Original Article

Physiotherapy in psychiatric ward: implication on psychopathology dimensions and subjective well-being

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SUMMARY

Objective

This study evaluates a physiotherapy program's impact on psychopathology and psychological well-being of hospitalized psychiatric patients.

Methods

From January to June 2024 a physiotherapy programme took place twice per week for 45 minutes each at the SPDC of the "San Camillo de Lellis" Hospital. All patients were asked to voluntarily participate. On the base of their choice we divided them into a Physiotherapy Group (PG) and Control Group (CG). Evaluations have been implemented at admission (T0) and discharge (T1) the GHQ-12 and BPRS have been administered.

Results

The PG (n=35) and CG (n=32) do not differ by demographics (age P=.60, edu P=.52, Gender P=.21), SUD (P=.64) and the length of hospitalization (P=.26) while differ in primary diagnoses (P=.014). Both groups showed significant improvements in well-being (GHQ-12) and psychopathology (BPRS) from T0 to T1 (P < .001). Interactions between Time and Group were significant for psychological well-being (P < .05), BPRS total score (P < .01), Tension, Unusual Thought Content, Excitement, and Disorientation (P < .05).

Conclusions

These findings align with previous research supporting physical activity's benefits in psychiatric conditions. The physiotherapy program significantly improved subjective well-being and reduced psychopathological severity, particularly in Tension, Unusual thought content, Excitement, and Disorientation symptoms.

A physiotherapy program for acute psychiatric inpatients shows promise as a low-cost, complementary treatment, improving well-being and reducing psychopathological symptoms. These preliminary data suggest that a structured physical activity intervention carried out by qualified personnel in mental health setting could represent a trans-categorical intervention.

Key words: physical activity, psychopathology, well-being, physiotherapy, integrated intervention

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Introduction

In the last decade, great importance has been placed on the use of physical activity as a supportive therapy for psychiatric disorders [1-5]. International guidelines for treating mental disorders have begun to incorporate the available scientific evidence and propose that physical activity and exercise should be integrated into mental health care [6-10]. In 2018 the European Psychiatric Association's guidelines on the promotion of physical activity in people with mental illness state that there is considerable em-

pirical evidence supporting the use of physical activity interventions in treating major depressive disorder and schizophrenia spectrum disorders [7].

The importance of physical therapy in mental disorders has also been recognized by the World Confederation of Physical Therapy that established a specialty group named The International Organization of Physical Therapy in Mental Health (IOPTMH). The IOPTMH has drawn up a guidance document providing specific indications in physiotherapy training programs in the field of mental health care and the specific skills related to the treatment of mental disorders that must be acquired by general and specialized physiotherapists [11]. More recently, the Italian Ministry of Health indicated in the Guidelines for physical activity that "Lifestyle interventions aimed to promote the introduction of physical activity into daily life, and structured, supervised and easy-to-perform physical activity programs are effective for people with psychiatric disorders" [12].

Several studies evaluated the clinical and psychosocial benefits and neurobiological correlates of physical activity on mental disorders. Indeed, it reduces sleep disturbances and has a positive impact on many psychiatric disorders such as depression and anxiety disorders, psychotic symptoms, alcohol and substance use disorders [13,14]. More neurophysiopathological factors are involved in the role of physical activity on psychiatric disorders such as improvement of the HPA axis functioning on a reduction in cortisol levels and the restoration of a balance in the production of leptin and ghrelin; increased plasma BDNF; increased B-endorphins which reduce anxiety-depressive symptoms; increased various neurotransmitters (i.e., serotonin, dopamine, acetylcholine and norepinephrine) [15-17].

Despite suggestive data reporting the positive effects of physical activity on physical and psychopathological condition of individuals with mental health issues, physical interventions are not widely implemented in mental health services. Recent systematic reviews display the problem related to the engagement of physical activity tools by users and the mental health professionals [18]. These factors include side effects of medication, the mental illness itself with lack of motivation as a symptom of more disorders, lack of support, auto-stigmatization and society stigmatization and limitations of the mental health service such as the lack of adequate space and the preference of pharmacological intervention through mental health providers.

