

Momentary triggers, lasting impact: Environmental dynamics and agitation in dementia

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- Dynamic home environmental factors explained substantial variability in severity of agitation.
- Sensory environmental dynamics showed distinct associations with agitation severity.
- Indoor microclimate conditions were significantly related to risk for agitation.

INTRODUCTION & METHODS	METHODS	RESULTS	CONCLUSIONS	REFERENCES	
- Evidence on how environmental triggers in home settings lead to momentary agitation remains limited. Data Source: Secondary analysis utilizing BESI Phase II data for comprehensive environmental tracking. Setting: Continuous 30-day monitoring within the familiar home environments of 7 persons living with dementia. Events: Captured, documented, and analyzed 181 distinct agitation events to determine correlations. Modeling: Employed Generalized Additive Mixed Models (GAMM) for robust, non-linear statistical analysis.	Generalized Additive Mixed Models (GAMM) Transformation To ensure robust statistical evaluation, agitation levels and all environmental measures were strictly rank-transformed. Validation Model assumptions were rigorously tested and verified using residual distribution analysis and concavity metrics. Modeling Applied Generalized Additive Mixed Models (GAMM) to accurately examine complex, dynamic relationships. Diagram: Sensory Environmental Measures Sensory Measures Light Levels (Lux) Noise (dB) Microclimate Measures Pressure (hPa) Humidity (%) Temperature (°F) 30 Minutes Before 30 Minutes Event Time Agitation Event 30-Minute Exposure Window Momentary Value at Event Time Mean Range Change Event - 30 Min Prior Event - 30 Min Prior 64% OF TOTAL VARIANCE Significant Explanatory Power The generalized additive mixed models successfully explained approximately 64% of the variance in levels of agitation utilizing solely in-home, room-level environmental data.	Sensory Dynamics Changes in Noise Exhibited a significant, non-linear relationship to higher agitation levels. (edf=3.78, p<0.001) Changes in Lighting Displayed a significant negative linear relationship to agitation severity. (edf=1.00, p=0.011) Indoor Microclimate Temperature Mean temperature displayed a positive linear relationship to agitation (edf=1.00, p=0.003). Barometric Pressure Elevated mean pressure exhibited a significant non-linear relationship (edf=1.73, p=0.003). Humidity Mean humidity showed a distinct non-linear, quadratic relationship to agitation (edf=2.60, p=0.004). Figure (Left): Sensory environmental measures and levels of agitation Figure (Right): Indoor microclimate measures and levels of agitation Light (logit) Noise (logit) Humidity (mean) Pressure (mean)	Shift in Paradigm: Agitation in dementia is a contextual, dynamic response to shifting indoor sensory inputs and room routines. Intervention: Target shifting environmental variability (noise, temperature, and thermal-humidity discomfort), for home-based risk interventions to reduce agitation severity. Future Research: Focus on individual-level microenvironmental factors (customizable lighting, temperature, and noise control); Explore interactions between dementia agitation and co-occurring behavioral conditions influenced by adjustable indoor factors.	Au-Yeung W-TM, Miller L, Wu C-Y, et al. Examining the relationships between indoor environmental quality parameters pertaining to light, noise, temperature, and humidity and the behavioral and psychological symptoms of people living with dementia: Scoping review. <i>Interact J Med Res.</i> 2024;13: e56452. doi:10.2196/56452 Bankole A, Anderson MS, Homdee N, et al. BESI: behavioral and environmental sensing and intervention for dementia caregiver empowerment-phases 1 and 2. <i>Am J Alzheimers Dis Other Demen.</i> 2020; 35:1533317Fauth EB, Zarit SH, Femia EE, Hofer SM, Stephens MAP. Behavioral and psychological symptoms of dementia and caregivers' stress appraisals: intra-individual stability and change over short-term observations. <i>Aging Ment Health.</i> 2006;10(6):563-573. doi:10.1080/13607860600638107520906686. doi:10.1177/1533317520906686 Delaney SW, Stegmuller A, Mork D, et al. Extreme heat and hospitalization among older persons with Alzheimer disease and related dementias. <i>JAMA Intern Med.</i> 2025;185(4):412-421. doi:10.1001/jamainternmed.2024.7719 Gitlin LN, Winter L, Corcoran M, Dennis MP, Schinfeld S, Hauck WW. Effects of the home environmental skill-building program on the caregiver-care recipient dyad: 6-month outcomes from the Philadelphia REACH initiative. <i>Gerontologist.</i> 2003;43(4):532-546. doi:10.1093/geront/43.4.532	CONTACT Chunhong Xiao, PhD, RN, University of Tennessee at Knoxville, United States, CXIAO9@UTK.EDU. ALZHEIMER'S ASSOCIATION AAIC 26