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Prevalence and Severity of Functional Capacity and Cognitive Health Among Individuals Recovering from Post-Acute Coronary Syndrome: A Cross-Sectional Study

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Abstract

Background: Individuals recovering from acute coronary syndrome (ACS) often experience persistent impairments in functional capacity and cognitive health, which may adversely affect recovery and quality of life. However, data examining the relationship between these domains during the post-acute phase remain limited.

Objective: To determine the prevalence and severity of functional capacity and cognitive impairment among individuals recovering from post-acute ACS and to examine the association between functional capacity and cognitive health.

Methods: This cross-sectional study included 120 clinically stable patients aged 40–75 years, evaluated 4–12 weeks after ACS**.** Functional capacity was assessed using the Six-Minute Walk Test (6MWT)**,** and cognitive function using the Montreal Cognitive Assessment (MoCA)**.** Correlation analysis was performed to examine the relationship between functional capacity and cognition.

Results: Participants had a mean age of 58.7 ± 9.1 years, with 69.2% males**.** A substantial proportion demonstrated reduced functional capacity and mild cognitive impairment. A moderate positive correlation was observed between 6MWT distance and MoCA scores **(**$p < 0.001$**).**

Conclusion: Reduced functional capacity and cognitive impairment are common in individuals recovering from post-acute ACS. The significant association between functional capacity and cognitive health highlights the importance of integrated cardiac rehabilitation strategies that address both physical and cognitive domains during recovery.

Keywords: Acute coronary syndrome; Functional capacity; Cognitive impairment; Six-minute Walk test; Montreal Cognitive Assessment; Cardiac rehabilitation.

1. Introduction

Acute coronary syndrome (ACS), encompassing unstable angina, ST-elevation myocardial infarction (STEMI), and non–ST-elevation myocardial infarction (NSTEMI), remains a leading cause of morbidity, disability, and mortality worldwide despite major advances in acute cardiac care and secondary prevention strategies.[1] Improvements in early diagnosis, reperfusion therapies, pharmacological management, and interventional cardiology have significantly increased survival rates following ACS. However, survival alone does not equate to full recovery, as many individuals experience persistent physical, cognitive, and psychosocial impairments during the post-acute coronary syndrome (PACS) phase.[2]

Functional capacity, defined as the ability to perform activities of daily living and sustain physical exertion, is a critical determinant of independence, quality of life, and long-term prognosis following ACS.[3] Reduced functional capacity in the post-ACS period is commonly attributed to myocardial injury, reduced cardiac output, skeletal muscle deconditioning, autonomic imbalance, endothelial dysfunction, and prolonged physical inactivity.[4] Evidence suggests that diminished functional capacity is associated with higher rates of rehospitalization, increased healthcare utilization, and elevated cardiovascular and all-cause mortality.[5] Consequently, assessment of functional capacity has become a cornerstone of post-ACS evaluation and cardiac rehabilitation planning.

In parallel with physical limitations, growing attention has been directed toward cognitive health in individuals recovering from ACS. Cognitive impairment following cardiac events is increasingly recognized as a prevalent but underdiagnosed complication.[6] Pathophysiological mechanisms proposed to underlie post-ACS cognitive dysfunction include cerebral hypoperfusion during acute ischemic events, micro embolic phenomena during coronary interventions, systemic inflammation, oxidative stress, and the cumulative impact of shared vascular risk factors such as hypertension, diabetes, and dyslipidemia.[7] Cognitive deficits most frequently affect executive function, attention, processing speed, and memory, which are essential for effective self-management and adherence to complex treatment regimens.[8]

Importantly, functional capacity and cognitive health are not isolated domains but are interrelated through common vascular, metabolic, and neurocardiac mechanisms.[9] Reduced physical activity and poor functional performance may exacerbate cognitive decline through decreased cerebral blood flow and neuroplasticity, while cognitive impairment may limit engagement in physical activity, exercise adherence, and participation in structured cardiac rehabilitation programs.[10] This bidirectional relationship underscores the need for integrated assessment approaches that address both physical and cognitive outcomes during recovery from ACS.

Despite the clinical relevance of these impairments, routine post-ACS care often prioritizes cardiovascular risk reduction while underemphasizing functional and cognitive evaluation, particularly in low- and middle-income countries. [11] Moreover, existing literature frequently examines functional capacity or cognitive impairment in isolation, with limited data describing their combined prevalence and severity during the post-acute recovery phase. Understanding this combined burden is essential for informing comprehensive, patient-centered rehabilitation strategies.