In January 2024, a new therapeutic rehabilitation activity started at the Psychiatric ward (SPDC) of "San Camillo de Lellis", Hospital. A Physiotherapy program was implemented in collaboration with the Physical Medicine and Rehabilitation Unit. Physiotherapy treatment in mental health makes sense because the body is involved in mental disorders and this practice can modify the suffering perceived by the patient [19]. The main goal of the physiotherapist in psychiatry is, therefore, to work on the bodily manifestation of mental distress and act to reduce its physical symptoms, determining at the same time a psycho-emotional benefits.

The project, lasting six months, was aimed to achieve the following objectives:

- reduce the distress related to hospitalization for patients with psychiatric disorders in the acute psychopathological phase by reducing the state of inactivity and/or immobility;
- change the discomfort perceived by the patient by trying to restore homeostasis between mind and body;
- reduce the physical symptoms of mental disorders, determining at the same time a psycho-emotional benefit;
- promote healthy lifestyles.

The aim of this study is to evaluate the impact of a Physiotherapy program on psychopathological dimensions and on the well-being perceived by participants.

Method

This naturalistic study involved subjects consecutively hospitalized at the SPDC of "San Camillo de Lellis" Hospital of Rieti ALS from January 15 to June 30, 2024.

Two groups of patients were identified:

- Patients who voluntarily participated in the Physiotherapy program (Physiotherapy Group, PG)
- Patients who declined the invitation to participate (Control Group, CG)

The study was conducted in accordance with globally accepted standards of good practice, in agreement with Declaration of Helsinki. This is a naturalistic study in the real clinical world. Participants gave their informed consent to participate at the time of admission as part of the informed consensus to the proposed interventions and to the processing of data for research purposes. The data reported in this study are those used for the clinical activity in order to formulate an individualized therapeutic project and evaluate the treatment outcome. In this study no procedures beyond standard routine care were performed. For these reasons the study has not been previously submitted to an ethics committee.

The Physiotherapy program was developed by experienced physiotherapists and a physiatrist based on the patients features, the service characteristics and the available literature data. Patients' characteristics were preliminarily evaluated in a small sample of patients through a physiatrist examination and with the aid of instruments such as *Barthel Index, Tinetti balance and Gait Scale and 30 seconds chair test.* The exclusion criteria for the eligibility for program participation included excessive sedation, presence of severe conceptual dis-

organization or severe behavioural alterations.
The program developed should be considered a specific intervention for hospitalized psychiatric patients. The program detail follows:

- Physiotherapy sessions were carried out in group format
- A physiotherapist led the group in which, in addition to the participants, at least one nurse from the psychiatric ward was present and actively involved.
- The physical exercise program included the use of aids, such as chairs, mats and a stopwatch. The physical activity was performed both in a standing position and lying in various positions on the mat.
- Two sessions per week of about 45 minutes have been carried on including the following exercises:

- Stretching of the main muscle groups;
- Spatial orientation and body proprioception exercises (static proprioception and movement of body segments);
- Assisted and free active movement;
- Coordination and balance exercises;
- Muscle strengthening.

The evaluation was carried out in two different times, at the time of admission (T0) and at discharge (T1), through the following psychometric instruments:

• *General Health Questionnaire- 12* (GHQ-12): it is a 12-item self-assessment test that evaluates adaptation patterns associated with distress [20]. The subject is asked to compare his/her current situation with his/her usual psychological state, choosing between four response modes: "as usual", "more than usual", "less than usual", "much less than usual". In this way it is possible to distribute individuals along a continuum whose extremes are constituted by a condition of psychological well-being or problems related to distress. The scale provides a Likert-type score through the assignment of a 0-1-2-3 score corresponding to the four choice options for each question.

• *Brief Psychiatric Rating Scale* (BPRS): it is an18 items scale by which the clinician evaluates the presence and severity of symptoms [21,22]. The score of each item is evaluated on a 7-point scale ("absent", "very mild", "mild", "moderate", "medium severity", "severe" and "very severe") in addition to "not assessed" (= 0). The sum of the scores of the individual items provides a total score, which can reasonably be considered as an expression of the severity of the mental disorder.

Statistical analysis was performed using the Statistical Package for Social Science (SPSS). Homogeneity of means across the two groups were analysed implanting the Welch t-test or Fisher exact test for continuous or categorical data respectively. The comparison between the mean scores of the variables at the two times of evaluation for the two groups (PG and CG) was performed using the ANOVA repeated measure design. The *GroupXTime* analysis was implemented to evaluate the interaction of all clinical dimensions assessed.
All analyses with a $p \leq 0.05$ were statistically significant.

