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Physical activity levels in Brazilian outpatients with bipolar disorder

Brief Running Head: Physical activity in outpatients with bipolar disorder

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Abstract

Objectives: The present study aimed to evaluate physical activity (PA) levels in individuals with bipolar disorder. Specifically, it sought to compare these levels across mood states (mania, depression, euthymia). **Methods:** A cross-sectional study utilizing both subjective (Simple Physical Activity Questionnaire-SIMPAQ)

and objective (accelerometers) measures to assess PA. Symptom severity was assessed using The Young Mania Rating Scale (YMRS) and the Hamilton Depression Rating Scale (HAM-D). Mood states were detected and assessed using the YMRS and HAM-D scales. One-way ANOVAs were used to compare differences in PA and sedentary behavior (SB) across mood states. Correlates were assessed using the Pearson correlation coefficient. **Results:** The sample included 43 individuals, 81.5% female, mean age of 47 years (SD=10.4). Regarding mood states, 17 patients were categorized as euthymic, 11 as manic and 15 as depression. The mania group exhibited the highest PA levels, mean = 206 minutes MVPA/week (SD=146.80), while the depression group was the most sedentary, mean = 428 (SD=224.44) minutes/day. ANOVA revealed significant differences in PA levels among the mood states (mania and depression) in accelerometry MVPA ($F = 3.598$; $p = 0.037$; $\eta^2 p = 0.152$) and SIMPAQ MVPA (euthymic, mania, depression) ($F = 7.373$; $p = 0.002$; $\eta^2 p = 0.269$). **Conclusion:** The mania group demonstrated higher PA levels, whereas the depression group exhibited more SB. These findings highlight distinct PA patterns that may inform clinical management and treatment of bipolar disorder.
Keywords: Bipolar disorder, mood states, physical activity, sedentary behavior.

Introduction

Bipolar disorder (BD) is a mental health condition characterized by extreme mood swings that include emotional highs (mania or hypomania) and lows (depression) (1), accompanied by alterations in motor activity and energy levels (2). It is generally estimated that in 2019, BD affects approximately 2% of the global population, approximately 40 million people (3,4). The age of onset for BD is mostly at late adolescence or early adulthood (1). However, some individuals may experience symptoms in childhood (5,6) and others will not experience symptoms until later in life (7).

Individuals with BD present a significant risk of premature mortality, and a reduction in life expectancy compared to the general population, with estimates suggesting a shortened lifespan of 12 to 14 years on average (1). This is partially explained by the heightened risk of physical health conditions, including metabolic syndrome, obesity, type 2 diabetes (8,9) and cardiovascular diseases emerging as the most prevalent cause of death among individuals with this condition (3,10,11). Such risks may arise from a range of interrelated factors, including the side effects of psychopharmacological treatments, metabolic changes, and lifestyle behaviors such as low levels of physical inactivity (12,13).

Vancampfort et al. (2017) in a systematic review and meta-analysis, found that individuals with mental illness presented higher levels of sedentary behavior (SB) compared to the general population (10). . Specifically, the authors showed that people with BD spent more time in sedentary behavior (615 min per day in sedentary time, 95% CI: 456-774) than those with major depressive disorder (414 min per day, 95% CI: 323-505) and schizophrenia (493 min per day, 95% CI: 400- 586) (10). Conversely, they also found that people with BD performed significantly more moderate-vigorous physical activity (MVPA), spending an average of 84.2 min per day (95% CI: 60.3-108.1) engaged in active time, compared to those with major depressive disorder (28.8 min per day, 95% CI: 17.8-41.8) and schizophrenia (37.5 min per day, 95% CI: 29.1-46.0) (10).

Studies utilizing actigraphy, a method for measuring physical activity (PA) and SB, have provided support for the claims regarding PA patterns in individuals with BD and depression (14,15). Cheniaux et al. (2018) appointed that actigraphy studies have consistently demonstrated a decrease in motor activity among individuals experiencing depressive episodes compared to individuals without mood disorders or in a euthymic state (16). However, more studies evaluating and investigating these differences between manic, depressive and euthymic states are needed.

