

ANALYSIS OF PHYSICAL-FUNCTION PERFORMANCE AND RISK OF FALLS IN ADULT PATIENTS ADMITTED TO A PSYCHIATRIC HOSPITAL

Éder Tiago de Pauli¹ , Gisele Battistelli¹ .

ABSTRACT

Introduction: Psychiatric hospitalization is indicated when outpatient resources are insufficient. Assessments of functional capacity have been associated with fall-risk detection, suggesting that reduced physical performance may increase the likelihood of adverse events. **Objective:** To analyze functional performance and fall risk among adult psychiatric inpatients and examine their relationship with age, gender, and diagnosis. **Methods:** This observational study was conducted with patients admitted to the Adult Psychiatric Inpatient Unit of a hospital. Functional performance was assessed using the Short Physical Performance Battery (SPPB), and fall risk was assessed using the Severo, Almeida, and Kuchenbecker Fall Scale (SAK-P), both analyzed in relation to age, sex, and diagnosis. **Results:** Fifty-five patients were evaluated. Approximately 90% (n = 49) demonstrated "Good Capacity" on the SPPB, with a median and IQR of the score of 11 [10-12] points. The median and IQR of the SAK-P score were 3.5 [2.5-5.5] points, with 83.6% (n = 46) classified as Low Risk. SPPB scores showed a significant correlation with age, with younger patients achieving better performance. No statistically significant association was observed between SPPB and SAK-P scores, although the p-value (0.052) approached the significance threshold. **Conclusion:** Most psychiatric inpatients demonstrated good functional capacity and low fall risk. Younger age was associated with better functional performance and a slightly lower fall-risk, while sex and diagnosis showed no significant relationships. Functional and fall-risk assessments may support early identification of more vulnerable patients and guide individualized care strategies during psychiatric hospitalization.

Keywords: *Physical Functional Performance; Accidental Falls; Mental Disorders; Inpatients; Psychiatric Hospitals; Exercise.*

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¹ Hospital de Clínicas de Porto Alegre, Porto Alegre, RS, Brazil.

Corresponding author:

Éder Tiago de Pauli
E-mail: eder.depauli@gmail.com
Rua Ramiro Barcelos, 2350,
CEP 90035-903 - Santa Cecília,
Porto Alegre - RS- Brasil.

INTRODUCTION

For many years, individuals with mental disorders were isolated from society. Rather than focusing on providing care for those in distress, society's main concern was to hide those who were different¹. Mental disorders negatively impact global health, affecting approximately 10% of individuals at any given time and 25% of people throughout their lifetime². Psychiatric hospitalization is recommended when outpatient resources are insufficient to ensure proper care and recovery³. Hospitalization takes place in settings such as emergency departments and general hospital wards, as well as in specialized public and private institutions⁴.

Studies have shown that psychiatric inpatients exhibit higher levels of sedentary behavior compared to healthy control groups⁵. Clinically, they represent a vulnerable group, often facing health inequalities that may, in part, be attributed to inadequate lifestyle choices⁶. Research indicates a two- to threefold increased risk of premature mortality and a reduction in life expectancy of 10 to 20 years compared to the general population⁷. In the Brazilian context, clinical vulnerability is also evident. A national study of psychiatric hospitalizations reported high rates of comorbidities, adverse clinical conditions, and repeated admissions, reinforcing the health risks faced by this population³. Impaired cognitive function, poor physical health, and deteriorating functional mobility are associated with

more severe negative symptoms and greater cognitive dysfunction, impacting overall health and quality of life⁸.

Assessments of functional capacity are associated with the identification of fall risk, suggesting that lower performance increases the likelihood of adverse events⁹. Additionally, the occurrence of adverse events significantly raises the risk of future falls, highlighting the need for targeted interventions¹⁰. Although functional capacity is important, psychological factors also contribute to fall risk, reinforcing the need for a multidisciplinary approach¹¹.

