psychiatry international

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Physical Rehabilitation Patterns and Clinical Categorization in a Japanese Psychiatric Hospital: A Retrospective Content Analysis

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Abstract

The rising prevalence of physical comorbidities among patients with mental illness has increased the relevance of physical rehabilitation within psychiatric care. However, specific physical rehabilitation practices in specialized psychiatric hospitals in Japan remain insufficiently documented. This exploratory and descriptive study aimed to characterize the rehabilitation content provided and to categorize patient characteristics and comorbidities in a single specialized psychiatric hospital using an expert-led consensus approach. Clinical data from 150 patients (median age 71.0 years) who received physical rehabilitation were retrospectively analyzed. Patient categorization was conducted through a multidisciplinary consensus-building process involving an expert panel of physical therapists, occupational therapists, psychiatrists, and nurses, each with over 10 years of clinical experience. Using a hierarchical rule set based on International Classification of Diseases, 10th Revision (ICD-10) codes and clinical referral data, five distinct categories were identified: Disuse Syndrome (41%), Neurologic Disorders (20%), Lower Limb Lesions (18%), Parkinson's Syndrome (15%), and Upper Limb Lesions (6%). Across all categories, rehabilitation interventions focused on foundational motor therapies, such as range of motion (27%) and strength training (23%). Mobility-oriented interventions were selectively provided to patients with high bedridden status based on clinical potential. Overall, practices in this setting primarily targeted disuse syndrome and maintenance of basic motor function and were delivered with input from multiple professional disciplines; such practices may inform future research on structured multidisciplinary rehabilitative approaches, especially for aging psychiatric populations.

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Academic Editor: Domenico De Berardis

Received: 22 December 2025
Revised: 25 January 2026
Accepted: 27 February 2026
Published: 11 March 2026

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Keywords: psychiatric physical rehabilitation; single psychiatric hospital; disuse syndrome; musculoskeletal disorders; motor therapy; interprofessional collaboration; occupational therapist; physical therapist; sarcopenia

1. Introduction

Population aging, driven by increased life expectancy and declining birth rates, has become a major global public health challenge [1]. In 2023, approximately 1.1 billion people worldwide were aged 60 years or older, a number projected to nearly double by 2050 [2]. As populations age, mental health conditions among older adults have become increasingly prevalent; global estimates indicate that approximately 14% of adults aged 70 years and older live with a mental disorder, contributing to years lived with disability in this age group [3,4]. Older adults with mental illness frequently experience prolonged disease courses and extended hospitalization, which contribute to a higher burden of physical comorbidities and functional decline [4,5]. As such, these trends of mental–physical morbidities have become a significant issue [6] and highlight the growing importance of addressing physical function and rehabilitation within psychiatric care.

Physical rehabilitation has gained increasing attention in psychiatric settings as a means of maintaining and improving physical function in patients with mental illnesses [7,8]. In Japan, there are approximately 288,000 patients in psychiatric facilities, with schizophrenia, schizotypal, and delusional disorders representing the most common diagnoses. Notably, approximately 185,000 of these patients are 65 or older, accounting for 64% of the total hospitalized population [9]. Aging psychiatric patients face a high risk of developing motor dysfunction, such as medication-related extrapyramidal symptoms, as well as age- and disease-related physical decline, and disuse syndrome [10–12]. Sarcopenia, in particular, significantly impacts the activities of daily living (ADL) in elderly patients [10] and has been linked to depressive symptoms [13].

Patients with schizophrenia, in particular, are at risk for motor abnormalities, including tremors, muscle rigidity, and characteristic hand gestures due to medication side effects [12,14], which can impair their ADL and functional independence. Cognitive decline can lead to swallowing difficulties [15], emphasizing the need for multidisciplinary collaboration during medication adjustments.

Although psychiatric care has traditionally focused on psychosocial rehabilitation, the role of physical rehabilitation has expanded in recent years [7,16,17]. The 2020 medical fee revision in Japan enabled the billing of disease-specific rehabilitation fees in psychiatric long-term care wards, thereby promoting the institutional implementation of physical rehabilitation [18]. However, in these wards, where many patients are in the chronic phase of their illness, challenges such as declining motor skills and an increased risk of falls remain prevalent [19,20].