According to the literature, increased motor activity may be more important than changes in mood in characterizing mania and represents a central characteristic of the disease (14). Cheniaux et al. (2019) reinforce the view of hyperactivity and motor retardation as cardinal markers for mania and depression, respectively (17). Neurobiologically, during manic episodes, there is often an increase in dopaminergic activity, which is linked to elevated mood, increased energy, and impulsivity (18). Additionally, heightened norepinephrine levels and decreased serotonin activity may also play a role in the manic state (19). In contrast, depressive episodes are marked by lower levels of serotonin, norepinephrine, and dopamine, resulting in symptoms like anhedonia, reduced energy, and cognitive impairment (18). This dysregulation of neurotransmitters is a fundamental characteristic of the depressive state, being this phase linked to a decrease in gray matter volume in regions such as the prefrontal cortex and hippocampus, both of which are essential for mood regulation and cognitive functioning (18,19).

Thus, investigating which category of symptoms – mood or energy/activity – represent the true cardinal symptoms of the disorder may help provide important information about the occurrence and severity of bipolar disorder clinical states. In light of this, the present study aimed to evaluate the PA levels in individuals with bipolar disorder. Specifically, to compare these levels according to the mood states (mania, depression, euthymia).

Methods

This is a cross-sectional study. The sample was composed of individuals of both sexes, aged between 28 and 64 years, diagnosed with a mental disorder and undergoing outpatient treatment at the Institute of Psychiatry of the Federal University of Rio de Janeiro (IPUB/UFRJ). Patients were invited to participated randomly by our staff at the Bipolar Disorder Outpatient Clinic at the Institute of Psychiatry IPUB/ UFRJ. The participants were not taking part in any program involving physical activity at the Bipolar Disorder Outpatient Clinic. Other variables such as previous physical activity practice or being involved in physical activity in their routine were not controlled. Exclusion criteria were defined as patients with mobility problems or incomplete accelerometer data. One participant had to be excluded on the basis of incomplete accelerometer data and two participants were excluded due to the loss of the accelerometer. The procedure was approved by the research ethics committee from Institute of Psychiatry of the Federal University of Rio de Janeiro (IPUB/UFRJ), registration CAAE: 48245021.7.0000.5263.

After signing the Informed Consent Form, participants completed the following evaluations at the baseline: anamnesis containing sociodemographic questions; application of the *Mini International Neuropsychiatric Interview (M.I.N.I. Plus)*; *Hamilton Depression Rating Scale (HAM-D)*; *Young Mania Rating Scale (YMRS)*; application of the *Simple Physical Activity Questionnaire*

(SIMPAQ); placing the accelerometer *(Actigraph wGT3X-BT)* on the patient and removing it after 7 days.

In the present study, we applied the SIMPAQ once (at the baseline), when participants self-reported their activity for the past week, followed by a week where PA was monitored using the accelerometer device. In this sense, the measurement periods for the two instruments, SIMPAQ and accelerometers, were not related to the same week. Moreover, the mood states were assessed based on the Hamilton Depression Rating Scale (HAM-D) and the Young Mania Rating Scale (YMRS) scores.

Instrument details:

Anamnesis

Contains personal and sociodemographic data such as name, address, telephone number, date of birth, sex, marital status, education, income, health history, use of medication, practice of PA.

Mini International Neuropsychiatric Interview (M.I.N.I. Plus)

The MINI is a brief (15-30 minutes) standardized diagnostic interview, compatible with DSM-III-R/IV and ICD-10 criteria, that is intended for use in clinical practice and research in primary care and psychiatry. Can be used by clinicians after brief training (1 to 3 hours). The Plus version of MINI, which is more detailed, generates positive diagnoses of the main DSM-IV psychotic and mood disorders (20).

Hamilton Depression Rating Scale (HAM-D)

The HAM-D is a scale for assessing depressive symptoms. It features 17 items depending. The items are evaluated within a determined period of days according to the intensity and frequency of the patient's symptoms using a scale that varies from “absent” to “quite severe”. The scale varies between zero and 56 points, with scores above 23 points identifying severely depressed patients; between 19-22 points, moderately depressed patients; between 14-18 points, mildly depressed patients, and scores lower than seven indicate euthymia (21).

Young Mania Rating Scale (YMRS)

The Mania Rating Scale (YMRS) consists of eleven items, each with five explicitly defined degrees of severity. A severity rating is assigned to each of the eleven items, based on the patient's subjective report of their clinical condition during the previous 48 hours. The scale is administered through an interview, is intended to be administered by a trained clinician, and lasts approximately fifteen to thirty minutes (22).

