(RESEARCH ARTICLE)

Centering prayer in the treatment of bipolar disorder

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Abstract

Bipolar Disorder (BD), formerly manic-depressive illness or manic depression, is a lifelong mood disorder and mental health condition that causes intense shifts in mood, energy levels, thinking patterns, and behavior. These shifts can last for hours, days, weeks, or months, interrupting the ability to carry out daily tasks. The condition is manageable with medications, talk therapy, lifestyle changes, and other treatments, but the therapy results are unreliable in many patients. Most faith traditions have two forms of prayer: discursive and contemplative. Most believers practice discursive prayer. Medical research has shown the statistical healing effects of discursive prayer, but there is considerably less research on contemplative prayer. Hesse reports a method of teaching CP by asking a volunteer to help demonstrate the analogy between human and Divine relationships in the following quoted phases., Therefore, we hypothesize that CP might produce a significant depression improvement in BP patients. Two neurologists double-blind diagnosed five patients complaining of BD and five normal subjects. All cases expressed their belief in God, so CP is prayer, not non-theistic meditation. Patients will be free of medication and selected during depressive episodes. Among the trait markers are frontal alpha asymmetry,[55,56,] and changes in frontal qEEG cordance. A very stable QEEG pattern, consisting of frontal alpha asymmetry, was observed in all five patients. Hence, this pattern was used to compare QEEG before and after CP. Our main result showed that the focal left frontal Alpha increment disappeared after CP. Conclusion: CP is a promising tool for treating depression, organizing the function interplay among brain networks that subserve Cognition-emotion interactions in the prefrontal cortex.

Keywords: Bipolar depression; Centering prayer; Quantitative EEG; Prefrontal cortex.

1. Introduction

1.1. What is depression?

Depression (major depression, major depressive disorder, or clinical depression) is a common but serious mood disorder causing severe symptoms that affect how a person feels, thinks, and handles daily activities, such as sleeping, eating, and working. To be diagnosed with depression, the symptoms must be present for at least two weeks.[1-5]

1.1.1. Bipolar Disorder

Bipolar Disorder (BD), formerly manic-depressive illness or manic depression, is a lifelong mood disorder and mental health condition that causes intense shifts in mood, energy levels, thinking patterns, and behavior. These shifts can last for hours, days, weeks, or months, interrupting the ability to carry out daily tasks. Manic and hypomanic episodes are the main signs of the condition, and most people with bipolar disorder also have depressive episodes. A few types of BD

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involve experiencing significant fluctuations in mood, referred to as hypomanic/manic and depressive episodes. However, people with bipolar disorder are not always in a hypomanic/manic or depressive state. They also experience periods of normal mood, known as euthymia. The condition is manageable with medications, talk therapy, lifestyle changes, and other treatments, but the therapy results are unreliable in many patients.[2, 6-8]

1.1.2. Manic episodes

A key feature of BD is manic episodes. To meet the criteria for bipolar I disorder, there must have been at least one manic episode in the patient's life for at least a week, with or without ever experiencing a depressive episode. Manic is a condition in which there is a period of abnormally elevated or irritable mood and extreme changes in emotions, thoughts, energy, talkativeness, and activity level. This highly energized level of physical and mental activity and behavior is a change from the usual self and is noticeable by others. People who are in manic states may indulge in activities that cause them physical, social, or financial harm, such as suddenly spending or gambling extreme amounts of money or driving recklessly. They also occasionally develop psychotic symptoms, such as delusions and hallucinations, which can cause difficulties distinguishing bipolar disorder from other disorders, such as schizophrenia or schizoaffective disorder.[9-12]

1.1.3. Depressive episodes

During a depressive episode, the patient experiences a low or depressed mood and/or loss of interest in most activities, as well as many other symptoms of depression, such as:[11, 13-15]:

- Tiredness.
- Changes in appetite.
- Feelings of worthlessness and hopelessness.