Psychiatric inpatients face a significant risk of falls due to various factors, including medication effects, neuropsychiatric symptoms, and environmental conditions¹². Additionally, falls occurring in inpatient settings, particularly among patients diagnosed with schizophrenia, highlight the importance of comprehensive risk assessments in psychiatric environments¹³. The implementation of multifactorial interventions, such as regular fall risk assessments and staff training, has shown promise in reducing fall incidents¹⁴.

However, there are many uncertainties regarding the true physical and health conditions of individuals with mental disorders. Adequate functional capacity is important for performing daily activities and self-care independently and safely. Patients requiring psychiatric hospitalization may present exacerbated symptoms and other impaired health conditions. Mental confusion, disorganization, motor difficulties, adverse medication reactions, and other clinical conditions influence and impair both the physical and mental state of the patients^{5,8}. Patients in these conditions require greater care from the healthcare team, as the risk of falls and deficits in self-care is higher^{4,12}.

Therefore, this study aims to answer the following question: "Do patients with mental disorders hospitalized in the Psychiatric Unit of a university hospital have impaired functional capacity and an increased risk of adverse events due to falls?" Our initial hypothesis was that patients hospitalized in the psychiatric unit have an increased risk of falls and compromised functional capacity. Additionally, we expected an association between lower SPPB scores and higher SAK-P (Severo, Almeida and Kuchenbecker Falls Scale) scores, with at least a moderate correlation. Understanding these aspects may support the identification of vulnerabilities and the planning of therapeutic strategies that enhance safety, autonomy, and quality of life during hospitalization.

METHOD

Study Design

This research consists of an observational, descriptive, and retrospective study.

Setting

The present study was conducted in the Adult Psychiatric Inpatient Unit of a university hospital, which provides care for severe acute psychiatric conditions. The unit comprises 35 beds, 26 of which are covered by the Brazilian Unified Health System (SUS) and 9 allocated for private insurance or self-funded hospitalizations.

Data from the SPPB test and the SAK-P, which are part of the routine clinical care of the inpatient unit, were used.

Participants

Participants were selected from the medical records of patients hospitalized between June and September 2023, using a convenience sampling method. **Inclusion criteria:** all medical records of adult psychiatric inpatients who underwent both the SPPB and the SAK-P. **Exclusion criteria:** incomplete medical records for the variables of interest.

Variables and Measurements

Functional Capacity — SPPB

The SPPB is a comprehensive functional capacity assessment tool with predictive applicability for adverse health events, such as impairment in activities of daily living, self-care, and mortality^{15,16}. It consists of three stages that evaluate static balance, gait speed, and lower limb muscle strength. The final SPPB classification is obtained by summing the scores of each stage¹⁷, ranging from:

- 0 to 3 points: poor capacity;
- 4 to 6 points: low capacity;
- 7 to 9 points: moderate capacity;
- 10 to 12 points: good capacity;

These results are not only linked to functional mobility and strength but are also associated with the chronic clinical conditions of the assessed individuals¹⁸. Although originally validated in older adults, the SPPB has been increasingly applied in other clinical populations, including psychiatric inpatients, due to its simplicity, safety, and clinical relevance. In this psychiatric inpatient unit, the test is routinely performed by the multiprofessional team as part of standard clinical care and is preferably administered within the first 24 hours of hospitalization.

The SPPB is not performed by the psychiatric inpatient care team in the following situations:

1. Patient refusal or clinical contraindications preventing test execution;
2. Presence of physical risk and/or risk of aggression toward the healthcare team;

3. Mental health conditions that impair understanding of test instructions.

Fall Risk — SAK-P

To assess the fall risk of patients during hospitalization, the SAK-P Fall Scale was used, which takes into account medications and procedures performed. The SAK-P has been validated for psychiatric inpatients and demonstrated adequate diagnostic accuracy in this population¹⁹. In the inpatient unit, the SAK-P assessment is carried out by the nursing team and consists of a questionnaire with seven variables, which are summed and classified as follows:

- Low risk: ≤ 6
- Moderate risk: 6.5 to 10
- High risk: ≥ 10.5

The data collected for the study were preferably obtained on the same day as the SPPB assessment.

