

# **Functional Improvement for Heart Failure Patients After Left Ventricular Assistive Device Placement in a Free Standing Rehabilitation Hospital**

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# Affiliations/ Disclosure

- Department of Physical Medicine and Rehabilitation, University of Kentucky
  - Cardinal Hill Rehabilitation Hospital, Lexington, Kentucky
    - Financial Support- None



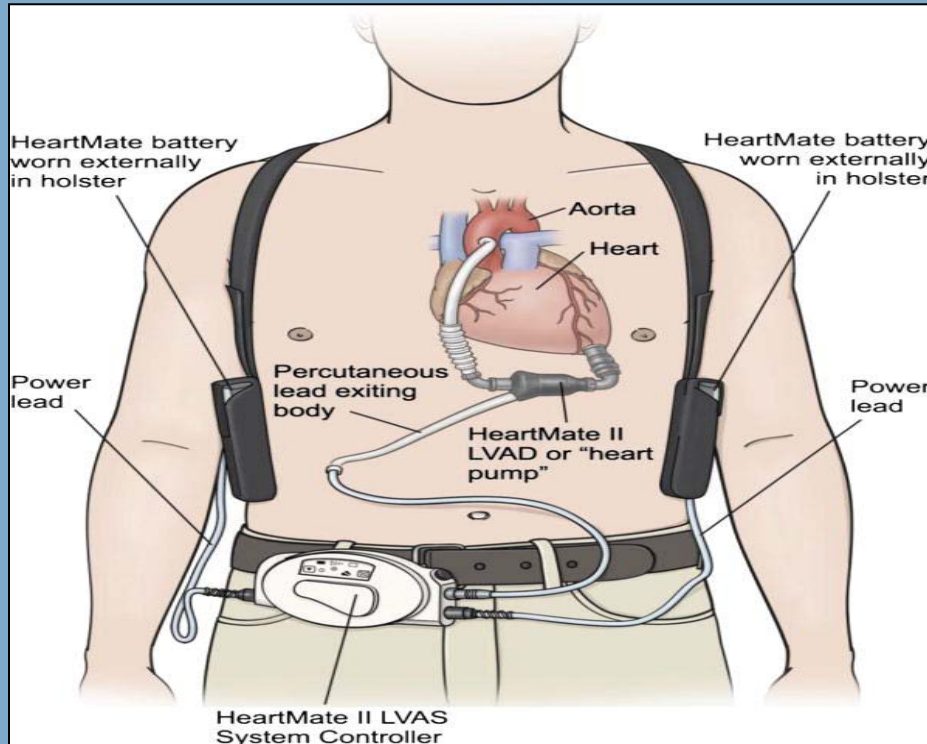
# Background

- Around 250,000–500,000 people in US have end-stage heart failure<sup>1</sup>.
- Previously, heart transplantation was the only intervention proven to improve survival.
- Left ventricular assistive devices (LVADs) have emerged as a bridging treatment for patients waiting for heart transplantation and, later, as a destination treatment<sup>2</sup>.
- Studies have demonstrated that LVAD placement improved survival compared with maximal medical management of patients with end-stage heart failure<sup>5</sup>.



# Background

- People who have LVAD placement often have deficits in ADLs<sup>3</sup> secondary to decreased cardiac output and strength and endurance from prolonged immobility and myopathy<sup>4</sup>.
- Our study is different from previous studies<sup>6,7</sup>, because we compared functional outcomes in a free standing rehab hospital rather than a tertiary care hospital and also analyzed for significance of FIM components and sub components .



Heartmate II left ventricular assist device with harness and controller. LVAS indicates left ventricular assist system <sup>6</sup>



# Objectives

- **The objective of this study is to determine the effectiveness of acute inpatient rehabilitation (AIR) in a free standing rehab hospital with respect to functional improvement in patients who have undergone LVAD placement.**
- **This study examines the length of stay (LOS), change in functional independence measure (FIM) score, and discharge location of patients admitted to AIR at Cardinal Hill Rehabilitation Hospital (CHRH) after LVAD placement.**



# Hypothesis

- **AIR in a free standing rehab hospital will improve functional outcomes in patients who have undergone LVAD placement.**



# Study Design/ Statistics

- A retrospective chart review of patients admitted for AIR at CHRH after placement of LVAD from 01/2011 to 11/2013 was performed.
- Statistical Package for the Social Sciences version 20.0 (SPSS Inc, Chicago, IL) was used to analyze the results.