Individuals with chronic mental illness are at high risk for poor cardiorespiratory fitness due to sedentary behavior and physical inactivity [21,22]. Therefore, rehabilitation professionals, such as physical and occupational therapists, must tailor interventions to a wide spectrum of needs, ranging from acute stabilization to chronic maintenance [21]. However, the actual modalities of rehabilitation provided in specialized psychiatric hospitals remain insufficiently documented.

Functional independence is a key determinant of both physical and mental well-being in psychiatric populations [23]. Bedridden status, in particular, serves as a vital indicator of a patient's functional ability and overall quality of life [24]. Understanding how physical rehabilitation practices relate to physical and psychiatric comorbidities, as well as

levels of independence, is essential for developing effective, patient-centered rehabilitation strategies [25].

Although this study included patients from both acute and long-term psychiatric wards, physical rehabilitation was predominantly provided to older inpatients with functional decline, which informed the clinical focus described below.

Accordingly, this exploratory and descriptive study aimed to elucidate the current state of physical rehabilitation in a Japanese psychiatric hospital. Using an expert-led consensus-building approach, we sought to (1) descriptively categorize patients based on their psychiatric and physical comorbidities, (2) identify the types of physical rehabilitation modalities provided, and (3) analyze the associations between these clinical profiles and patients' levels of independence. This comprehensive assessment intends to provide a foundational understanding of current psychiatric rehabilitation practices.

2. Materials and Methods

2.1. Study Design

This was a retrospective observational study conducted at a single psychiatric hospital in Japan. The study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

2.2. Setting

The study site is a 328-bed single-specialty psychiatric hospital established in 1953. It includes psychiatric emergency acute care, psychiatric medical care, special disease, and dementia treatment wards.

The special disease wards primarily accommodate older patients with chronic schizophrenia; approximately 80% of these patients experience significant gait disturbances, requiring physical intervention. The psychiatric medical care wards mainly admit patients in the chronic phase of schizophrenia, while the dementia treatment wards primarily care for patients with Alzheimer's-type dementia. While the psychiatric emergency acute care wards predominantly admit younger patients with acute psychiatric symptoms, they also accommodate older adults, including those presenting with severe Behavioral and Psychological Symptoms of Dementia (BPSD).

2.3. Participants

2.3.1. Inclusion Criteria

The study initially identified 198 patients hospitalized between November 2014 and June 2024 who received physical rehabilitation services provided by an occupational or physical therapist.

2.3.2. Exclusion Criteria and Selection Flow

Of the initial 198 patients, 48 individuals (24.2%) were excluded due to missing clinical data or unclear physical diagnoses, resulting in a final sample of 150 eligible patients. Diagnostic clarity assessment and subsequent exclusion of cases were performed through a rigorous multidisciplinary review process. To ensure objectivity, each case was evaluated by a team of clinical experts, including physical therapists, occupational therapists, psychiatrists, and nurses, all with over 10 years of clinical experience, with more than half holding a PhD. The exclusion focused on cases lacking a formal International Classification of Diseases, 10th Revision (ICD-10) code or showing inconsistent documentation between medical and rehabilitation records. Decisions were reached through consensus-building sessions (peer debriefing) involving multiple professionals, thereby minimizing individual bias and ensuring the clinical validity of the selection process.

This exclusion rate was primarily attributed to the institutional transition during the early part of the study period (approximately 2014 to 2020), during which physical therapy was provided on a part-time basis. During this transitional phase, formal ICD-10 physical diagnostic coding and functional assessment records were not yet fully standardized in the electronic medical records, leading to incomplete datasets. A review of these excluded cases indicated no significant differences in age or primary psychiatric diagnoses compared with the included cohort, suggesting no systematic selection bias.

2.4. Variables

Clinical data were retrospectively extracted from electronic medical records. The variables collected included: (1) *Patient Demographics:* Age and gender; (2) *Diagnoses:* Psychiatric and physical diagnoses were coded according to the ICD-10; And (3) *Rehabilitation Details:* The total count and specific types of prescribed physical rehabilitation modalities identified for each patient. The primary category for patients with multiple physical comorbidities was determined using a hierarchical priority: (a) Acute/Subacute Limb Lesions, (b) Neurological Disorders, and (c) Disuse Syndrome. (4) *ADL Level:* The degree of independence in daily life, represented by the "bedridden status [21]," was retrieved as an indicator of functional baseline. ADL was evaluated using the "Degree of Independence in Daily Living for the Disabled Elderly," a standardized 4-level scale (Levels J, A, B, and C/D) routinely used in Japanese psychiatric care settings.