Therefore, the present cross-sectional study was designed to assess the prevalence and severity of reduced functional capacity and cognitive impairment among individuals recovering from post-acute coronary syndrome. Additionally, the study aimed to explore the association between functional capacity and cognitive health, thereby providing evidence to support integrated screening and multidisciplinary rehabilitation interventions in post-ACS care. [12]

2. METHODOLOGY

2.1 Study Design

A cross-sectional observational study

2.2 Participants

Individuals aged 40–75 years who had experienced ACS (STEMI, NSTEMI, or unstable angina) and were clinically stable 4–12 weeks post-event were recruited.

2.3 Inclusion Criteria:

- Diagnosed case of ACS
- Medically stable and cleared for functional assessment
- Ability to follow verbal instructions

2.4 Exclusion Criteria:

- History of stroke, dementia, or major neurological disorders
- Severe heart failure (NYHA class IV)
- Psychiatric illness affecting cognition
- Musculoskeletal conditions limiting ambulation

3. PROCEDURE

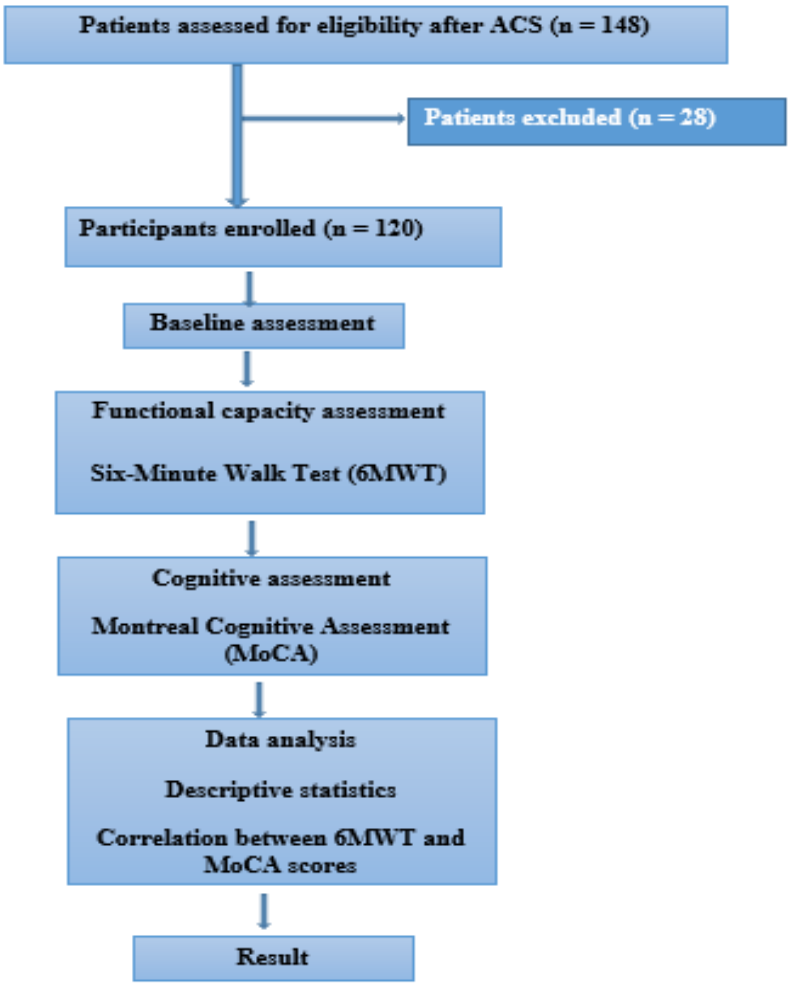

Figure. 1

4. OUTCOME MEASURES

4.1 Functional Capacity

Functional capacity was assessed using the Six-Minute Walk Test (6MWT) following American Thoracic Society guidelines. [6] Functional capacity was assessed using the Six-Minute Walk Test (6MWT) following American Thoracic Society guidelines. Distance walked (meters) was recorded and categorized as normal, mildly reduced, or severely reduced based on age and sex-predicted norms.

4.2 Cognitive Health

Cognitive function was assessed using the Montreal Cognitive Assessment (MoCA).[7] Cognitive function was assessed using the Montreal Cognitive Assessment (MoCA). Scores were interpreted as:

- Normal cognition: ≥26
- Mild cognitive impairment: 18–25
- Moderate cognitive impairment: 10–17

4.3 Ethical Considerations

The study was approved by the Institutional Ethics Committee. Written informed consent was obtained from all participants.

5. Statistical Analysis

Data were analyzed using SPSS software. Descriptive statistics (mean, standard deviation, frequency, and percentage) were used to summarize variables. Pearson or Spearman correlation coefficients were used to assess the relationship between functional capacity and cognitive scores. Statistical significance was set at $p < 0.05$.

