

## Heart Rate Reserve and Cognitive Impairment

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### **Introduction:**

Age-associated cognitive decline that is greater than expected but without significant functional disability is designated mild cognitive impairment (MCI). Data from several studies suggest that aerobic exercise may be an effective intervention for preserving cognition and possibly alleviating disability associated with mild cognitive impairment. Heart rate reserve (HRR) is the difference between a person's measured or predicted maximum heart rate and resting heart rate ( $HRR = HR_{max} - HR_{rest}$ ).

Chronotropic incompetence (CI) is defined as the inability to achieve 80% of heart rate reserve, using a population-specific equation for age-predicted maximal heart rate.

### **Aim:**

We aimed to examine the relationship between HRR and CI with cognitive state in old age subjects.

### **Methods:**

54 old and oldest old nursing home residents (34 females & 20 males), age range = 75-92 yrs, with a  $\geq 18$  score in the MMSE (mini mental status examination), e/o 0-1 CDR (clinical dementia rating) impairment level, who completed a submaximal treadmill exercise test (Modified Bruce or Naughton protocols). Patients with clinical frailty scale 5-7 were excluded.

### **Results:**

MMSE = 21.11 +/- 3.35 s.d., Mean HRR = 46.03 +/- 11.02 s.d., Mean CI = 60.2% +/- 5.5s.d, METS achieved = 4.15 +/- 1.13, Frailty index score was 1.8 +/- 0.27s.d. HRR & CI correlated well with MMSE score,  $r = 0.88$  &  $0.79$ ,  $p < 0.01$ , consecutively. METS correlated with MMSE score,  $r = 0.66$ ,  $p < 0.01$  while no significant correlation was found between Frailty index and HRR or CI. No correlation was found between blood pressure and MMSE, CI & Frailty Index.

### **Conclusions:**

Exercise fitness indices correlated well with cognition in patients with mild cognitive impairment.

Exercise may be considered an effective non-pharmacologic intervention for preserving healthy cognition.