2.5. Data Analysis and Categorization

2.5.1. Expert-Led Classification Process

Instead of automated clustering, a manual, expert-driven taxonomic approach was employed to ensure clinical relevance. Over a one-year period, a multidisciplinary team of experts engaged in iterative consensus-building (peer debriefing) to group patients.

To ensure reproducibility, the team applied a hierarchical priority rule set based on ICD-10 codes and clinical referral data:

Rule 1 (Acute/Subacute Priority): Patients referred for acute injuries or postoperative states (ICD-10: S00–T98) were categorized as having Lower or Upper Limb Lesions, regardless of chronic conditions.

Rule 2 (Chronic Specificity): If Rule 1 did not apply, patients with confirmed Parkinson's disease (G20) or cerebrovascular diseases (I60–I69) were categorized as having Parkinson's Syndrome or Neurologic Disorders.

Rule 3 (Default Categorization): If no specific acute or neurological pathology was the primary driver for the rehabilitation modality, the patient was categorized as having Disuse Syndrome. For example, a patient with Parkinson's disease referred for a femoral neck fracture was categorized under "Lower Limb Lesion," as the acute injury was the primary indication for rehabilitation. This process resulted in five mutually exclusive categories: (1) Disuse Syndrome, (2) Neurologic Disorders, (3) Parkinson's Syndrome, (4) Lower Limb Lesions, and (5) Upper Limb Lesions.

2.5.2. Ensuring Reliability and Validity

The rigor of this qualitative categorization was maintained through several procedures. First, Multidisciplinary Peer Debriefing was used to resolve any discrepancies in sorting until a final clinical agreement was reached. While this ensured clinical validity, it is distinct from formal statistical inter-rater reliability testing. Second, an Iterative Constant Comparison method was employed, where researchers repeatedly revisited original medical records to verify the appropriateness of each assignment. Finally, a clear Audit Trail was maintained in Microsoft Excel to document all sorting and filtering steps, ensuring the process is transparent and replicable.

2.5.3. Statistical Analysis

Quantitative variables (e.g., age, rehabilitation frequency) were summarized using medians and interquartile ranges (IQRs). Qualitative variables, such as prescribed rehabilitation modalities, were analyzed using frequencies and percentages. To compare the prevalence of modalities and age distribution across the four ADL levels, the Fisher–Freeman–Halton exact test was employed. This method provides accurate *p*-values even with low expected counts in certain cells. Statistical significance was set at $p < 0.05$. Analysis was performed using Jamovi software (version 2.3) [26].

3. Results

3.1. Patient Characteristics and Diagnoses

The patient demographics and psychiatric diagnoses are summarized in Table 1. Majority of patients were diagnosed with schizophrenia (71.3%, n = 107), followed by dementia (16.0%, n = 24). The median age across the cohort was 71.0 years, with the dementia and depression/bipolar groups exhibiting the highest median ages (78.5 and 78.0 years, respectively).

Table 1. Age at the start of physical rehabilitation by mental illness.

Psychiatric Disorders	N (%)	Median Age (Years)	IQR (Years)	Minimum (Years)	Maximum (Years)
Schizophrenia	107 (71.3%)	70	12.5	39	96
Dementia	24 (16.0%)	78.5	13	46	95
Organic mental disorders	10 (6.7%)	68	17	49	89
Depression/bipolar disorder	9 (6.0%)	78	24	40	93

Note: Final Sample: 150 eligible participants for analysis. Gender Breakdown: Male: n = 65, Female: n = 85. IQR: Interquartile ranges. Age Breakdown: Median Age: 71.0 years (IQR: 15.0); Male: 68.0 years (IQR: 16.0), Female: 73.0 years (IQR: 13.0).

3.2. Physical Comorbidities and Rehabilitation Content

Table 2 details the distribution of physical comorbidities of the patients. The most prevalent condition was disuse syndrome, affecting 41% of patients (n = 61). Other major comorbidities included neurologic disorders (20%, n = 30), Parkinson's syndrome (15%, n = 23), lower limb lesions (18%, n = 27), and Upper limb lesions (6%, n = 9).

Table 2. Patient demographics by physical comorbidity.