The SAK-P assesses fall risk based on seven clinical and behavioral variables:

1. History of falls in the past 12 months;
2. Use of medications associated with increased fall risk (e.g., antipsychotics, benzodiazepines, anticonvulsants, antihypertensives);
3. Presence of agitation or psychomotor agitation;
4. Impaired gait or mobility limitations;
5. Altered level of consciousness or cognitive impairment;
6. Sensory deficits, such as visual or auditory impairment;
7. Need for assistance during hospitalization procedures or daily activities.

Statistical Analysis

The data were analyzed using SPSS version 18.0. Non-parametric tests were used due to the distribution of the variables, with the significance level set at $p < 0.05$. The existence of an association between the distribution SPPB and SAK-P scores with gender and diagnoses was assessed using non-parametric tests Mann-Whitney's U or Kruskal-Wallis, whereas the association of categorical variables diagnoses and gender was evaluated using Fisher's Exact test. To evaluate the correlation between SPPB and SAK-P, SPPB and age, and SPPB and diagnoses, Spearman's rho test was applied.

Ethical Considerations

The study was approved by the Research Ethics Committee of the institution (CAAE 74202923.3.0000.5327). The ethical aspects of

the research were ensured, in compliance with Resolution No. 466/2012 of the Brazilian National Health Council²⁰. The researchers were granted an exemption from the Informed Consent Term due to the retrospective nature of the data collection, which did not involve patient identification (through De-identified Queries), and the absence of any potential diagnostic and/or prognostic repercussions for the patient or their family members resulting from the procedures or outcomes of the study.

RESULTS

A total of 55 participants underwent both assessments (SPPB and SAK-P), consisting of 29 men (52.7%) and 26 women (47.3%). The mean age was 36.82 ± 13.35 years (men: 38.96 ± 13.02 ; women: 34.42 ± 13.55). The most frequent diagnoses were Depressive Episodes and Schizophrenia, with a statistically significant association between diagnosis and gender (Fisher's exact test), as shown in Table 1.

The median and interquartile range (IQR) of the SPPB results were 11 [10–12] points, with approximately 90% of the patients ($n = 49$) demonstrating "Good Capacity." No statistically significant association was found between SPPB scores and gender (Mann-Whitney U, $p = 0.908$), in table 1. Figure 1 shows the dispersion between SPPB and age, demonstrating a significant negative correlation of -0.337 ($p < 0.05$). Table 1 presents the relationship between SPPB classification and psychiatric diagnoses, with no statistically significant differences (Kruskal-Wallis, $p = 0.163$).

The median and IQR of the SAK-P score were 3.5 [2.5-5.5] points, with 83.6% ($n = 46$) of the patients showing Low Fall Risk and 16.4% ($n = 9$) showing Moderate Risk, as shown in Table 1. There was no statistically significant association between gender and SAK-P classification (Fisher's exact test, $p = 0.475$). As shown in Figure 2, SAK-P scores showed a weak but statistically significant positive correlation with age (Spearman's $\rho = 0.301$, $p = 0.026$), indicating slightly higher fall-risk scores among older patients. In Table 1, according to the analysis, there was no statistical difference ($p > 0.05$) between psychiatric disorders and the SAK-P results.

Figure 3 demonstrates the relationship between the SPPB and the SAK-P. Using the Spearman's rho correlation test with a significance level of 5%, we observed that there is insufficient evidence to suggest that an increase in the functional capacity score (SPPB) is associated with a reduction in the fall risk score (SAK-P), as the p-value was 0.052. Nevertheless, the estimated correlation was negative (-0.263), although weak.

