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Letter to the Editor

August 6, 2012

Mark P. Jensen, PhD, Editor, *The Journal of Pain*, University of Washington, Rehabilitation Medicine, 1959 NE Pacific Street, Box 356490, Seattle, WA 98195-6490

Refers to: Slade GD, Sanders AE, Kunthel B. Role of allostatic load in sociodemographic patterns of pain prevalence in the U.S. population. The Journal of Pain, 2012; 13 666-675.

Dear Dr. Jensen:

We would like to express appreciation to Slade and colleagues for exploring on a population-based level the associations between pain prevalence and allostatic load. The relationship between pain and stress has been recognized conceptually;[2;10] however, studies evaluating the purported dynamics are limited.[14] The selection of allostatic load provides a solid framework from which to initiate the evaluation of possible systemic dysregulation contributing to or resulting from chronic pain conditions.[1] The authors establish an important foundation for further scientific effort in an area with high relevance for patients, providers, and researchers.[15] In order to advance understanding of predisposing risk factors contributing to the onset of chronic pain and/or the consequences of the physiological toll of chronic pain, three areas in particular warrant consideration in future studies: 1) the directional relationships between allostatic load and pain need to be clearly defined and investigated; 2) a comprehensive array of biological measures reflecting allostatic load and chronic pain need to be explored; and 3) the influence of maladaptive and protective factors need to be considered when evaluating relationships between pain, SES, and allostatic load.

First, two directions between pain and allostatic load can be hypothesized. One proposes that allostatic load increases the risk of onset of chronic pain conditions or pain-related symptoms. For example, the association of childhood adverse psychosocial stress (conceptualized as allostatic load) with the onset of arthritis in adulthood has been investigated.[18] In keeping with this, the current study hypothesized that high allostatic load resulting from SES and ethnic/racial differences would account for the occurrence of pain symptoms within a one to three month time period.[15] However, a second direction that can be hypothesized is that the physiological consequences of chronic pain and pain-related biopsychosocial sequelae (e.g., disrupted sleep patterns, functional limitations, decreased social interactions, unemployment) may increase allostatic load. Based on the questions

evaluated in the current study, differentiating the allostatic profile associated with acute or intermittent pain compared to chronic pain is not possible. Allostasis is an adaptive response to stress, but under conditions of chronic and unrelenting stress, allostatic load, an index of biological burden, becomes apparent.[8] Chronic pain has been associated with increased mortality,[16] indications of an "overloaded" system. Exploring the second direction, the consequences of chronic pain and associated stressors and lifestyle on system functioning and resulting allostatic load might prove equally relevant.[1] In order to adequately quantify the physiological burden of chronic pain and associated stressors, measures of pain duration, frequency (e.g., persistent or intermittent), intensity, and suffering[3] and other relevant psychosocial measures should be included.

Second, as noted by the authors, the allostatic load battery implemented in the study is based on 10 secondary measures of allostatic load. More comprehensive batteries of neuroendocrine, immune, metabolic, and cardiovascular systems have been evaluated in prior studies of allostasis.[6;11] Essentially, a battery is only as good as the individual markers that are selected for the endpoint under study, in this case, pain. In addition to including primary mediators (cortisol, noradrenalin, epinephrine, and DHEA, dehydroepiandrosterone), future studies would benefit from the investigation of additional secondary allostatic measures (e.g., glycosylated hemoglobin, a cytokine panel, and waist-hip ratio),[6] and other biological measures associated with chronic pain. Findings from this battery would then influence the development of a pain-specific battery of allostatic load that may reflect the consequences and/or predict the onset of chronic pain.

Third, the finding that allostatic load did not account for the relationship between socioeconomic status (SES) and pain is interesting and compels further consideration. First, are the pain symptoms endorsed in the study the result of allostatic load or associated with a condition that if it becomes chronic, could lead to allostatic load, or possibly a combination of both? Second, there are indications that in addition to perception and experiences of discrimination;[5;17] level of education, social support, roles/responsibilities, and psychological and behavioral coping patterns can reduce or increase experiences of stress and alter the course toward allostatic load.[4;7;9;12;13] Predictive models will improve as we are better able to quantify the maladaptive and protective factors contributing to the influence of SES and pain on biological functioning.

We greatly appreciate the opportunity to comment on this important line of developing research and are enthusiastic about the foundation initiated by Slade and colleagues.

Respectfully,

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