# Study Population

- **Inclusion Criteria:** Hospital records of all the patients with LVAD admitted to CHRH over a 34-month period, between Jan 2011 and Nov 2013, was reviewed. All patients with LVAD admitted to the CHRH irrespective of their initial admission diagnoses were included.
- **Exclusion criteria:** Patients were excluded if they were younger than 18 or if they were pregnant.
- **Participants:** A total of 20 LVAD patients were identified.





# Interventions

- **Once the patients were admitted to the CHRH, they would receive a standard inpatient rehabilitation program, defined as a total of 3 hours per day of comprehensive physical and occupational therapy as well as speech therapy as indicated. Physiatrists would have provided routine inpatient rehabilitation management, and the patients were followed up by the acute care LVAD team on a consulting basis while the patients were in the CHRH.**
- **We secured approval by the University of Kentucky/CHRH Institutional Review Board and began data collection**



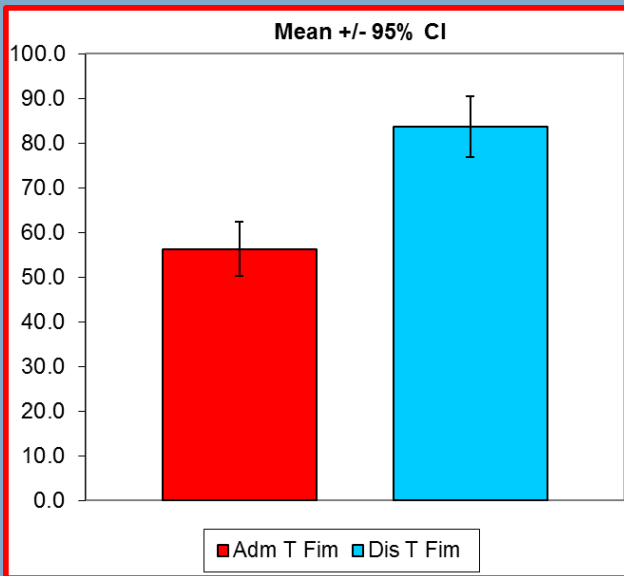
# Research Procedures

- We coded all subjects' data with numbers so the processed data excluded any identifiers. No identifiable protected health information was collected from the proposed chart reviews.
- Main Outcome Measures:
  - ❑ Change in total FIM scores
  - ❑ Change in motor and cognitive components of FIM scores
  - ❑ Change in self-care, sphincter control, transfer mobility, locomotion, communication, social cognition sub-components of FIM scores
  - ❑ LOS
  - ❑ Total FIM gain
  - ❑ Total FIM efficiency
  - ❑ Discharge setting after AIR stay



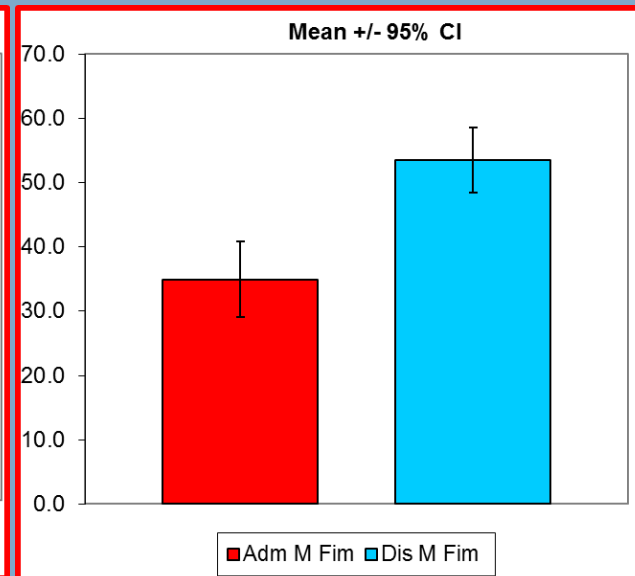
# Results: Total; motor and cognitive components