Table 1: Sociodemographic and clinical characteristics of the participants.

	n	Male	Female	p-value
Diagnosis				0.014
Depressive Episode	23 (41.8%)	7	16	
Bipolar Affective Disorder	15 (27.3%)	8	7	
Schizophrenia	12 (21.8%)	10	2	
Other Disorders	5 (9.1%)	4	1	
Classification SPPB				0.206
Good Capacity	49 (89.1%)	27	22	
Moderate Capacity	5 (9.1%)	1	4	
Low Capacity	1 (1.8%)	1	0	
Score*	11.00 [10.0 - 12.0]			
Classification SAK-P				0.475
Low Risk	46 (83.6%)	23	23	
Moderate Risk	9 (16.4%)	6	3	
Score*	3.50 [2.50 - 5.50]			
Association between SPPB and Gender		11.00 [10.0 - 12.0]	11.00 [10.0 - 12.0]	0.908
Association between SAK-P and Gender		3.50 [2.50 - 5.50]	3.50 [2.50 - 5.50]	0.851
Association of SPPB classification and Diagnostics.				0.163
Classification	Episode Depressives	Bipolar Affective Disorder	Schizophrenia	Other Disorders
Good Capacity	21	12	11	5
Moderate Capacity	2	2	1	0
Low capacity	0	1	0	0
Score*	12.00 [10.0 - 12.0]	10.00 [10.0 - 11.0]	11.50 [10.5 - 12.0]	11.00 [11.0 - 12.0]
Association of SAK-P Classification and Diagnoses				0.067
Low Risk	19	12	10	5
Moderate Risk	4	3	2	0
Score*	3.50 [3.00 - 5.50]	4.50 [2.50 - 5.50]	3.00 [2.00 - 5.00]	2.50 [1.50 - 2.50]

Abbreviations: SAK-P, Severo, Almeida and Kuchenbecker Falls Scale; SPPB, Short Physical Performance Battery

Statistical tests: Fisher's Exact Test for associations between categorical variables (diagnosis × gender, SPPB classification × diagnosis, SAK-P classification × diagnosis); Mann–Whitney U test for comparisons of SPPB and SAK-P scores between genders; Kruskal–Wallis test for comparisons of SPPB and SAK-P scores across diagnostic categories. ***Score:** Median (25th Percentile - 75th Percentile)

Age (mean ± SD) is reported in the text.

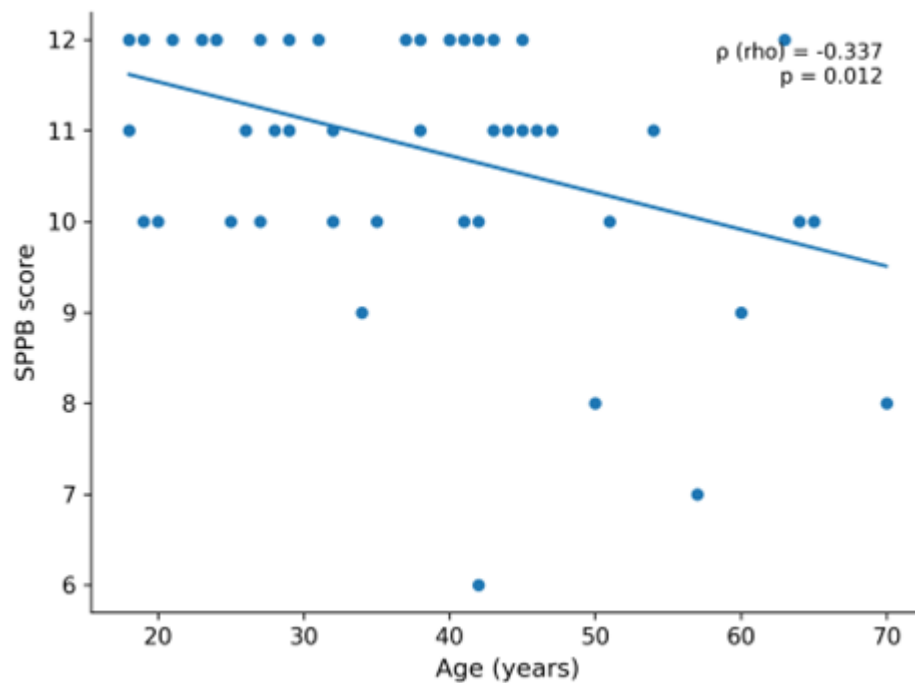


Figure 1: Dispersion of the SPPB score and Age.