5.1 Results

Participant Characteristics

A total of **120 participants** recovering from post-acute coronary syndrome (ACS) were included in the study. The mean age of the participants was **58.7 ± 9.1 years.** The study population demonstrated a male predominance, with **83 males (69.2%)** and **37 females (30.8%).**

With respect to ACS subtypes, **ST-elevation myocardial infarction (STEMI)** was the most common presentation, accounting for **45.0%** of cases, followed by **non–ST-elevation myocardial infarction (NSTEMI)** in **35.8%** and **unstable angina** in **19.2%** of participants.

Table 1. Baseline Demographic and Clinical Characteristics of Participants

ariable	**n (%)/Mean ± SD**
Age (years)	58.5 ± 9.0
Male sex	83 (69.2%)
Female sex	37 (30.8%)
BMI (kg/m²)	27.0 ± 3.5
STEMI	54 (45.0%)
NSTEMI	43 (35.8%)
Unstable angina	23 (19.2%)

Hypertension	77 (64.2%)
Type 2 diabetes mellitus	52 (43.3%)
Dyslipidemia	83 (69.2%)

Table 2. Functional Capacity Outcomes Based on Six-Minute Walk Test (6MWT)

Functional capacity category	**n (%)**	**6MWT distance (m) Mean ± SD**
Normal	27 (22.5%)	485.6 ± 43.2
Mildly reduced	60 (50.0%)	418.9 ± 38.7
Severely reduced	33 (27.5%)	331.4 ± 42.1

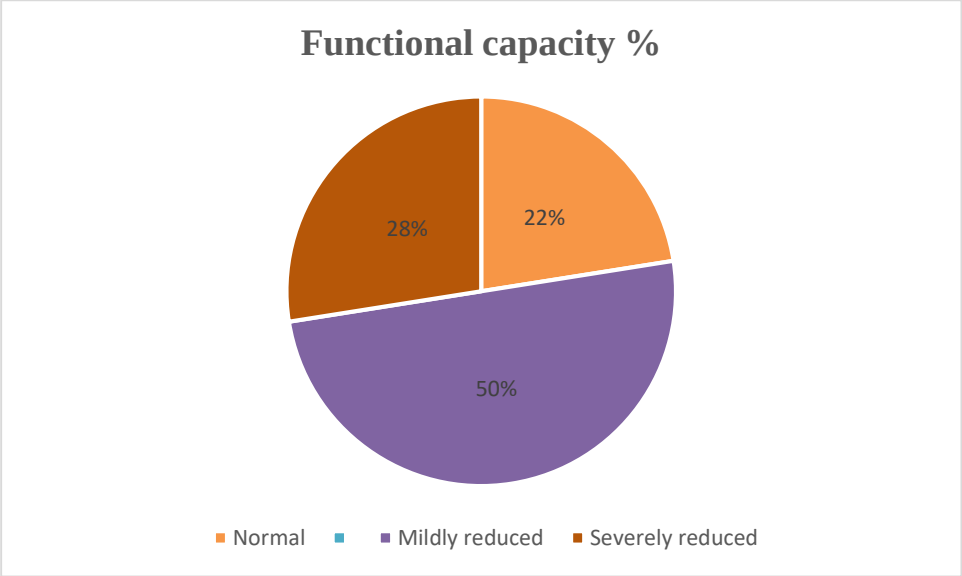

Table 3. Cognitive Health Status Based on Montreal Cognitive Assessment (MoCA)

Cognitive status	**MoCA score range**	**n (%)**
Normal cognition	≥26	29 (24.2%)
Mild cognitive impairment	18–25	64 (53.3%)

Moderate cognitive impairment	10–17	27 (22.5%)