The most effective treatment for BD is a combination of medication and psychotherapy. Most people take more than one drug, like a mood-stabilizing drug and an antipsychotic or antidepressant. Nonetheless, this condition is often resistant to treatment.[4, 16, 17]

Some authors have recommended the use of meditation to treat depression. Stress and anxiety are major triggers of depression, and meditation can alter the reaction to those feelings. Meditation trains the brain to achieve sustained focus and return to that focus when negative thinking, emotions, and physical sensations intrude.[18-20]

Scientists have shown the medial prefrontal cortex (mPFC) becomes hyperactive in depressed people. The mPFC is often called the "me center" because this is where information such as worrying about the future and ruminating about the past is processed. When people get stressed about life, the mPFC goes into overdrive.[21-24]

Another brain region associated with depression is the amygdala, or "fear center." This part of the brain is responsible for the fight-or-flight response, which triggers the adrenal glands to release the stress hormone cortisol in response to fear and perceived danger. Some authors concluded the increased activity in the prefrontal cortex after healing prayer may be associated with increased cognitive control over emotions. Healing prayer may help dissociate the trauma's memory from associated feelings, as evidenced by changes in the precuneus region. BP might be defined on the level of neuronal activity, and incongruence between prefrontal and limbic activities must be mentioned.[25-30]

The Bipolar Depression Rating Scale (BDRS) is a validated instrument for measuring depression in bipolar disorder. The scale has good internal validity and interrater reliability.[2, 31-33] The Bipolar Depression Rating Scale (BDRS) is the first clinician-administered depression rating scale tailored to the clinical profile of bipolar depression. It includes items for mixed rating features and is sensitive to many common phenomenological elements in bipolar depression, such as hypersomnia and hyperphagia, which are not picked up by conventional depression measures. Nonetheless, there are many other instruments to assess either maniac or depression symptoms.

The BDRS is a validated instrument for measuring depression in bipolar disorder. The scale has good internal validity, inter-rater reliability, and strong correlations with other depression rating scales.

1.2. Centering prayer

Most faith traditions have two forms of prayer: discursive and contemplative. Most believers practice discursive prayer. Medical research has shown the statistical healing effects of discursive prayer, but there is considerably less research on contemplative prayer. The Abrahamic faiths have practiced it for centuries: Judaism's Kabbalah, Christianity's

mysticism, and Islam's Sufism. Because they are wordless forms of listening to God, they can be taught on an interfaith basis called interfaith Centering Prayer (CP). CP is taught as a vehicle to open oneself up to the gift of contemplative prayer.[34-42]

Over the centuries, the wisdom literature and anecdotal observations in most faith traditions have reported improved quality of life when practicing CP. Several reports indicated it could lead to a contemplative state associated with marked hemodynamic and neuroelectric changes in brain regions, which are known to be involved in positive emotions, visual mental imagery, attention, or spiritual experiences. [43-48]

Hesse reports a method of teaching CP by asking a volunteer to help demonstrate the analogy between human and Divine relationships in the following quoted phases:[49] ACQUAINTANCESHIP is when I meet someone. It is more formal with the introduction of names. Taking Bill as my volunteer's name, I asked about his interests and agreed to meet again.

- FRIENDLINESS is my next meeting with Bill when we are less formal and on a first-name basis. We talk about having shared a meal since we both enjoy food.
- FRIENDSHIP is my next meeting with Bill, at which we pretend Bill is very ill. I offered to do anything to help, as I knew he would do the same for me. The acronym sometimes refers to them as ACTS, meaning adoration, contrition, thanksgiving, and supplication. The last, supplication, has been the most common for me over the years, the shortest of which is "help."
- UNION is my final meeting with Bill, during which we remain silent and embrace each other in a heartfelt hug. We know each other so well that no words are necessary. Words would get in the way.

We hypothesize that CP might produce a significant depression improvement in BP patients.

2. Methodology

Brain mapping" with quantitative electroencephalography (QEEG) is being commercially promoted as a way to predict response or nonresponse to treatments for major depressive disorder. The faster the nonresponse in a patient is identified, the thinking goes, the faster a different therapy can be tried. QEEG and QEEGt studies in patients with bipolar disorder might reveal amplitudes' asymmetries in brain oscillations. The importance of assessing BD patients with QEEGt is we can find the main brain structures changing their functional activity before and after CP. Consequently, QEEG harbors affective and cognitive components for assessing the current situation in cases diagnosed with affective disorders. QEEG is more cost-effective and practical than other electrophysiological studies and functional imaging methods. It increases the cooperation of non-compliant patients by providing objective evidence and alleviates self-stigmatization. The capability of these directly obtained data with high temporal resolution to support the diagnosis cross-sectionally is not a contribution to be underestimated. Some authors have affirmed frontal alpha asymmetry is fundamental among the trait markers in BP.[12, 50-52]

2.1. Protocol

Two neurologists double-blind diagnosed five patients complaining of BD and five normal subjects. All cases expressed their belief in God, so CP is prayer, not non-theistic meditation. Patients will be free of medication and selected during depressive episodes.