Physical Comorbidity	N (%)	Median Age (Years)	IQR (Years)	Minimum (Years)	Maximum (Years)
Disuse Syndrome	61 (41%)	70	11	53	89
Neurologic Disorders	30 (20%)	69.5	17.5	39	95
Parkinson's Syndrome	23 (15%)	71	16	48	92
Lower Limb Lesions	27 (18%)	74	15.5	54	96
Upper Limb Lesions	9 (6%)	70	14	46	93

3.3. Characteristics of Physical Rehabilitation by Physical Disease Group

A total of 359 prescribed rehabilitation modality items were identified for the 150 patients (Table 3). Foundational motor therapies were the most frequently prescribed interventions regardless of physical comorbidity. Range of Motion (ROM) exercises were prescribed for 79.3% of the total cohort, peaking in the upper limb lesions group (100.0%). Strength training was followed at 68.0%, being most prevalent in the disuse syndrome and neurologic disorder groups.

Table 3. Prevalence of prescribed rehabilitation modalities by disease category.

Classification	Parkinson's (n = 23)	Upper Limb (n = 9)	Lower Limb (n = 27)	Disuse (n = 61)	Neuro (n = 30)	Total (N = 150)
Modalities	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
ROM exercise	16 (69.6)	9 (100.0)	24 (88.9)	48 (78.7)	22 (73.3)	119 (79.3)
Strength training	15 (65.2)	7 (77.8)	16 (59.3)	43 (70.5)	21 (70.0)	102 (68.0)
Bed mobility	9 (39.1)	3 (33.3)	13 (48.1)	31 (50.8)	18 (60.0)	74 (49.3)
Walking training	15 (65.2)	3 (33.3)	9 (33.3)	24 (39.3)	13 (43.3)	64 (42.7)

Note: n (%) indicates the number and percentage of patients who were prescribed each rehabilitation modality. Percentages are calculated using the number of patients in each disease category as the denominator. The sum of percentages may exceed 100% because multiple modalities could be prescribed to a single patient.

3.4. Association Between ADL Levels and Rehabilitation Modalities

The relationship between functional independence (ADL Level), age, and rehabilitation modalities is presented in Table 4. Approximately 74% of the patients were aged 65 years or older. The Fisher–Freeman–Halton exact test revealed a significant difference in age distribution across ADL levels ($p < 0.001$), with a notable trend where higher dependency levels (Level C and D) were characterized by a greater proportion of older patients.

Table 4. Patient characteristics and prevalence of prescribed rehabilitation modalities by ADL level.

Variables	A: Independent (n = 6)	B: Semi-Independent (n = 38)	C: Nearly Bed. (n = 88)	D: Completely Bed. (n = 18)	*p*-Value
Age, n (%)					<0.001 a
Under 65 years	5 (83.3)	13 (34.2)	20 (22.7)	1 (5.6)	
65–74 years	1 (16.7)	13 (34.2)	34 (38.6)	11 (61.1)	
Over 75 years	0 (0.0)	12 (31.6)	34 (38.6)	6 (33.3)	
Modalities, n (%) b					
ROM exercise	6 (100.0)	30 (78.9)	68 (77.3)	15 (83.3)	0.579 c
Bed mobility training	2 (33.3)	13 (34.2)	52 (59.1)	7 (38.9)	0.038 c
Transfer training	0 (0.0)	0 (0.0)	22 (25.0)	5 (27.8)	<0.001 c
Gait training	1 (16.7)	21 (55.3)	39 (44.3)	3 (16.7)	0.002 c
Coordination/Balance	3 (50.0)	15 (39.5)	22 (25.0)	3 (16.7)	0.136 c
Strength training	6 (100.0)	30 (78.9)	54 (61.4)	12 (66.7)	0.085 c
Edema/Pain relief	0 (0.0)	3 (7.9)	6 (6.8)	1 (5.6)	0.906 c

Note: ADL: Activities of Daily Living; ROM: Range of Motion. a: *p*-value calculated using the Fisher–Freeman–Halton exact test to compare the age distribution across ADL levels, b: Percentages are calculated using the number of patients in each column as the denominator. Total percentages may exceed 100% as patients could be prescribed multiple modalities. c: *p*-values calculated using Fisher–Freeman–Halton exact test to compare the prevalence of each modality across ADL levels. Bold indicates statistical significance ($p < 0.05$). ADL level classifications: A: Independent: largely independent in daily life; B: Semi-Independent: independent indoors but requires assistance for going out; C: Nearly Bedridden: primarily confined to bed but can maintain a sitting position; D: Completely Bedridden: spends all day in bed and requires full assistance.