Scatter plot showing the relationship between age and Short Physical Performance Battery (SPPB) score. Spearman's correlation analysis demonstrated a significant negative association between age and functional performance ($\rho [\text{rho}] = -0.337$, $p = 0.012$). Spearman's rho and p-values are displayed in the upper right corner of the figure. The solid line represents the linear trend.

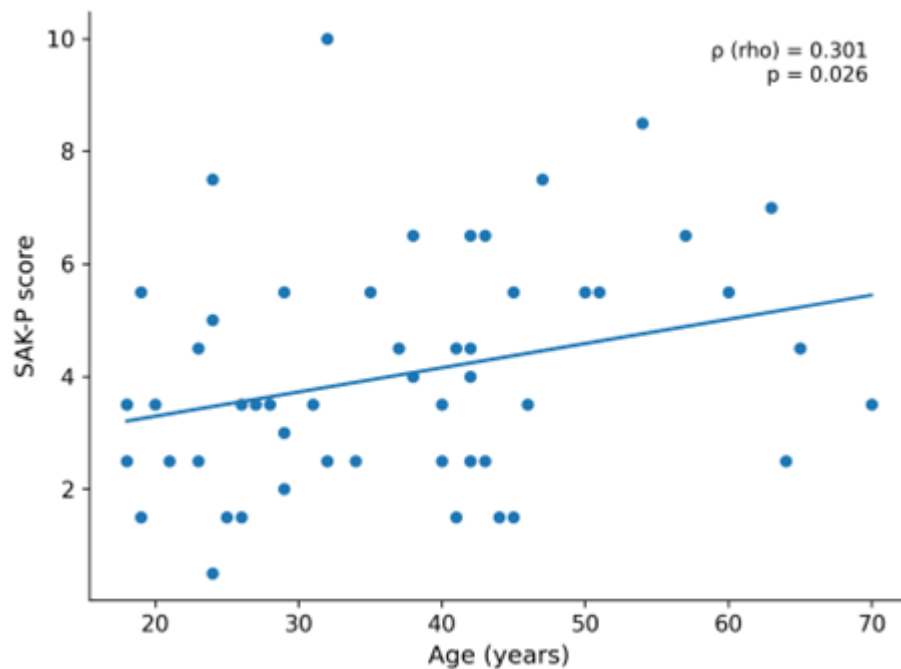


Figure 2: Dispersion of the SAK-P score and Age.

Scatter plot showing the relationship between age and Severo, Almeida and Kuchenbecker Fall Scale (SAK-P) score. Spearman's correlation analysis demonstrated a weak but statistically significant positive association between age and fall-risk score ($\rho [\text{rho}] = 0.301$, $p = 0.026$). Spearman's rho and p-values are displayed in the upper right corner of the figure. The solid line represents the linear trend.