Results

The sociodemographic and clinical characteristics of Physiotherapy Group (PG) and Control Group (CG) are reported in Table I and Table II, respectively.
The PG patients were 35 (17 males and 18 females), with an average age of 38.20+15.42 year and an edu-

TABLE I. *Socio-demographic features in Physiotherapy Group (PG) and Control Group (CG)[a].*

	PG	CG	p
AGE mean (SD), Y	37.40 (+16.52)	39.31(+13.16)	.60
EDUCATION mean (SD), Y	10.3(+3)	10.8(+2.8)	.52
GENDER, N (%)			
MALE	17 (48.6)	10(31.3)	.21[b]
FEMALE	18(51.4)	22(68.8)	

[a]P values refer to statistical differences between PG and CG as tested by Welch t-test
[b]P values refer to statistical differences between PG and CG as tested by Fisher exact test

TABLE II. *Clinical features in Physiotherapy Group (PG) and Control Group (CG)[a].*

	PG	CG	P
ICD-9 CM DIAGNOSIS, N (%)			.014
DEPRESSION	7(20)	6(18.8)	
PSYCOSIS	17(48.6)	5(15.6)	
BIPOLAR DISORDER	1(2.9)	4(12.5)	
PERSONALITY DISORDER	10(28.6)	17(53.1)	
SUBSTANCE USE DISORDER, N (%)			.64
NONE	24(68.6)	20(62.5)	
ALCOOL	5(14.3)	3(9.4)	
COCAINE	3(8.6)	6(18.8)	
HEROIN	1(2.9)	1(3.1)	
CANNABIS	2(5.7)	2(6.3)	
LENGTH OF HOSPITALIZATION (days), mean (SD)	11.8(+4.3)	9.3(+8.3)	.26

[a]P values refer to statistical differences between PG and CG Welch two sample t test

cation of 10.3+3 years.
Patients in the PG received the following ICD-9-CM diagnoses: 48.6% (N=17) Psychotic Disorder, 20% (N=7) Depressive Disorder, 2.9% (N=1) Bipolar Disorder and 28.6% (N=10) Personality Disorder. Eleven of the 35 participants also had a comorbidity for Substance Use Disorder (SUD): 14.3% (N=5) alcohol abuse/dependence, 8.6% (N=3) cocaine abuse/dependence, 5.7% (N=2) cannabis abuse/dependence, 2.9% (N=1) opioid abuse/dependence.
The mean length of hospitalization was 11.8±4.3 and the mean number of physiotherapy sessions was 1.7+0.8.
Patients who decided not to participate (CG) were 32 (10 males and 22 females), with an average age of 39.31+13.16 and an education of 10.8+2.8 years. They received the following ICD-9 CM diagnosis: 15.6% (N=5) Psychotic Disorder, 18.8% (N=6) Depressive Disorder, 12.5% (N=4) Bipolar Disorder and 53.1% (N=17) Personality Disorder. Twelve of the 32 participants also had a comorbidity for SUD: 9.4% (N=3) alcohol abuse/dependence, 18.8% (N=6) cocaine abuse/dependence, 6.3% (N=2) cannabis abuse/dependence and 3.1% (N=1) opioid abuse/dependence.
The mean length of hospitalization was 9.3+8.3 days.
The two groups did not differ significantly in age, gender, SUD and hospitalization duration (Tabb. I, II). However, they differ significantly in diagnoses: the diagnosis of Psychotic Disorder (48,6% *vs* 15,6%) is more prevalent in the PG while the diagnoses of Bipolar Disorder (2,9% *vs* 12,5%) and Personality Disorder (28,6% *vs* 53,1%) were more prevalent in the CG.
The subjective well-being assessed with GHQ-12 showed a significant improvement at two time (T0 *vs* T1) and for two groups (PG: 24,1+4,8 *vs* 13,3+5,4; CG: 22,5+7,5 *vs* 17,5+7,4; F: 44,7 (1 gdl), $p < .001$).
Psychopathology, assessed by the BPRS, showed a significant reduction (T0 *vs* T1) both in the PG than in the CG and. Reductions were significant in both, the BPRS total score (PG: 44,4+11 *vs* 25,9+4,5; CG: 39+7,5 *vs* 26,6+5,4; F=192 (1 gdl), $p < .001$) and the subdimensions *Somatic Concern* (PG: 3+1,5 *vs* 1,7+0,8; CG: 3+1,4 *vs* 2,1+1,1; F=63,8 (1 gdl), $p < .001$); *Anxiety* (PG: 3,7+1,2 *vs* 2+0,9; CG: 3,8+1,1 *vs* 2,25+1; F=131,1 (1 gdl), $p < .001$); *Emotional withdrawal* (PG: 2,9+1,5 *vs* 1,8+1; CG: 2,3+1,4 *vs* 1,7+0,8; F=25,6 (1 gdl), $p < .001$); *Conceptual Disorganization* (PG: 3+1,8 *vs* 1,5+0,8; CG: 2,1+1,3 *vs* 1,2+0,5; F=44 (1 gdl), $p < .001$); *Guilt Feeling* (PG: 2,5+1,4 *vs* 1,5+0,8; CG: 2,2+1,5 *vs* 1,3+0,6; F=39,3 (1 gdl), $p < .001$); *Tension* (PG: 3,5+1,4 *vs* 1,3+0,6; CG: 3,2+1 *vs* 1,8+0,9; F=113,4 (1 gdl), $p < .001$); *Mannerism and Posturing* (PG: 2,2+1,3 *vs* 1,5+0,6; CG: 1,5+0,8 *vs* 1,1+0,3; F=16,8 (1 gdl), $p < .001$); *Grandiosity* (PG: 2,1+1,5 *vs* 1,2+0,5; CG: 2+1,3 *vs* 1,5+1; F=22,9 (1 gdl), $p < .001$); *Depressive mood*