Simple Physical Activity Questionnaire (SIMPAQ)

SIMPAQ is an interview format instrument that assesses the level of incidental or unstructured physical activity, the time the individual spends in bed and participation in structured physical exercise. SIMPAQ has been translated into several languages (French, German, Spanish, Portuguese, Farsi and most Scandinavian languages). A validation study, comparing data obtained via SIMPAQ, with objective accelerometer-based measurements, was carried out in 2016 and 2017 (24).

Accelerometer (Actigraph wGT3X-BT)

The ActiGraph wGT3X-BT captures and records raw, high-resolution acceleration data, which is converted into a variety of objective activity measures using publicly available algorithms developed and validated by members of the academic research community. Measures include: gross acceleration; activity counts; energy expenditure; MET rates; steps taken; PA intensity; sedentary time. In the present study, the participants were asked to wear the accelerometer on their right hip during waking hours for seven consecutive days. They were asked to remove the accelerometer only to perform water activities (i.e., showering, swimming) and sleep. The Actigraph wGT3X-BT was initialized in a software called ActiLife v6.13.3. When the participants returned with the accelerometer, we downloaded the data collected by the devices into software and the systems converted it into summary data for processing. Summary or “epoch” data is essentially raw data that has been filtered to be run through algorithms to produce outputs. The raw data was summed into data blocks called “epochs” and the G-values were converted into activity counts, which are then used to generate data numbers. Summary data is used to generate the results displayed in ActiLife. The base unit for the summary data (which is then run through various algorithms within the software to produce outputs) is called activity counts. Activity counts are essentially a combination of the intensity and frequency of movement within the epoch. The filtering process by which counts are produced is proprietary to ActiGraph. There are filters in place that are coded into the device firmware, that will exclude any ‘noise’ that is outside of the spectrum of normal human ambulatory movement. This includes small tremors and vibrations found naturally in the environment and also includes faster accelerations such as driving/riding in a car. After this process (downloaded the data collected by the devices into the ActiLife), we used Troiano's algorithm to validate accelerometer usage time (25). Troiano's algorithm looks for basic patterns in the data and classifies these patterns as times of use or non-use, essentially filtering out these periods for further analysis (25). Non-use is estimated by looking at periods of little or no activity and applying algorithms to these periods to determine whether the user was actually using the device or not. With regard to partial abandonment of the accelerometer, we adopted zero value records during a certain sequence of time (e.g. 60 minutes of consecutive zeros) as a criterion for detecting non-use time. For data to be considered valid and included in the analysis, participants had to record activity for a minimum of four days, comprising at least three weekdays and one weekend day, and 8 hours of accelerometer use per day, in accordance with previous literature (26-28). In this study, we applied the following cut-points to assess the time spent in different activity categories: sedentary activities (<100 counts per minute), light-intensity PA (100-1951 counts per minute), and MVPA (≥1952 counts per minute) (29).

Data analysis

Quantitative data

To analyze the normality and homoscedasticity of the data, the Shapiro Wilk and Levene tests were performed, respectively. Descriptive analyses were performed using means and standard deviations for continuous measures and frequencies for categorical variables. One-way ANOVAs were used to evaluate the interaction between mood states groups on PA and SB levels. Correlates were assessed using the Pearson correlation coefficient. Correlations were significant at the 0.05 level (2-taled) and at the 0.01 level (2-tailed). We used the

Statistical Package for the Social Sciences (SPSS126.0 (Armonk, NY, USA) to perform the statistical analyses.

Results

The sample was composed of 43 individuals, 81.5% female, 42% with monthly income of up to 3 salaries, mean age = 47 years (SD=10.4), mean body mass index (BMI) = 30.7 (SD=5.4), indicating obesity (full details in table 1). In the total sample, at the baseline, the average self-reported MVPA was 224 minutes/week (SD=274.5), while the average self-reported sedentary time was 324 minutes/day (SD=204.34). According to accelerometer measures, 14 individuals (32.5%) met the recommended guidelines of PA, performing at least 150 minutes/week of MVPA, while 29 individuals (67.5%) did not meet the recommended guidelines.

According to SIMPAQ, 22 individuals (51%) were sufficient actives, performing at least 150 minutes/week of MVPA, while 21 (49%) did not meet the recommended guidelines.