## Total FIM



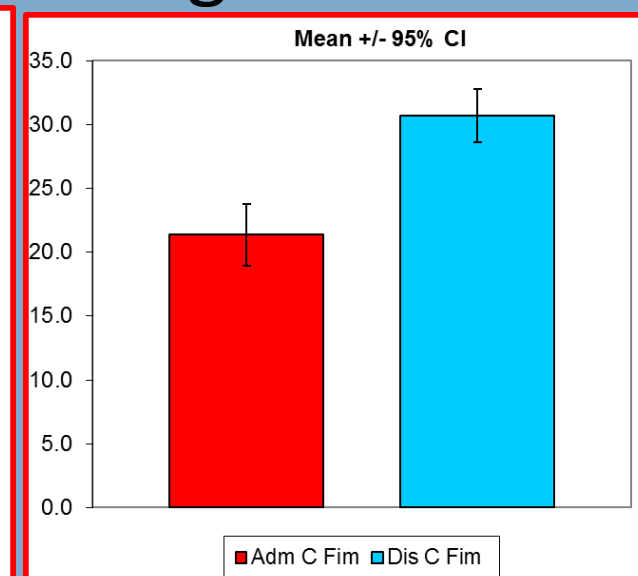
	Adm T Fim	Dis T Fim
Mean =	56.300	83.650
Standard Deviation =	12.974	14.630
95% Confidence Interval =	6.072	6.847
N =	20	20
2-tail t-test p value:	<b>0.000</b>	
	<b>Significant</b>	

## Motor FIM



	Adm M Fim	Dis M Fim
Mean =	34.950	53.450
Standard Deviation =	12.534	10.865
95% Confidence Interval =	5.866	5.085
N =	20	20
2-tail t-test p value:	<b>0.000</b>	
	<b>Significant</b>	

## Cognitive FIM



	Adm C Fim	Dis C Fim
Mean =	21.350	30.700
Standard Deviation =	5.194	4.414
95% Confidence Interval =	2.431	2.066
N =	20	20
2-tail t-test p value:	<b>0.000</b>	
	<b>Significant</b>	

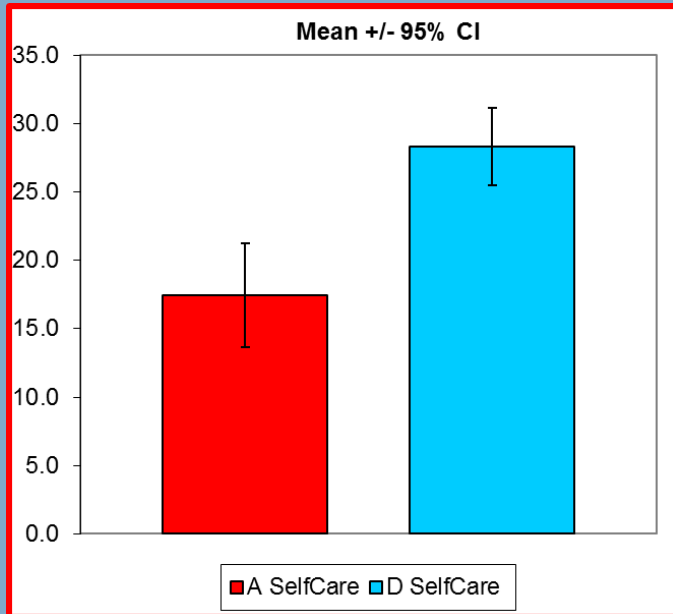
AIR resulted in a significant increase in:

- (1) total FIM score ( $p < 0.0001$ ) [ $\alpha = 0.05$ ];
- (2) motor ( $p < 0.0001$ ) & cognitive ( $p < 0.0001$ ) FIM components [ $\alpha = 0.025$ ]



