

Title: Epidemiology and burden of sleep disturbances in atopic dermatitis in US adults.

Running Header: Sleep in adult AD.

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Abstract

Background: The complex relationship between atopic dermatitis (AD) severity, sleep disturbance (SD), and health-related outcomes is not fully elucidated.

Objective: To determine the prevalence of SD in adult AD, and its relationship with AD severity and health outcomes among the US population.

Methods: A cross-sectional, US population-based survey study of 2893 adults was performed. AD was determined using modified UK Diagnostic Criteria.

Results: Among adults with AD, 255 (40.7%) reported at least one night of SD, 67 (11.1%) reported 3-4 nights and 57 (9.5%) reported 5-7 nights of SD in the past week. Moreover, 475 (79.7%) reported at least some trouble sleeping in the past 3 days. Frequency of SD was associated with increased severity of SD, with SD occurring on 3-7 vs. 0-2 nights having higher proportions of moderate and/or severe SD (Chi square, $P < 0.0001$). Among adults with AD, more severe SD was associated with younger age ($P = 0.009$), lower level of education (Chi square, $P = 0.0003$), Hispanic ethnicity ($P = 0.005$), lower household income ($P < 0.0001$), but not gender ($P = 0.26$) (Figure 2). Similarly, more frequent SD was associated with lower level of education ($P = 0.0003$) and household income ($P < 0.0001$), but not age ($P = 0.38$), gender ($P = 0.95$), or race/ethnicity ($P = 0.72$). In multivariable linear regression models, moderate and severe Patient-Oriented Scoring AD (PO-SCORAD), Patient-Oriented Eczema Measure (POEM) and Numerical Rating Scale (NRS)-itch and skin pain were associated with more severe SD compared to those without AD. In multivariable linear regression models adjusting for POEM, NRS-itch, and socio-demographics, more frequent and severe SD were associated with higher Dermatology Life Quality Index (DLQI), lower Short Form-12 physical and mental component scores, and higher Hospital Anxiety and Depression Scores (HADS). Significant causal

mediation by SD severity was observed between POEM and NRS-itch with DLQI, SF-12 PCS and MCS, HADS-A and HADS-D scores, diagnosed anxiety and heart disease; marginally significant mediation by SD was observed for hypertension.

Conclusion: AD is associated with increased SD, with worse SD in more severe AD. SD considerably impact quality of life and other health outcomes in adults with AD.