The accelerometer measures related to the following week showed an average of MVPA of 137 (SD=107.3) minutes/week and an average of 377 minutes/day (SD=193.93) in sedentary time. In addition, the total sample performed an average of 4.835 steps/day (SD=2.354) according to actigraphy measures.

According to HAM-D and YMRS scores, a total of 17 patients were categorized as euthymic, 11 as manic and 15 as depression. Considering the subjective MVPA levels, the euthymic group reported an average of 193 (SD=124.36) minutes/week of MVPA, the mania group reported an average of 453 (SD=442.63) minutes/week of MVPA, while the depression group reported an average of 93 (SD=82.80) minutes/week of MVPA. Considering SB, the euthymic group reported an average of 321 (187.60) minutes/day being sedentary, the mania group reported an average of 306 (SD=226.49) minutes/day of SB, while depression group reported an average of 342 (SD=218.63) minutes/day of SB (full details in table 2). In week measurement of SB, the euthymic group reported an average of 2.398 (SD=1.385) minutes/week being sedentary, the mania group reported an average of

2.271(SD=1.469) minutes/week of SB, while depression group reported an average of 2.130 (SD=1.537) minutes/week of SB.

Considering the recommended guidelines of PA, in subjective measures, 10 euthymic participants (58.8%) met the guidelines, performing at least 150 minutes/week of MVPA. The manic patients that met the recommended guidelines of PA were eight participants (72.7%), and regarding the depression group, three participants (20%) met the recommended guidelines of PA.

In MVPA objective measures, the euthymic performed an average of 125 (SD=72.70) minutes/week of MVPA, the mania group performed an average of 206 (SD=104.90) minutes/week of MVPA, while the depression group performed an average of 102 (SD=89.21) minutes/week of MVPA. In SB, the euthymic group spent an average of 368 (SD=179.52) minutes/day being sedentary, the mania group spent an average of 321 minutes/day (SD=200.84) in SB, and the depression group spent an average of 428 (SD=224.44) minutes/day in SB. In week measurement of SB, the euthymic group spent an average of 2.627 (SD=1.286) minutes/week being sedentary, the mania group spent an average of 2.373 (SD=1.164) minutes/week of SB and the depression group spent an average of 2.973 (SD=1.501) minutes/week of SB.

Regarding PA guidelines and objective measures, five euthymic (29.4%) participants met the recommended guidelines, performing at least 150 minutes/week of MVPA. In the mania group, six participants (54.5%) met the guidelines, while in the depression group, three participants (20%) met the PA guidelines.

Accelerometry assessed MVPA suggests that the mania group performed significantly higher levels of PA than depression group ($F = 3.598$; $p = 0.037$; $\eta^2p = 0.152$). This is confirmed by subjective measures of MVPA where a main effect is also found ($F = 7.373$; $p = 0.002$; $\eta^2p = 0.269$) showing that the mania group performed significantly higher levels of PA than both groups, depression and euthymic, respectively (full details in table 2).

Regarding correlates, SIMPAQ MVPA min/week were positive associated with elevated mood and affect ($r = 0.469$; $p = 0.001$) and motor activity ($r = 0.472$; $p = 0.001$) subdomains of YMRS (full details in the table 3).

Table 1. Demographic characteristcs.

	Total sample (N = 43)
Sex - N (%)	
Female	35 (81.5%)
Age - mean (SD)	47 (10.40)
Body mass index (BMI) – mean (SD)	30.8 (5.42)
Income range – N (%)	
1-3 minimum wages	27 (64.2%)
3-6 minimum wages	11 (26.2%)
6-9 minimum wages	2 (4.8%)
More than 9 minimum wages	2 (4.8%)
Marital status – N (%)	
Single	18 (42%)
Married	11 (25.5%)
Divorced	11 (25.5%)
Widowed	1 (2.5%)
Did not inform	2 (4.5%)
Scholarity – N (%)	
Postgraduate	7 (16.3%)
Incomplete college	7 (16.3%)
Complete College	7 (16.3%)
Complete High School	11 (25.5%)
Incomplete High School	4 (9.3%)
Complete Elementary School	1 (2.3%)
Incomplete Elementary School	6 (14%)
Color/race	
Black/brown	23 (53.5%)
White	20 (46.5%)
Mood states – N (%)	
Euthymia	17 (39.5%)
Mania	11 (25.5%)
Depression	15 (35%)
YMRS score – mean (SD)	
Euthymia	2.94 (4.40)
Mania	11.82 (2.08)
Depression	2.87 (2.66)
HAM-D score – mean (SD)	
Euthymia	3.94 (3.92)
Mania	6.91 (4.48)
Depression	13.60 (5.85)

Table 2. Accelerometer and SIMPAQ measures among mood states.