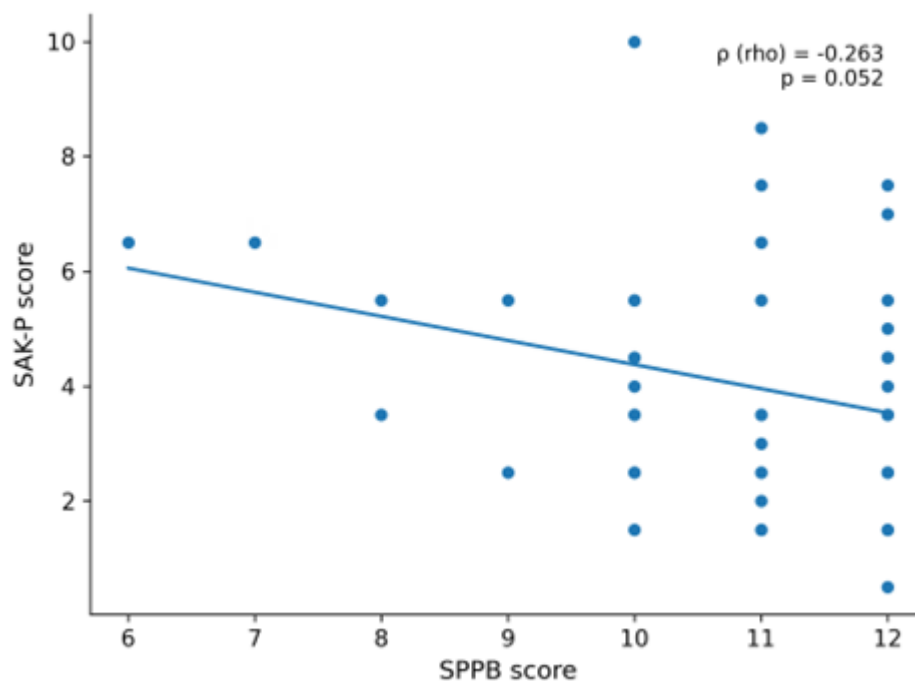


Figure 3: Dispersion of SPPB and SAK-P scores.

Scatter plot showing the relationship between functional performance (SPPB) and fall risk (SAK-P). Spearman's correlation analysis indicated a weak negative association that did not reach statistical significance ($\rho \text{ [rho]} = -0.263$, $p = 0.052$). Spearman's rho and p-values are displayed in the upper right corner of the figure. The solid line represents the linear trend.

DISCUSSION

The aim of this study was to analyze functional performance and fall risk among adult patients hospitalized in a psychiatric unit, as well as to examine their relationship with age, gender, and psychiatric diagnosis. Overall, the results showed that most patients demonstrated good functional capacity and a low risk of falls, partially contradicting the initial hypothesis of more evident functional impairment in this population. Age showed a significant association with SPPB scores and a weak but significant association with SAK-P scores, while sex and diagnosis did not show statistically relevant relationships with the outcomes evaluated. Although the correlation between functional capacity and fall risk did not reach statistical significance, a negative trend was observed between the variables, suggesting that lower functional performance may be related to an increased risk of falls.

Regarding diagnoses, a significant association was found between gender and the presence of depressive episodes and schizophrenia. As observed in the studied population, the rate of schizophrenia patients is much higher in the male gender, while depressive episodes are more than double in the female gender. According to a study²¹, males tend to develop schizophrenia earlier, between 18-25 years old, gender is an important predictive

factor in the disorder. In adolescence, the male-to-female ratio is 2:1, with this proportion reversing after the age of 50. Regardless of the outcome measure, gender is an important predictive factor in the disorder. Regarding the diagnosis of depression, women are typically twice as likely to develop the disorder compared to men²². Our findings are consistent with the data mentioned above and described in the literature, suggesting that the participants reflect a similar demographic distribution of the population.

According to the results presented (Table 1), the majority of hospitalized patients exhibited good functional capacity. The results were not as expected, as the initial hypothesis was that patients admitted to the Psychiatric Inpatient Unit would have impaired functional capacity. In the SPPB results regarding gender and psychiatric diagnoses of the participants, no statistically significant association was found.

However, Figure 1 demonstrates a statistically significant correlation between the SPPB results and the participants' age, indicating that younger patients presented better results ($p < 0.05$). Another study demonstrated an association between low SPPB functional capacity and age, with rates exceeding 50% in patients over 85 years of age²³. Evidence suggests that functional decline and symptom severity

tend to progress with advancing age, potentially leading to greater impairment over time²⁴. In the present study, the predominance of good SPPB performance is likely related to the relatively young age of the sample (36.82 ± 13.35 years). Probably, many problems affecting psychiatric patients have not yet occurred in these younger patients, explaining the discrepancy with our initial hypothesis.

Regarding the SAK-P results, most participants were classified as having a low risk of falls. Although SAK-P scores showed a weak but statistically significant association with age (Figure 2), no significant associations were observed with gender or psychiatric diagnosis.

There was no statistically significant correlation between the SPPB and the SAK-P, although the p-value (0.052) was very close to the significance level of 5%. Figure 3 shows a close relationship between good functional capacity and a low risk of falls. The lack of statistical significance is likely due to the small participants size, the relatively young age of the participants, and some patients in worse conditions being unable to complete the assessments. According to study⁸, the deterioration of functional mobility is associated with more severe negative symptoms, and more disturbed cognitive abilities.