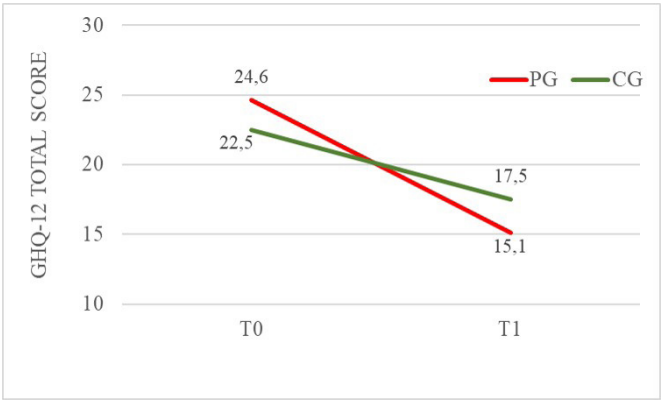

FIGURE 1. *General Health Questionnaire (GHQ-12) evaluation at admission (T0) and at discharge (T1) in Physiotherapy Group (PG) and Control Group (CG)[a].*
[a]A repeated measures ANOVA was implemented to investigate changes across time and groups. P < 0.01

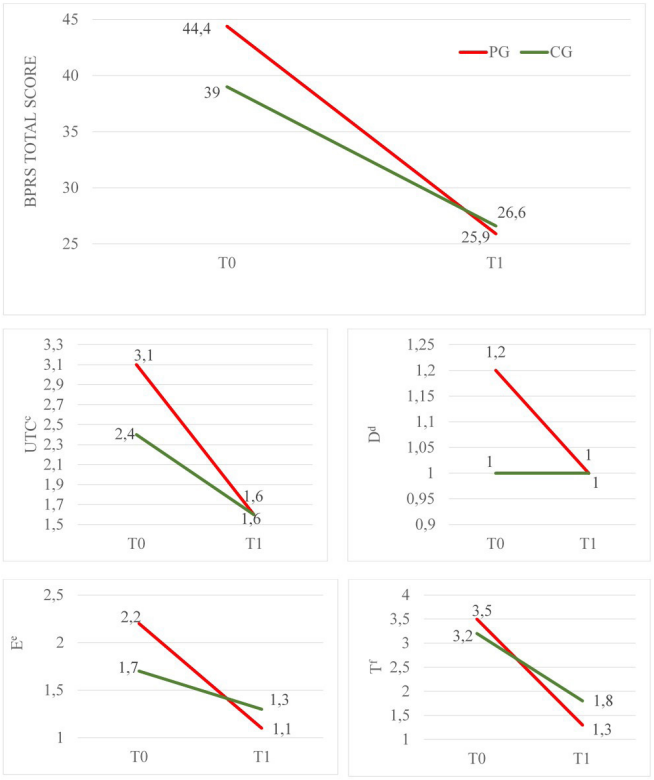

FIGURE 2. *Brief Psychiatric Rating Scale Total Score and dimensions evaluation at admission (T0) and at discharge (T1) in Physiotherapy Group (PG) and Control Group (CG)[ab]*
[a]Repeated measures ANOVAS were implemented to investigate changes across time and groups.
[b]Graphs are provided for BPRS dimensions that present significant (P < 0.05) interactions.
[c]Unusual Tought Content
[d]Excitement Score
[e]Disorientation Score
[f]Tension Score

(PG: 3+1,6 *vs* 1,7+0,8; CG: 2,8+1,4 *vs* 1,5+0,7; F=59,3 (1 gdl), $p < .001$); *Hostility* (PG: 2,2+1,7 *vs* 1,1+0,4; CG: 2+1,2 *vs* 1,3+0,7; F=22,5 (1 gdl), $p < .001$); *Suspiciousness* (PG: 2,6+1,6 vs 1,5+0,7; CG: 2,2+1,3 vs 1,6+0,8; F=29,7 (1 gdl), $p < .001$); *Hallucinatory Behavior* (PG: 1,2+0,6 *vs* 1+0,2; CG: 1,2+0,6 *vs* 1+0,2; F=5,4 (1 gdl), $p < .05$); *Motor Retardation* (PG: 1,7+1,1 *vs* 1,4+0,6; CG: 1,8+1 *vs* 1,3+0,7; F=9,9 (1 gdl), $p < .01$); *Uncooperativeness* (PG: 2+1,6 *vs* 1,1+0,4; CG: 1,9+1,1 *vs* 1,4+0,7; F=88,9 (1 gdl), $p < .001$); *Blunted Affect* (PG: 2,2+1,3 *vs* 1,6+0,8; CG: 1,9+1,2 *vs* 1,5+0,8; F=12,9 (1 gdl), $p < .01$); *Unusual thought content* (PG: 3,1+1,7 *vs* 1,6+0,7; CG: 2,4+1,5 *vs* 1,6+1; F=42,9 (1 gdl), $p < .001$); *Excitement* (PG: 2,2+1,7 *vs* 1,1+0,5; CG: 1,7+1,1 *vs* 1,3+0,7; F=21,8 (1 gdl), $p < .001$).

