# Impact of body mass index on the clinical outcomes in heart failure patients undergoing cardiac rehabilitation

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**Background:** Increased body mass index (BMI) has recently shown to have a favorable effect on the prognosis in heart failure (HF) patients. However, the impact of BMI on clinical events and mortality in HF patients who underwent cardiac rehabilitation (CR) remains unclear.

**Purpose:** This study aimed to investigate whether the obesity paradox is present in HF patients who have undergone CR.

**Methods:** This study enrolled 238 consecutive HF patients who had undergone CR at our university hospital between November 2015 and October 2017. The clinical characteristics and anthropometric data of these patients, including BMI, were collected at the beginning of the CR. The major adverse cardiovascular event (MACE) was defined as a composite of all-cause mortality and unplanned hospitalization for HF. Follow-up data regarding the primary endpoints were collected until November 2018.

**Results:** Patients (mean age 68.7 years, male 61%) were divided into four groups as per BMI quartiles. More patients in the highest BMI group were women, were significantly younger, and had a higher prevalence of hypertension, dyslipidemia, and diabetes mellitus; however, no significant differences were observed in the prevalence of chronic kidney disease, left ventricular ejection fraction, and brain natriuretic peptide levels of the four groups. During a median follow-up duration of 583 days, 28 patients experienced all-cause mortality, and 42 were hospitalized for HF. Kaplan–Meier analysis showed that patients in the highest BMI quartiles had lower rates of MACE (Log-rank $P<0.05$) (Figure 1). After adjusting for confounding factors, Cox regression multivariate analysis revealed that BMI was negatively and independently associated with the incidence of MACE (hazard ratio: 0.89, 95% confidence interval: 0.83–0.96, $P<0.05$).

**Conclusion:** Increased BMI was associated with better clinical prognosis even in HF patients who have undergone CR Therefore, BMI assessment may be useful for risk stratification in HF patients who have undergone CR.

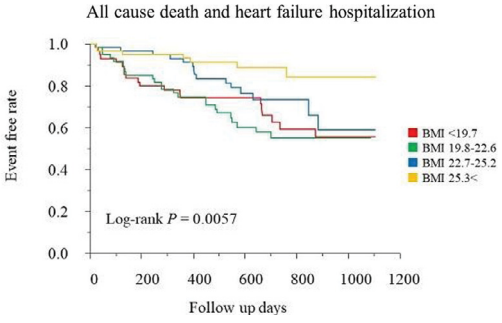


Figure 1. Kaplan-Meier survival curve