Visual acuity and increased mortality: the role of allostatic load and functional status.

PURPOSE: Poor vision may detrimentally impact functional status and affect allostatic load (AL), a measure of cumulative physiological wear and tear on the body's regulatory systems. We examined the direct effects of visual acuity (VA) on mortality and its indirect effect on mortality through its impact on functional status and AL in older adults.

METHODS: Data from 4981 participants (age ≥ 60 years) from the 1999-2004 National Health and Nutrition Examination Survey (NHANES) with mortality linkage through 2006 were analyzed. Functional status was assessed by activities of daily living (ADL) and instrumental activities of daily living (IADL). The AL index was composed of 10 biomarkers: systolic and diastolic blood pressures, body mass index (BMI), glycosylated hemoglobin, total cholesterol, triglycerides, albumin, C-reactive protein, homocysteine, and creatinine clearance. Visual acuity was categorized as no (20/20-20/25), mild (20/30-20/40), moderate (20/50-20/80), or severe (≥20/200) visual impairment. Structural equation modeling using three mediating variables representing ADL, IADL, and AL examined the effects of VA on all-cause and cardiovascular disease (CVD)-related mortality.

RESULTS: Adjusting for all covariates, a one-unit change in VA category increased mortality risk (hazard ratio [HR] = 1.17; 95% confidence interval [CI] 1.05, 1.32); IADL and AL predicted mortality (HR = 1.15; CI 1.10, 1.20 and HR = 1.13; CI 1.06, 1.20, respectively). Activities of daily living did not predict mortality (HR = 0.98; CI 0.91, 1.05). Worse VA was associated with increased AL (β = 0.11; P = 0.013) and worse IADL (β = 1.06; P < 0.001). Worse VA increased
mortality risk indirectly through AL (HR = 1.01; CI 1.00, 1.03) and IADL (HR = 1.16; CI 1.09, 1.23). The total effect of VA on mortality including through IADL and AL was HR = 1.38 (CI 1.23, 1.54). Similar but slightly stronger patterns of association were found when examining CVD-related mortality, but not cancer-related mortality.

**CONCLUSIONS:** Allostatic load and particularly IADL may function as mediators between VA impairment and mortality. Older adults with VA impairment could potentially benefit from interventions designed to prevent IADL functional status decline to reduce the risk of mortality.

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