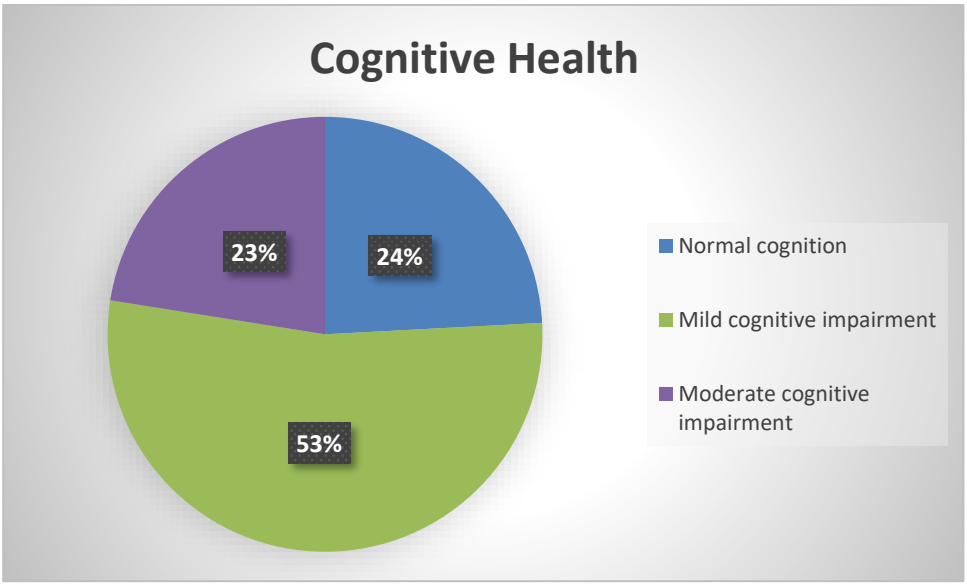

Table 4. MoCA scores across functional capacity categories (ANOVA)

Functional capacity category	**n (%)**	**MoCA score Mean ± SD**	**ANOVA F-value**	**p-value**
Normal	32 (26.7%)	26.4 ± 2.1	29.6	<0.001
Mildly reduced	55 (45.8%)	23.5 ± 3.1		
Severely reduced	33 (27.5%)	20.2 ± 3.3		

Table 5. Correlation between functional capacity and cognitive function (Pearson)

Functional capacity category	**Correlation coefficient (r)**	**p-value**
6MWT distance vs. MoCA score	0.49	< 0.001

6. Discussion

The present study examined functional capacity and cognitive health in individuals recovering from post-acute acute coronary syndrome (ACS) and explored the association between these two clinically relevant domains. The findings demonstrate that a substantial proportion of patients exhibited reduced functional capacity and cognitive impairment within 4–12 weeks following the ACS event. Importantly, a moderate positive relationship was observed between Six-Minute Walk Test (6MWT) distance and Montreal Cognitive Assessment (MoCA) scores, indicating that individuals with better functional capacity tended to have superior cognitive performance.

Reduced functional capacity following ACS is well documented and may be attributed to myocardial injury, deconditioning, autonomic dysfunction, and reduced physical activity during recovery. The mean 6MWT distance observed in the present study is comparable to values reported in previous cardiac rehabilitation cohorts, suggesting persistent limitations even after clinical stabilization. Such impairments may delay return to daily activities and negatively affect long-term cardiovascular outcomes.

Cognitive impairment was also prevalent in this cohort, with a majority of participants demonstrating mild deficits on MoCA assessment. Post-ACS cognitive changes have been linked to cerebral hypoperfusion, vascular inflammation, endothelial dysfunction, and shared cardiovascular risk factors such as hypertension and diabetes. Early cognitive deficits may adversely influence treatment adherence, self-management behaviors, and participation in rehabilitation programs.

The observed association between functional capacity and cognitive health highlights the interconnected nature of cardiac and cerebral recovery. Improved functional capacity may reflect better cardiovascular efficiency and cerebral perfusion, thereby supporting cognitive function. Conversely, cognitive impairment may limit engagement in physical activity, contributing to poorer functional outcomes. These findings align with previous evidence suggesting that physical fitness is an important determinant of cognitive performance in cardiac populations.

From a clinical perspective, the results emphasize the need for comprehensive post-ACS assessment strategies that extend beyond traditional cardiac parameters. Incorporating simple, validated tools such as the 6MWT and MoCA into routine evaluations may facilitate early identification of patients at risk for suboptimal recovery. Furthermore, integrated cardiac rehabilitation programs that combine physical training with cognitive engagement may offer additional benefits during the post-acute phase.

This study has certain limitations. Its cross-sectional design precludes causal inference, and cognitive assessment was limited to a screening tool rather than detailed neuropsychological testing. Additionally, the study did not account for psychosocial factors or medication effects that may influence cognition and functional capacity. Despite these limitations, the study provides clinically relevant insights into the early recovery phase following ACS.

7. Conclusion

Individuals recovering from post-acute coronary syndrome commonly exhibit reduced functional capacity and mild cognitive impairment. The significant positive association between functional capacity and cognitive health highlights the interrelated nature of physical and cognitive recovery following ACS. These findings support the incorporation of combined functional and cognitive assessment into routine post-ACS evaluation and emphasize the importance of comprehensive rehabilitation strategies addressing both domains to optimize recovery outcomes.

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