These patients presented most of the following symptoms:

- Symptom 1. Pervasive Sadness
- Symptom 2. Loss Of Interest Or Pleasure
- Symptom 3. Fatigue And Low Energy
- Symptom 4. Changes In Sleep Patterns
- Symptom 5. Changes In Appetite And Weight
- Symptom 6. Feelings Of Worthlessness Or Excessive Guilt
- Symptom 7. Difficulty Concentrating Or Making Decisions
- Symptom 8. Psychomotor Agitation Or Retardation
- Symptom 9. Recurrent Thoughts Of Death Or Suicidal Ideation
- Symptom 10. Loss Of Touch With Reality

The five patients were selected free of drugs in the last 20 days before the study and during the depressive phase, excluding also a history of neurological and another psychotic diseases. Normal subjects did not have any history of neurological, systemic disease, or head trauma. Each patient underwent a CT scan study to exclude neurological lesions.

The sample included five subjects from 42 to 53 years old, three males and two females. Normal subjects were paired in gender and age with patients.

According to Hesse's method, the patients and normal subjects were trained on CP for 15 days. Once all cases were trained, three weekly sessions were run for two months.

The BDRS scale was used to assess each patient and the normal subjects. Moreover, the Hamilton Depression Scale (HDS) was applied in all cases.

We used the following CP methodology as the successive steps for CP training, according to Hesse:

- STEP 1: Choose a sacred word to symbolize your intention to consent to God's presence and action.
- STEP 2: Sitting comfortably with eyes closed, settle briefly; silently introduce the sacred word.
- STEP 3: Return ever-gently to the sacred word when engaged with thoughts.
- STEP 4: At the end of the prayer period, remain silent with your eyes closed for a couple of minutes.

Subjects were studied in our laboratory at a controlled temperature from 24 to 26^0 Celsius, with noise attenuation and dimmed lights. EEG records were obtained by the MEDICID 05 system (Neuronic S. A.), with the following technical parameters: gain of 20,000, filters pass-band between 0.3-50 Hz, 60 Hz "notch" filter, level of noise 2μv RMS and environmental temperature of approximately 23 °C. A sampling period of 5 ms was used. Nineteen monopolar derivations of the International10/20 System (FP1, FP2, F3, F4, C3, C4, P3, P4, O1, O2, F7, F8, T3, T4, T5, T6, Fz, Cz, Pz) were recorded using scalp electrodes of copper coated with silver chloride, with linked ear lobes as a reference. Electrode-skin impedance was less than 5 KΩ. Artifact-free segments of 2.56-sec duration were selected through visual editing by an expert electroencephalographer, who eliminated obvious changes such as drowsiness. This way, twenty-four closed-eyes EEG segments were collected from each subject for QEEG analysis. Using each frequency in every channel, the complex covariance matrix known as the cross-spectra was calculated with Fast Fourier Transform (FFT, Tim domain EEG data was transformed to the frequency domain for each of 49 discrete frequencies from 0.39 Hz to 70 Hz in steps of 0.39Hz.

Subsequently, broad-band spectral parameters (BBSP) were calculated for the frequencies bands of the EEG, defined as delta: 1.5-3.5 Hz, theta: 4-7.5 Hz, alpha:8-12.5 Hz, beta: 13-19 Hz, Gamma: 20-70 Hz, and Total Power: 1.5-70 Hz. These results were for comparison with the Cuban QEEG norms, which had been constructed for a sample of 211 normal subjects between the ages of 5 and 97. Absolute Power (AP) from these classic frequency bands, from eyes-closed records, were the QEEG variables studied in our research. These APs represent the energy content in each frequency band or the whole spectrum and can be represented graphically as the area of those frequency bands under the power spectrum. Z transform was applied to these data, and the probabilistic statistical significance maps were obtained. We selected the maximum and minimum Z values within each frequency band and Totals, relative power (RP). The five neighboring Z values of these were also chosen. Then, the median Z from these five neighboring maximum and minimum points was estimated to summarize the information and reduce the number of variables. For offline ulterior processing, the records were later exported to an ASCII file using the facilities of the MEDICID-05 system, which contained a matrix of the original EEG values corresponding to the segments selected by the specialists. For further quantitative analysis, three ASCII files were selected for every test and from each subject. These files contained the basic EEG information of the experimental sections.