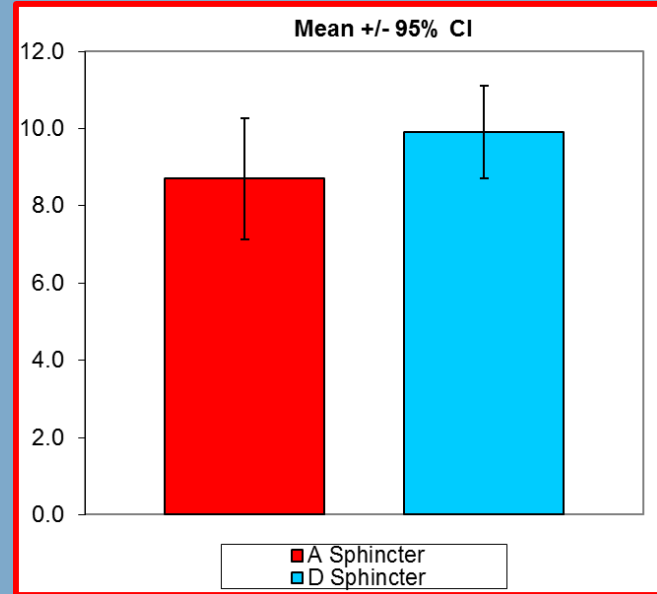
# Results for motor sub-components

## Self Care FIM



	A SelfCare	D SelfCare
<b>Mean =</b>	17.450	28.300
<b>Standard Deviation =</b>	8.134	5.975
<b>95% Confidence Interval =</b>	3.807	2.796
<b>N =</b>	20	20
<b>2-tail t-test p value:</b>	<b>0.000</b>	
	<b>Significant</b>	

## Sphincter FIM



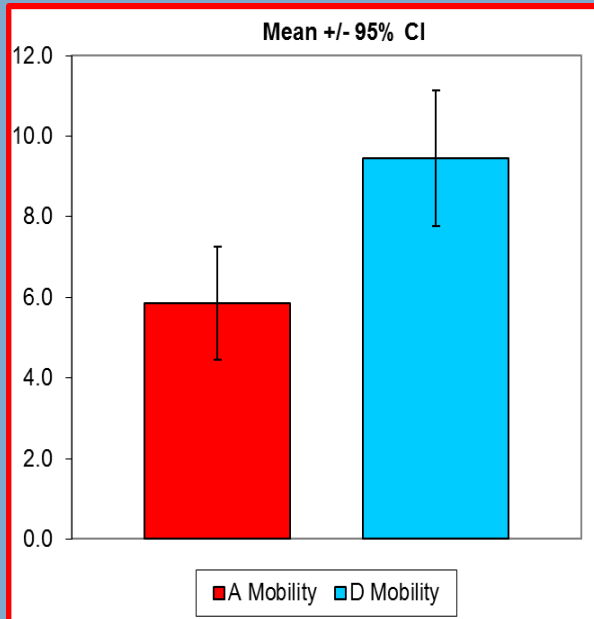
	A Sphincter	D Sphincter
<b>Mean =</b>	8.700	9.900
<b>Standard Deviation =</b>	3.358	2.553
<b>95% Confidence Interval =</b>	1.571	1.195
<b>N =</b>	20	20
<b>2-tail t-test p value:</b>	<b>0.211</b>	
	<b>Not Significant</b>	

AIR resulted in a significant increase in self-care ( $p < 0.0001$ ) sub components of FIM [ $\alpha = 0.008$ ]



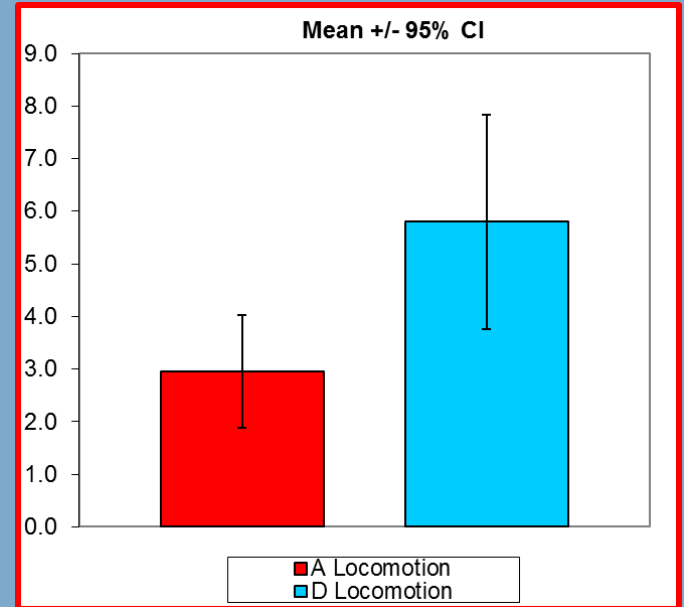
# Results for motor sub-components

## Mobility FIM



	A Mobility	D Mobility
Mean =	5.850	9.450
Standard Deviation =	2.978	3.591
95% Confidence Interval =	1.394	1.680
N =	20	20
2-tail t-test p value:	0.001	
	<b>Significant</b>	