The loss of functional capacity initially becomes noticeable in more complex activities and progresses to interfere with the execution of simpler tasks. The impairment of functional systems can lead to a complete level of dependence, including postural instability, immobility, and even communicative incapacity²⁵. Considering these factors, it is possible that the low-complexity assessment and the younger population in this study contributed to the positive results. It is important to highlight that age is a significant factor in the classification of functional capacity. Given the importance of detecting patients with functional impairment and an increased risk of falls, incorporating additional physical tests during hospitalization may be beneficial in routine clinical practice.

Physical activity benefits mental health, including the prevention of cognitive decline and symptoms of depression and anxiety²⁶. Through functional assessments, psychiatric inpatients with good functional capacity can receive interventions more suited to their conditions. On the other hand, patients with greater physical and cognitive impairment may require increased attention regarding fall risk, recovery of physical abilities, and aspects that may be more critical to quality of life and self-care. Therefore, interventions involving physical exercise can lead to numerous physiological changes, resulting in improved physical health, mood, self-esteem, and reduced stress and anxiety. The lack of supportive interventions, restrictions on physical activity, and inadequate facilities are potential contributors to sedentary behavior among patients in mental health hospitalizations²⁷.

According to the results, we demonstrated that most patients exhibited good functional capacity and a low risk of falls, while also establishing relationships with important parameters such as age, gender, and diagnosis. The SPPB and SAK-P results predominantly indicated positive outcomes and did not show statistical differences concerning the diagnosed disorders. These findings suggest that both tests describe consistent parameters and can complement each other. Assessing patients, identifying fall risk, and classifying functional capacity enable more effective approaches by the healthcare team.

The findings of this study have important clinical applicability in the context of psychiatric hospitalization. Identifying that most patients presented good functional capacity and a low risk of falls suggests that systematic assessment using simple and easy-to-apply instruments, such as the SPPB and SAK-P, may help in the early screening of patients who require greater attention regarding functional decline and adverse events. These instruments can guide individualized interventions, especially supervised physical activity programs, which contribute to maintaining mobility, improving social engagement, and reducing behaviors associated with inactivity. Thus, integrating these assessments into routine care may optimize interdisciplinary management and support physical and psychosocial rehabilitation practices in this setting.

However, further studies are needed to strengthen the findings and better clarify the relationship between the results, functional capacity, and psychiatric disorders. This study presented some limitations, including its retrospective design, the short data collection period, and the small number of participants, which may have reduced the statistical power to detect differences between groups. A significant limitation was the likely exclusion of patients with more severe psychiatric symptoms. In these cases, the care team was unable to perform the functional assessments (SPPB) due to barriers such as aggressiveness, clinical instability, or cognitive inability to understand the protocol. This restriction may have generated selection bias, leading to a possible overestimation of the functional capacity observed in the participants. More severe patients typically present greater psychomotor impairment and an increased risk of adverse events. Therefore, the study results should be interpreted with caution, as they may not adequately represent the functional profile of patients with greater clinical severity.

We suggest that future studies include a longer data collection period, a larger number of participants, assessments performed at hospital admission and discharge, and explore strategies to safely include patients with more severe psychiatric conditions, who represent a group at higher functional and fall risk.

CONCLUSION

This study did not identify a statistically significant association between functional performance (SPPB) and fall risk (SAK-P), although a negative trend was observed between the variables. Overall, most psychiatric inpatients demonstrated good functional capacity and a low risk of falls, with functional performance associated with age but not with gender or psychiatric diagnosis. These findings suggest that younger patients and those with less psychomotor impairment tend to show better physical-functional outcomes during hospitalization.

From a clinical perspective, the use of functional assessments such as the SPPB and SAK-P can help identify patients at higher risk of adverse events, contributing to more targeted and individualized

care strategies. Furthermore, physical activities can be incorporated to facilitate socialization among hospitalized patients. Positive interactions between patients and the physical education team serve as important bonds that provide greater emotional support.

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Conflicts of Interest

The authors declare no conflicts of interest.

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