The subdimension *Disorientation* (PG: 1,2+0,6 *vs* 1+0,2; CG: 1+0 *vs* 1+0,2; $p=.09$) presented a different trend in the two groups with a significant reduction for PG only.

Interactions Time X Group have been observed for Psychological well-being (F=6.1 (1 gdl) $p=.017$), the BPRS total score (F=7.6 (gdl 1) $p=.008$), and for the BPRS subdimensions *Tension* (F=5.7(1) $p=.02$), *Unusual thought content* (F=5.4(1) $p=.02$), *Excitement* (F=4.7 (1gdl) $p=.03$) and *Disorientation* (F=5 (1 gdl) $p=.03$) (Figs. 1, 2).

Discussion

Physical activity is recognized as an effective complementary intervention on many psychiatric disorders. In a recent literature review Jakubowska et al. concluded that physical activity effectively reduces symptoms and enhances cognitive functions in depression, schizophrenia, bipolar disorder, anxiety disorders, and ADHD[23]. In schizophrenia, physical activity seems to improve symptoms and cognitive functions, mitigate medication side effects, and enhance well-being. In bipolar disorder, it may reduce mood swings and aid long-term management. In anxiety disorders and ADHD it seems to improve symptoms and cognitive functions [23]. Furthermore, Türkmen et al. [24] reported that physical activity may improve cardiorespiratory fitness and reduce drug craving among individuals with SUD, potentially improving treatment outcomes and lowering the risk of relapse.

The findings of the present study suggest that a specific physiotherapy program for hospitalized patients may play a relevant role in improving subjective well-being, reducing overall psychopathological severity and alleviating symptoms such as Tension, Unusual thought content, Excitement and Disorientation.