## Locomotion FIM



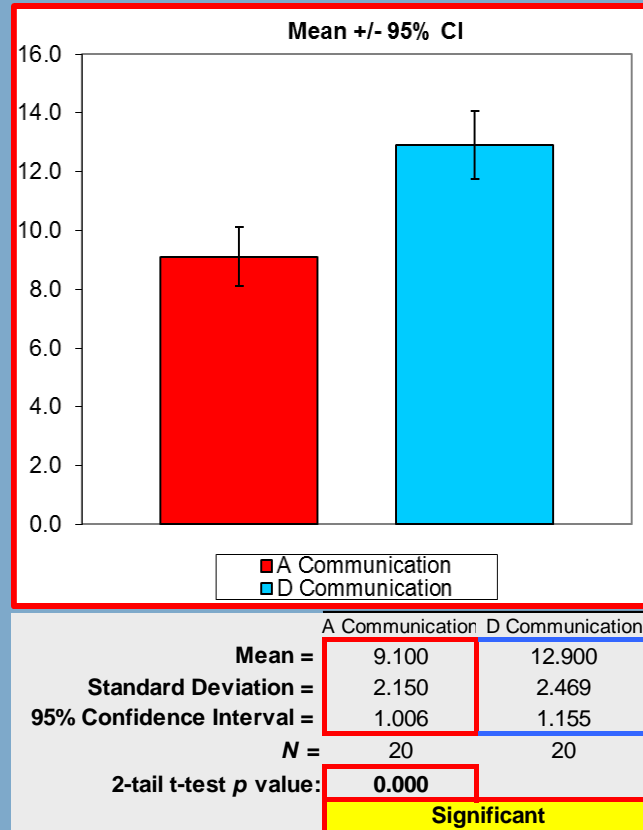
	A Locomotion	D Locomotion
Mean =	2.950	5.800
Standard Deviation =	2.282	4.348
95% Confidence Interval =	1.068	2.035
N =	20	20
2-tail t-test p value:	0.013	
	<b>Not Significant</b>	

AIR resulted in a significant increase in transfer-mobility ( $p = 0.0001$ ) sub components of FIM [ $\alpha=0.008$ ]