Regarding rehabilitation modalities, no significant differences were found in the implementation of foundational ROM exercises ($p = 0.579$) or strength training ($p = 0.085$) across ADL levels, suggesting these are standard practices applied regardless of functional status.

In contrast, functional mobilization programs showed significant distributional differences associated with the degree of independence. Descriptive analysis of the frequencies indicated that Bed mobility training ($p = 0.038$) and Gait training ($p = 0.002$) were most frequently prescribed for patients in levels B (Semi-independent) and C (Nearly bedridden). Similarly, the implementation of Transfer training differed significantly across groups ($p < 0.001$), being utilized almost exclusively for patients in levels C and D.

Notably, for patients in Level D (Completely Bedridden), while the majority received ROM (83.3%) and strength exercises (66.7%), mobilization attempts remained limited; 16.7% and 27.8% of this group received selective gait and transfer training, respectively.

4. Discussion

4.1. Clinical Implications of Patient Demographics

The demographic profile of the study population reflects the global challenge of an aging psychiatric inpatient population. The observed association between advanced age and lower independence aligns with international reports of "accelerated aging" in psychiatric populations, where physical frailty often manifests earlier than in the general population [27]. Unlike general medical settings, physical decline in these patients is likely exacerbated by long-term institutionalization and the metabolic side effects of psychotropic medications [28]. Key risk factors—such as physical inactivity, obesity, and negative symptoms of schizophrenia—further accelerate functional decline [24,28,29]. Our findings highlight that physical rehabilitation in this context is an important supportive intervention to address the compounded risks arising from psychiatric–somatic comorbidity. These observations highlight the importance of coordination between physical therapists and occupational therapists to provide specialized motor interventions within Japanese psychiatric care.

4.2. Strategic Focus of Rehabilitation Modalities

The high frequency of foundational motor therapies, specifically ROM exercises and strength training, represents a direct response to the prevalence of disuse syndrome and musculoskeletal disorders in this population.

ROM exercises were implemented as a standardized priority across all disease groups and ADL levels. This suggests that preventing joint contractures from prolonged immobility is a primary clinical goal in psychiatric settings. Furthermore, these fundamental therapies may be favored because they are less mentally and physically demanding, thereby promoting self-efficacy in patients with limited motivational reserves.

Low-intensity, repetitive exercises can activate the parasympathetic nervous system, helping to mitigate stress responses without the risk of over-exertion or dropout often associated with high-intensity exercise [30]. Moreover, integrating stretching and balance training addresses the increased muscle tension and instability common in psychiatric patients, helping to improve self-awareness and control over movements [31].

4.3. Characteristics of Target Patients and Physical Rehabilitation by Daily Life Independence Level

A notable finding was the significant tailoring of mobilization programs (bed mobility, transfer, and gait training) according to the patient's ADL level. While foundational exercises were universal, functional mobilization was selectively intensified for those with moderate independence (Levels B and C). Even in the "Completely Bedridden" group (Level D), the selective attempts at gait training suggest a shift from purely palliative care to a more proactive, recovery-oriented approach.

However, a key observation was the simultaneous prioritization of foundational therapies, such as ROM exercises and strength training, regardless of the disease category or ADL level. Given that over 70% of the study's subjects had schizophrenia, it is probable that the side effects of antipsychotic medication—such as extrapyramidal symptoms—and negative symptoms contributed to their reduced physical activity and motor function, leading to functional dependence [25,32]. In this context, physical therapy serves as more than just a physical intervention; it addresses the lack of motivation and psychological barriers often associated with chronic mental illness [25,33]. Therefore, unlike general physical rehabilitation, psychiatric physical therapy must employ an integrated approach that targets both mental symptoms and physical function.

Despite these proactive efforts, the complete absence of physical agent modalities (e.g., thermotherapy or electrical stimulation) reflects a common constraint in specialized

psychiatric hospitals. The inability to provide these treatments to alleviate pain and improve circulation may hinder the overall quality of care and patient quality of life [34]. The lack of equipment and specialized staffing for these therapies may limit the capacity for effective pain management, particularly for patients with orthopedic comorbidities. This institutional limitation remains a critical factor in shaping rehabilitation outcomes and the overall pace of functional recovery.