	All sample (N=43)	Euthymia (N=17)	Mania (N=11)	Depression (N=15)	F (Main effect)	p	Partial Eta Squared (n^2p)
Accelerometer MVPA min/week (SD)	137 (107.30)	125 (72.70)	206 (144.90)*¶	102 (89.21)*¶	**3.598[a]**	**0.037***	**0.152**
SIMPAQ MVPA min/week (SD)	224 (274.50)	193 (124.36)*¶	453 (443.00)*¶	93 (82.80)*¶	**7.373[a]**	**0.002***	**0.269**
Accelerometer sedentary time min/day (SD)	377 (193.93)	368 (179.52)	321 (200.84)	428 (224.44)	1.004	0.376	0.048
SIMPAQ sedentary time min/day (SD)	325 (204.34)	321 (187.60)	306 (226.49)	342 (218.63)	0.097	0.907	0.005

Table 3. Physical activity, sedentary behavior levels and YMRS correlates.

	Accelerometer MVPA min/week	SIMPAQ MVPA min/week	Accelerometer sedentary time min/day	SIMPAQ sedentary time min/day
Elevated mood and affect (YMRS)	0.359	**0.469****	-0.078	-0.144
Motor activity (YMRS)	0.361	**0.472****	-0.114	-0.027
Sexual interest (YMRS)	0.176	0.121	0.005	0.113
Sleep (YMRS)	-0.001	0.034	-0.068	-0.026
Irritability (YMRS)	-0.166	-0.016	-0.175	-0.022
Speech (YMRS)	0.427	0.326	-0.005	-0.076
Thought disorder (YMRS)	-0.117	0.106	-0.216	-0.235
Content (YMRS)	-0.132	-0.074	-0.261	0.080
Aggressive disruptive behavior (YMRS)	-0.034	0.020	0.090	0.020
Appearance (YMRS)	-0.122	-0.120	0.090	0.122
Insight (YMRS)	0.115	-0.075	-0.138	-0.195
Total (YMRS)	0.200	0.242	-0.270	-0.048

** Correlation is significant at the 0.001 level (2-tailed).

Discussion

Our study presents findings that highlight specific characteristics distinguishing the different mood states in bipolar disorder regarding PA levels. Considering the mood states and the self-reported PA and SB at the baseline, manic patients were the most active group, while the depression group were the most sedentary. In the following week, the same pattern was observed in accelerometer measures. The mania group was the most active, and the depression group the most sedentary and less active, in line with other studies, where manic patients exhibited higher PA levels than healthy controls (15), euthymic and depressive individuals (30). Considering the total sample and accelerometer measures, 67.5% of the patients did not meet the PA guidelines, in accordance with previous study involving bipolar individuals (31), but they weren't that far from reaching the recommendations of MVPA weekly levels. Regarding SB levels, our findings indicated less sedentary time compared to other studies utilizing accelerometer measurement (31,32).

We found a significant difference between mood states in PA levels (subjective and objective). The subjective measures showed greater differences between the state of moods. The manic patients self-reported higher levels of PA, followed by euthymic, being the depression group the least active. However, previous studies indicated concerns about self-reported questionnaires, since bipolar patients tend to overestimate their PA levels and underestimate SB (33–35). According to the accelerometer, in the following week, the mania group was in fact the most active, maintaining the same pattern and showing greater difference especially compared to those categorized as depression group. This finding is in line with previous evidences, reinforcing that mood states can influence behavior patterns, being mania associated with more exercise in bipolar individuals and depression associated with less exercise (36). Conversely, Simjanoski et al. (2023) found no significant differences in unhealthy lifestyle patterns among BD patients across different mood episodes (depressive, manic, and manic with mixed features), indicating that unhealthy lifestyle behaviors are prevalent in these individuals regardless of the polarity of their mood episode (37).

According to our findings, motor activity and elevated mood and affect assessed by YMRS were positively correlated with subjective MVPA levels.

