

# Stress hormone levels associated with grip strength and walking speed

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Lower morning and higher evening cortisol levels contribute to frailty in older individuals, according to new research accepted for publication in the Endocrine Society's *Journal of Clinical Endocrinology & Metabolism (JCEM)*.

Frailty confers a high risk for institutionalization and increased risk of mortality and is characterized by unintentional weight loss, feelings of exhaustion and fatigue, physical inactivity, slow gait speed and low grip strength. Neuroendocrine function, including [cortisol](#) secretion, is thought to be involved in the etiology of [frailty](#), but until now the underlying biological mechanisms have not been well understood.

"Cortisol typically follows a distinct daily pattern with the highest level in the morning and the lowest basal level at night," said Karl-Heinz Ladwig, PhD, MD, of Helmholtz Zentrum München in Neuherberg, Germany and an author of the study. "Our findings showed dysregulated [cortisol secretion](#), as featured by a smaller morning to evening [cortisol level](#) ratio, was significantly associated with frailty status."

In this study, researchers conducted a cross-sectional analysis of 745 participants between the ages of 65 and 90 years. Cortisol levels were measured using saliva samples at three points: awakening, 30 minutes after awakening and evening. Participants were classified as frail if three or more of the following criteria were met: exhaustion, physical inactivity, low walking speed, weakness (measured by grip strength) or weight loss (loss of more than 5 kilograms in the past six months).

"Our results suggest a link between disrupted cortisol regulation and loss of muscle mass and strength, as the underlying pathophysiology of frailty," said Hamimatunnisa Johar, a PhD student at Helmholtz Zentrum München and an author of the study. "In a clinical setting assessment of frailty can be time-consuming, and our findings show measurements of cortisol may offer a feasible alternative."

**More information:** The study, "Blunted Diurnal Cortisol Pattern is Associated with Frailty: A Cross-Sectional Study of 745 Participants Aged 65 to 90 Years," appears in the March issue of *JCEM*.

Provided by The Endocrine Society

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