2.2. Statistical Analysis

Normal distribution for absolute and relative QEEG PSD values and functional magnetic resonance imaging (fMRI) parameters were achieved through log-normal transformations and confirmed with the Shapiro-Wilk's W test. Based on the general linear model assumption, the multifactor ANOVA test for repeated measures was used to compare patients vs. normal subjects.

Results were tabulated, and graphics were created to analyze and present this study better. The StatSoft, Inc. (2007). STATISTICA (data analysis software system), version 8.0. (www.statsoft.com) was used for all the analytical processes.

2.3. Ethical Issues

Written informed consent was obtained from each subject, and a form was approved by the "Helsinki" committee of the Institute of Neurology and Neurosurgery under the supervision of the Ministry of Health of Cuba.

3. Results

Among the trait markers are frontal alpha asymmetry,[55,56,] and changes in frontal qEEG cordance. A very stable QEEG pattern, consisting of frontal alpha asymmetry, was observed in all five patients. Hence, this pattern was used to compare QEEG before and after CP.
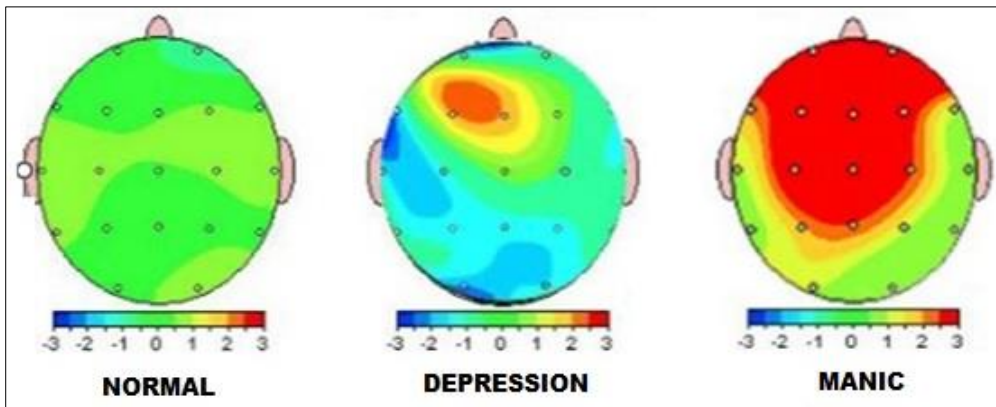

Figure 1 With each condition, there is a change in different areas of the brain with more than one standard deviation from zero, either +1 to +3, indicating an increase in brainwave activity in this area, causing over-activity of the brainwaves as you see in yellow and red for depression and maniac.
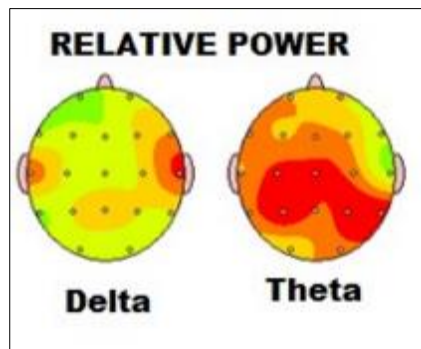

Figure 2 In depression, a significant increment of delta and theta activity was found in the right frontal-temporal lobe
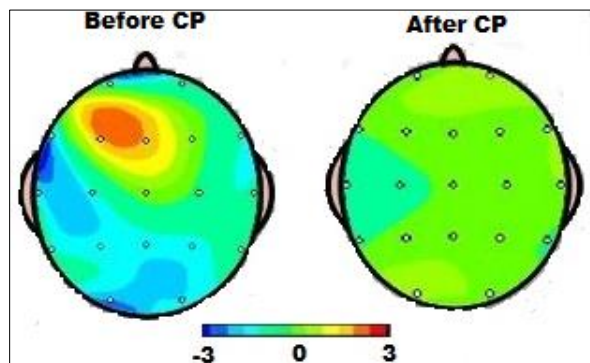

Figure 3 The most frequent QEEG pattern was a focal significant increment or Alpha relative power. The maps show the grand average of the five patients before and after CP. Colors (red and yellow) show a statistical increment of 3 standard deviations.