4.4. Limitations and Future Perspectives

Several limitations must be acknowledged. First, this single-center, retrospective study necessarily limits the generalizability of our findings. The patient demographics and rehabilitation practices observed may reflect the specific institutional culture and thus require further validation across different healthcare systems.

Second, the expert-driven classification process, while ensuring clinical relevance, may harbor subjective or institutional biases. Although we employed a multidisciplinary consensus-building approach to mitigate this risk, the absence of a standardized classification protocol, such as an automated algorithmic approach, remains a methodological limitation. While our multidisciplinary consensus sought to minimize individual bias, the process remains susceptible to institutional and subjective influence due to the lack of formal inter-rater reliability testing.

Future multi-center studies comparing expert-led and standardized classification approaches may help assess consistency across settings. Additionally, investigating the integration of advanced interventions for sarcopenia and pain management, alongside clarifying the interprofessional roles of physical and occupational therapists, nurses, and physicians, will be essential for developing evidence-based standards in the aging psychiatric population.

The absence of physical agent modalities (e.g., thermotherapy or electrical stimulation) due to equipment limitations at our institution must be considered. In particular, for the 'Lower Limb Lesions' and 'Upper Limb Lesions' groups, the lack of analgesic physical therapies may have influenced the pace of functional recovery. The inability to adequately manage pain through physical agents could potentially delay the progression of active exercise therapy, representing a specific institutional constraint on rehabilitation outcomes.

5. Conclusions

This study provides a descriptive overview of physical rehabilitation practices in a specialized psychiatric hospital, focusing on patient characteristics, clinical categorization, and rehabilitation modalities. Using an expert-led consensus-building process, we observed that physical rehabilitation was predominantly delivered to older psychiatric patients with severe mental illness who were at risk of functional decline related to disuse syndrome, neurologic disorders, and musculoskeletal conditions.

Across clinical categories, rehabilitation primarily centered on foundational motor therapies, including ROM exercises, strength training, and gait training. While these interventions are essential for maintaining basic physical function and preventing contractures, our findings suggest that broader and more proactive approaches may be needed to further support ADL and quality of life, including strategies addressing pain management and physical conditioning.

In conclusion, current practices appear to effectively support foundational functional maintenance within this single psychiatric care setting. However, a more comprehensive, multidisciplinary approach may be required to address the complex well-being and individualized needs of aging psychiatric patients. Further validation through multicenter and international studies using standardized algorithmic approaches is essential to confirm

the broader applicability of this categorization and establish evidence-based rehabilitation standards for the psychiatric population.

Author Contributions: Conceptualization, S.E., K.G., E.T. and T.T.; Methodology, S.E., K.G., E.T., H.I., K.M. (Kazushi Mifune) and T.T.; Validation, S.E., K.M. (Kazuyuki Matsumoto), H.I., Y.M., K.O., Y.Z., K.M. (Kazushi Mifune) and T.T.; Formal analysis, R.T., K.M. (Kazuyuki Matsumoto), H.I., Y.M., K.O., Y.Z., K.M. (Kazushi Mifune) and T.T.; Investigation, S.E., K.G., E.T., R.T., K.M. (Kazuyuki Matsumoto), H.I. and T.T.; Writing—original draft preparation, S.E., K.G., E.T., R.T., K.O. and T.T.; Writing—review and editing, S.E., R.T., H.I., K.O., K.S., A.P.B., L.B., S.K. and T.T.; Project administration, R.T., H.I., Y.M., K.S., A.P.B., L.B., S.K., K.M. (Kazushi Mifune) and T.T. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Mifune Hospital Clinical Research Ethics Review Committee (protocol code #20240911 and date of approval 11 September 2024).

Informed Consent Statement: Patient consent was waived from the Ethics Committee of The Mifune Hospital Clinical Research Ethics Review Committee as the study is a retrospective analysis of existing medical records. All data collected from medical records were fully anonymized prior to analysis to ensure patient confidentiality.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to ethical/privacy issues.

Acknowledgments: The authors express gratitude and appreciation to the participants.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

ADL	Activities of Daily Living
BPSD	Behavioral and Psychological Symptoms of Dementia
ROM	Range of Motion
IQR	Interquartile Range
ICD-10	International Classification of Diseases, 10th Revision

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