Indeed, during manic episodes, there is typically an increased activation in brain regions associated with reward processing and emotional regulation, including the anterior cingulate cortex, striatum, and amygdala (18). This heightened activation may play a significant role in the euphoric mood, elevated energy levels, and impulsive characteristics of mania (18,19) and could lead to an exaggerated sense of confidence, motivation, and pleasure-seeking behavior. The brain's reward system becomes overactivated, causing individuals to perceive their actions as more successful, desirable, and impactful than they actually are. All of these factors may provide valuable insights into understanding their PA behavior during this mood state and could, to some extent, explain the elevated PA levels observed in our study. Indeed, changes in energy and activity levels seem to be more informative than mood changes during this phase (21) and track this behavior pattern through the use of accelerometers could be a feasible alternative. Furthermore, actigraphy studies have demonstrated that patients experiencing mania or hypomania exhibit higher levels of PA compared to other groups (15,30). These findings are in accordance with our data, since the mania group was the only one that met PA guidelines. Thereby, this is consistent with the clinical presentation of mania, which includes increased energy, reduced need for sleep, and heightened goal-directed activities (17,38).

On the other hand, in accelerometer measures, our findings indicated that depression group was the most sedentary, compared to mania and euthymic groups. This finding aligns with existing literature, as several studies found a decrease in PA levels in patients with depression compared with controls (39,40). During depressive episodes, connectivity in networks responsible for emotion regulation, including the prefrontal cortex and amygdala, is often diminished. This decrease in connectivity can result in difficulties with emotional processing and regulation (18). Moreover, in this mood state, individuals could show a significant decrease in motor activity, characterized by psychomotor retardation, fatigue, and lack of motivation (40,41). In accordance, previous studies showed higher and concerning levels of SB in bipolar disorder population, but did not specify in which mood state this behavior was observed (10,31,33,35). Furthermore, Vancampfort et al. (2017) found interesting and surprising findings. They showed that individuals with BD were the most sedentary diagnostic subgroup compared to other disorders, presenting high levels of SB, almost double the amount of sedentary time compared to our findings for the total sample, in both subjective and objective measures. These findings reinforce the fact that SB and PA should be analyzed independently, especially in this population. However, as mentioned above, the authors did not present data on the mood states of participants with BD and this issue could be a type of bias in relation to this specific diagnostic subgroup, impacting on PA and SB levels. (10).

As such, psychomotor activation could be an important key factor in classified bipolar phases and subtypes (40). Tracking PA can also inform treatment adjustments, helping clinicians determine adequate approaches and understanding the dynamics of the disorder. Despite the well-documented beneficial effects of PA, previous studies showed that frequent exercise was associated with mania in individuals with bipolar disorder (36,42). Besides, it remains unclear whether the exacerbation of manic symptoms is a cause or consequence of increased PA (43). In light of this, future research focused on mood changes and swings should be implemented and adequately investigated in BD patients.

The present study has some limitations. First, the limited sample size could not be representative of the BD population. Secondly, we assessed self-reported PA via SIMPAQ, at baseline (questioning about the previous week), followed by a week in which PA was monitored using an accelerometer, thus being the measurements referring to two weeks different. As strength, our study assessed objective measures (accelerometer) to accurately assess PA and SB levels, presenting concise and accurate data. Therefore, our findings elucidate the importance of perceiving manic episodes based on behavioral changes in PA patterns, since higher levels of energy or motor activity should be considered a core symptom of mania (16).

In summary, our findings underscore the importance of assessing PA behavior in BD patients, specifically through the use of accelerometers (objective measurement), allowing them to accurately assess PA levels. Continuous monitoring of exercise behavior and mental state could be an important tool to detect early signs of mania. Furthermore, the practice of PA in BD should be prescribed with caution, considering the different stages of the disorder. In the depressive state, moderate aerobic exercise (walking, light jogging, swimming) can be useful for reducing depressive symptoms (44). Similarly, group exercise can help combat social isolation. Shorter, more frequent exercise sessions can be easier to adhere to than long workouts. In the manic phase, caution is advised, as intense exercise can exacerbate agitation and motor activity (45,46). Activities that require focus and control, such as yoga and tai chi, may be more suitable, as well as taking care with the timing of the activity, since training at night can further compromise the sleep of these individuals. In the euthymic phase, structuring the exercise routine in a balanced way can be beneficial in contributing to long-term mood stability (47,48). Besides, encouraging social support systems and professional guidance can enhance adherence to balanced PA programs, improving overall quality of life.

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