Figure 3 shows a significant CP effect in solving the QEEG abnormality in BP patients during the depressive phase. QEEG comparison in normal subjects did not show any statistical difference.

4. Discussion

Bipolar disorder (formerly called manic-depressive illness or manic depression) is a mental illness that causes unusual shifts in a person's mood, energy, activity levels, and concentration. These shifts can make it difficult to carry out day-to-day tasks. A disorder associated with episodes of mood swings ranging from depressive lows to manic highs.[2, 6-8, 53]

The exact cause of bipolar disorder is not known, but a combination of genetics, environment, altered brain structure, and chemistry may play a role. Manic episodes may include symptoms such as high energy, reduced need for sleep, and loss of touch with reality. Depressive episodes may include symptoms such as low energy, low motivation, and loss of interest in daily activities. Mood episodes last days to months at a time and may also be associated with suicidal thoughts. Treatment is usually lifelong and difficult and often involves a combination of medications and psychotherapy, which are not efficient.[54-57]

The past decade has seen much progress in describing the complex interplay among brain networks that subserve Ccgnition-emotion interactions in prefrontal Ccrtex. Orbito-frontal cortex (OFC) receives input from subcortical structures and sensory cortex and computes emotional appraisal, tagging the stimulus as either punishment or reward in the context of one's current needs. Anterior insula (AI) integrates this information with afferent projections from the body, giving rise to emotional awareness or feeling. Ventromedial PFC (vmPFC) is closely associated with emotional experience and evaluation of emotional relevance for the self (Ochsner et al., 2004). The prefrontal cortex is located at the front of the frontal lobe. Studies suggest people with bipolar disorder may have decreased gray matter volume in the prefrontal cortex, specifically in the subgenual prefrontal cortex (SGPFC), which appears to regulate mood. Subcortical structures.[21, 25, 58-61]

Our main result showed that the focal left frontal Alpha increment disappeared after CP.

Even Conventional EEG, per se, shows from 20% to 40% abnormalities in depressed patients. Although unspecific, these changes help in differentiating a normal or nearly normal EEG of depression from a similarly impaired patient with severe EEG slowing suggestive of functional or structural decline regardless of diagnosis. Nonetheless, the accuracy of these QEEG findings in detecting depression has been demonstrated and replicated in large samples with 72–93% sensitivity and 75–88% specificity. Consequently, QEEG harbors affective and cognitive components for assessing the current situation in cases diagnosed with affective disorders. QEEG is more cost-effective and practical than other electrophysiological studies and functional imaging methods. It increases the cooperation of non-compliant patients by providing objective evidence and alleviates self-stigmatization. The capability of these directly obtained data with high temporal resolution to support the diagnosis cross-sectionally is not a contribution to be underestimated. These directly obtained data with high temporal resolution contribute even more to clinical assessment in regard to treatment response monitorization.

Additionally, it probably carries information about the longitudinal course of the symptoms and residual symptoms in periods of wellness. Future studies should target depression subtypes, bipolar disorder subtypes, course features, and comorbid.[12, 62-66]

Several reports indicated the contemplative state is associated with noticeable hemodynamic and neuroelectric deviations in several brain regions involved in positive emotions, visual mental imagery, attention, or spiritual experiences. [48, 67-71] Laureys et al. have investigated the benefits of meditation, hypnosis, and meditation interventions in clinical applications to improve available therapeutic options in oncology. These authors also affirm further neurophysiological and neuroimaging studies, such as the ones focused on default mode network activity on larger samples, would be useful in understanding the neural basis of these specific meditation states better.[72-77]

5. Conclusion

Hence, CP is a promising tool for treating depression, organizing the function interplay among brain networks that subserve Cognition-emotion interactions in the prefrontal cortex.

Limitations

This study has several limitations, principally the relatively small number of patients. We plan to study a larger number of BD patients both in depression and manic phases.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest is to be disclosed.

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