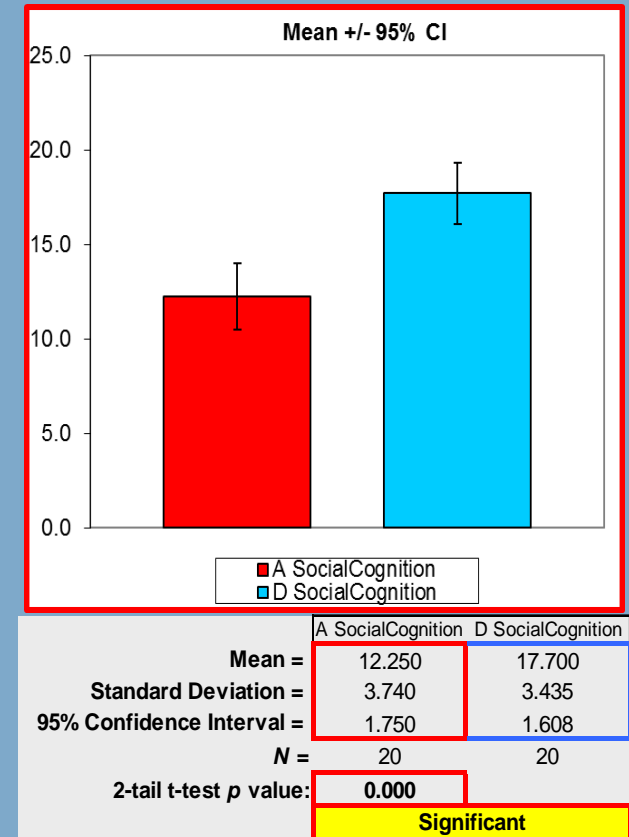


# Results for cognitive sub-components

## Communication FIM

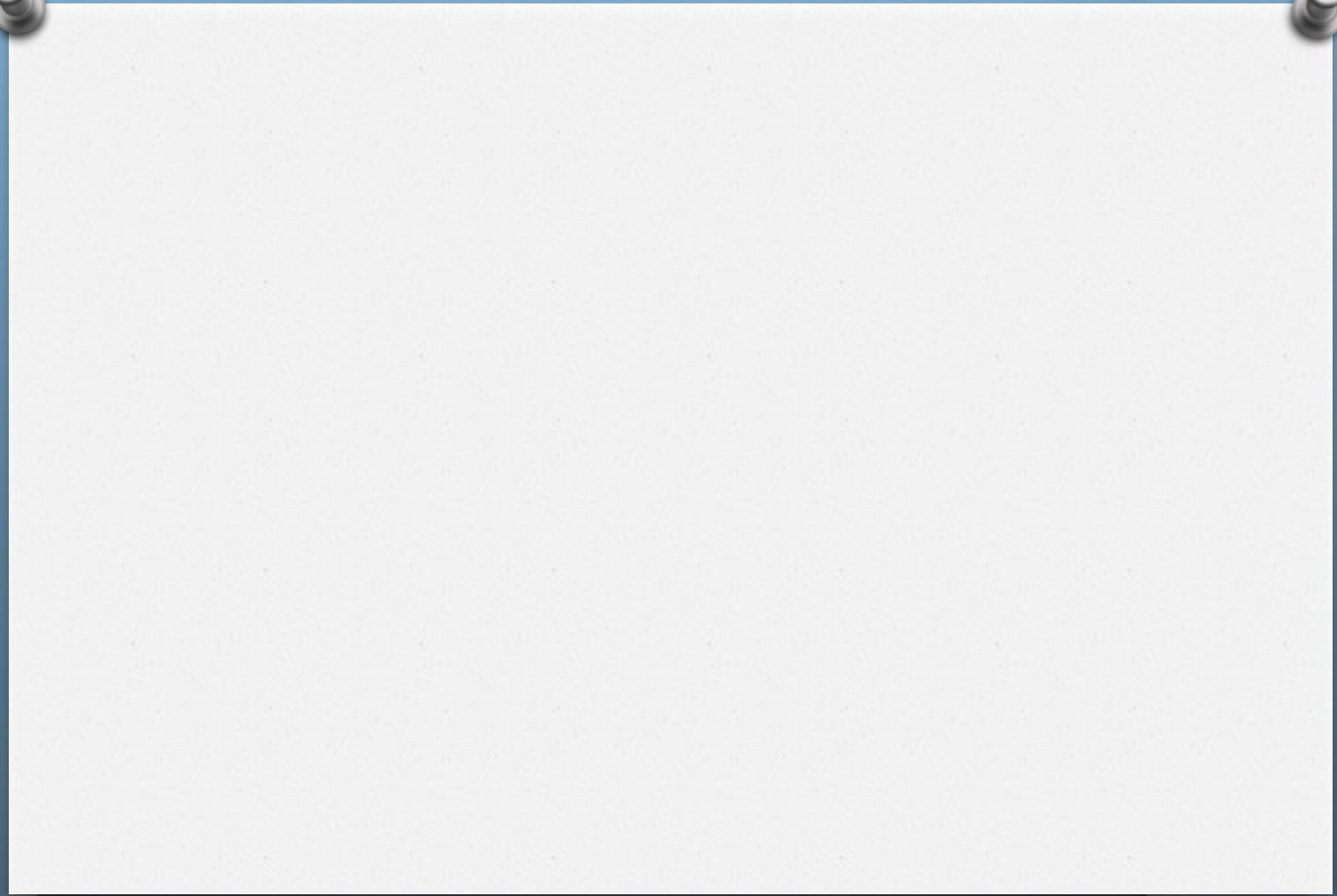


## Social Cognition FIM



AIR resulted in a significant increase in communication ( $p < 0.0001$ ), and social cognition ( $p < 0.0001$ ) sub components of FIM [ $\alpha=0.008$ ]





# Conclusions

- **Our findings are similar to Nguyen E et al., 2013<sup>7</sup>. However, data from our study was collected in a free-standing rehab hospital versus tertiary care hospital.**
- **Our findings further suggest that patients with LVADs achieved significant motor [self care and transfer mobility] and cognitive [communication and social cognition] functional gains during AIR stay, which were not previously reported.**
- **The beneficial effect of AIR stay promotes discharge home.**





# Acknowledgement

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Thank  
you



**Any Questions...**  
**Just Ask!**

