nonverbal methods, is also recommended. Understanding the impact of CCB on different age groups, especially young people who may struggle to articulate their mental health issues, is essential.

Potential side effects of CCB, such as its impact on carbon dioxide sensitivity, should be studied, considering concerns about overbreathing leading to adverse health effects.⁴⁴ McKeown suggested that short-term CCB does not affect CO₂ tolerance but should be balanced with practices that increase CO₂ tolerance.⁴⁴ However, further research is needed to measure this impact, especially given that some CCB schools recommend daily sessions. Investigating the effect of mystical experiences reported by participants on mental health outcomes would also be valuable.

Long-term studies are needed to assess the sustainability of CCB benefits. Exploring the optimal duration of CCB practice, with studies comparing different session lengths (20, 40, 60, and 80 minutes), could provide valuable insights. Comparing in-person and online CCBs to evaluate the convenience versus the potency of in-person sessions would be interesting. It would be insightful to see if the convenience of online CCBs results in lower attrition rates and better anxiety reduction outcomes than in-person sessions, which may involve travel stress.

Conclusion

This study underscores the promising potential of CCB as an effective, accessible, and cost-efficient intervention for reducing anxiety symptoms, including through online modalities. This study contributes valuable empirical evidence to the field of mental health treatments, highlighting the role of CCB in addressing the critical need for diverse therapeutic options in the face of rising global anxiety levels. By demonstrating significant reductions in anxiety symptoms among participants in the online CCB program, this research advocates for the inclusion of such nontraditional interventions within mainstream mental health care strategies.

However, while the findings are compelling, it is crucial to acknowledge the limitations of this research. The study's scope, which primarily focused on short-term impacts without a longitudinal follow-up, leaves unanswered questions regarding the durability of CCB's effects on anxiety reduction. Moreover, the generalizability of these results may be limited by the sample size and demographic homogeneity of the studies. Future research should aim to explore the long-term efficacy of CCB and its effectiveness

across a broader range of populations and perform a comparative analysis with in-person delivery modes to more thoroughly understand its therapeutic potential and mechanisms of action.

This study marks a significant step forward in legitimizing alternative approaches to mental health treatment, particularly for those seeking nonpharmacological options to manage anxiety. The evidence presented herein strongly supports the further investigation and integration of CCB into mental health practices, advocating for a more inclusive, holistic approach to mental health care that embraces the diversity of human experience and the broad spectrum of healing modalities available. As we continue to navigate the complexities of mental health challenges in the modern world, therapeutic strategies must evolve to meet the diverse needs of those we aim to serve, encouraging a future where access to effective treatment is not just a privilege but a universal right.

Declarations

Competing Interests

Prior to completing this research I practiced as a breathwork facilitator. However, I have not been engaged as a breathwork facilitator since I began this PhD research in December 2020.

Author Contribution

R.B. conducted the experiment, analysed the data and wrote the entirety of the article

Data Availability

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

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