These evidences confirm data showed in previous studies [13-14, 25-27]. Although we cannot rely on homogeneous studies within hospital settings with respect to efficacy assessment tools and kind of activity programs, in a recent meta-analysis of 132 studies Tew et al. found that hospital-based physical activity programs offer the opportunity to improve the physical and mental health of patients [25]. Furthermore, Fraser et al. highlight that a physical activity intervention in a hospital setting can help reduce the burden of chronic diseases and improve psychological well-being in adults with psychiatric disorders [26]. The result of present study confirmed the suggestions of our previous work that showed the effectiveness of a structured physical activity program carried out by qualified personnel, especially in relation to the perceived improvement of symptoms related to tension, anxiety, and mood and to an improvement in psychological well-being [27]. Also, in present study most of the psychopathological dimensions assessed with the BPRS significantly improved prior to discharge however the activity performed seems to have influenced the severity of the psychopathological condition particularly affecting on the three reported above dimensions. In fact, the improvements relating to the other symptomatic dimensions may be due to the global and person-centered intervention carried out during hospitalization or to the interviews with healthcare personnel, to the psychopharmacological therapy and to the psychoeducational interventions that are part of the integrated treatment proposed daily in our ward.

The observed benefits across different diagnostic categories support the idea of physiotherapy as a transcategorical intervention, targeting shared neurobiological and behavioral mechanisms rather than disorder-specific symptoms. The impact of motor activity on specific psychopathological symptoms, such as tension, excitement, and disorientation, may be explained by several underlying neurophysiological mechanisms. Indeed, physical activity is known to modulate neurotransmitter systems involved in arousal and emotional regulation, including serotonin and dopamine, which may contribute to a reduction in psychomotor agitation and excessive excitement [15-17]. Additionally, motor activity has been shown to regulate the hypothalamic–pituitary–adrenal (HPA) axis, thereby decreasing physiological stress responses and subjective tension [15-17]. From a neurocognitive perspective, structured motor activity may enhance sensory integration, proprioceptive processing, and body awareness, which are critical for spatial orientation and cognitive coherence [23]. Improvements in these processes may help reduce disorientation and improve patients' ability to engage with their environment. Moreover, exercise-induced neuroplastic changes, supported by increased levels of neurotrophic factors such as BDNF, may strengthen cortical networks involved in executive control and emotional stability [15-17].

The limitations of our study are primarily the small sample size and heterogeneity of the diagnostic categories in the two groups. In fact, 48,6% of PG patients were di-

agnosed with Psychotic Disorder while 53,1% and 12,5% of CG patients were diagnosed with personality disorder and bipolar disorder, respectively. However, patients voluntarily joined the physiotherapy program and the refusal by subjects with certain diagnostic categories could be part of the clinical issues of some disorders. Although the heterogeneity of the diagnostic categories in our sample and the presence of comorbidity with a SUD can be considered limitations they mirror a clinical population representative of the real clinical world. Furthermore, this heterogeneity must also be interpreted in the light of literature data according to which a motor activity intervention appears to be effective across various diagnostic categories [23-27]. This effect across a variety of disorders could be explained by the neurophysiological mechanisms that underlie the effectiveness of motor activity on these disorders [15-17]. The efficacy on different clinical populations could suggest that motor activity could represent a trans-categorical intervention. Finally, the reported data are preliminary and require further investigations in the future that consider these limitations.

Conclusions

The data of present study show that a specific physiotherapy program for hospitalized acute psychiatric patients could represent a complementary and low-cost treatment that has an impact on improving of subjectively perceived well-being and reducing the severity of psychopathological condition. It would also have a function on improving the Tension, Unusual thought content, Excitement and Disorientation symptoms.
Interventions like physiotherapy may support patient stabilization and recovery even in highly dynamic or resource-limited hospital contexts [28].

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Conflict of interest

No potential conflicts of interest. The authors declare that the research was conducted in the absence of any commercial of financial relationships that could be constructed as a potential conflict of interest.

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Authors contributions

AT, CC, ADL, VS and ST: write the original draft, data curation. AT, CC statistical analysis, conceptualization and supervision. PM, EV, FF and AM: data curation. DPS, VM and AB: critical revision of the manuscript. All authors: final approval of the manuscript.

Ethical consideration

The present study is a retrospective study in which only aggregate data are analyzed, as the data cannot be traced back to specific patients.

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