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Sensory Processing Sensitivity and Migraine-Related Disability: A Longitudinal Mediation Model Through Body Vigilance and Sleep Disturbance

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Ali Aghaziarati Department of Psychology and Counseling, KMAN Research Institute, Richmond Hill, Ontario, Canada aliaghaziarati@kmanresce.ca	**Reviewer 1:** Sara Vancleef Clinical Psychological Science, Maastricht University, 6200 MD, Maastricht, Netherlands. sara.vancleef@maastrichtuniversity.nl **Reviewer 2:** Bridget Abalorio Faculty of Psychology, Peruvian University of Applied Sciences, Lima, Peru. bridget.abaloro@upc.edu.pe

1. Round 1

1.1. Reviewer 1

Reviewer:

The paragraph stating that "One plausible mechanism linking sensory processing sensitivity to migraine-related disability is body vigilance" presents a reasonable hypothesis, but the distinction between adaptive symptom monitoring and maladaptive hypervigilance remains underdeveloped. In migraine management, monitoring prodromal signs may support timely medication use and behavioral adjustment, whereas persistent threat-oriented scanning may increase symptom salience and avoidance. The authors should explicitly describe the point at which body awareness becomes maladaptive, explain whether the Body Vigilance Scale captures threat appraisal or only attentional allocation, and avoid treating all attention to bodily sensations as pathological.

The participant-flow description requires correction and expansion. The manuscript states that 401 individuals completed preliminary screening, 367 were eligible, 15 declined or failed to complete consent, and 352 entered the baseline cohort. However, it does not report the reasons for exclusion among the 34 ineligible individuals or whether any participants were removed after baseline because of invalid responses, diagnostic uncertainty, or data-quality concerns. A participant-flow

diagram should identify the number screened, excluded with reasons, enrolled, assessed at each wave, included in full-information analyses, and included in complete-case and stable-medication sensitivity analyses.

The temporal design requires closer attention to the recall periods of the measures. The sentence "migraine-related disability was evaluated using the Migraine Disability Assessment questionnaire" is methodologically important because the MIDAS questionnaire assesses disability over the preceding three months. Therefore, the nine-month MIDAS score reflects disability accumulated approximately between months six and nine, whereas six-month sleep disturbance reflects only the preceding seven days. The authors should explain how these unequal recall periods affect temporal interpretation, acknowledge that the mediator and outcome assessment windows may partially abut rather than represent discrete instantaneous states, and consider whether a shorter-interval disability measure would provide a more precise prospective test.

Authors revised the manuscript and uploaded the document.

1.2. Reviewer 2

Reviewer:

The Introduction should articulate the study's novelty more explicitly. The paragraph beginning with "Despite growing recognition of the relationships among sensory reactivity, somatic monitoring, sleep, and pain-related functioning" identifies several literature gaps but does not clearly specify whether previous studies have tested sensory processing sensitivity in migraine populations, whether body vigilance has previously been linked to migraine disability, or whether sleep disturbance has been examined as a mediator rather than a correlate. The authors should summarize the closest existing empirical models and state precisely which paths, temporal sequence, and population are novel in the current investigation.

The title and several passages imply a stronger causal interpretation than the design can support. The phrase "a longitudinal mediation model through body vigilance and sleep disturbance" is acceptable as a statistical description, but statements such as "sensory processing sensitivity may lead to" or "is translated into functional impairment" imply causation. A four-wave observational design improves temporal ordering but does not eliminate residual confounding, measurement error, or reciprocal causation. The authors should consistently use prospective-association language and state that the mediation analysis estimates indirect statistical associations rather than causal mechanisms.

In the Methods paragraph stating that "The analytical sample consisted of exactly 352 adults with migraine residing in Canada," the recruitment framework requires substantially more detail. Recruitment from neurology clinics, primary care practices, universities, advocacy organizations, and online advertisements creates multiple sampling pathways with potentially different disease severity and socioeconomic profiles. The authors should report the number recruited from each source, whether recruitment was consecutive or convenience-based, the provinces represented by each pathway, and whether recruitment source was examined as a potential source of selection bias or included in sensitivity analyses.

The sentence "Migraine status was verified through a self-reported physician diagnosis followed by a structured screening interview based on the diagnostic characteristics described in the third edition of the International Classification of Headache Disorders" is insufficiently reproducible. The authors should identify the interviewer's professional qualifications, specify the questions or diagnostic module used, indicate whether inter-rater reliability was assessed, and explain how uncertain or mixed headache presentations were resolved. Because no direct neurological examination was conducted, the manuscript should also clarify how secondary headache disorders, medication-overuse headache, and probable migraine were differentiated.

The eligibility criterion requiring "at least two migraine attacks or four migraine days per month during the three months preceding enrollment" needs justification. This threshold may exclude individuals with infrequent but highly disabling migraine and may produce a sample with moderate-to-high disease burden. The authors should provide a clinical or methodological rationale for this criterion, clarify whether participants with medication-overuse headache were included, and report whether chronic migraine classification was based on the baseline 28-day diary alone or corroborated by a three-month history consistent with diagnostic criteria.

The power-analysis paragraph is not sufficiently transparent for replication. The statement that "an a priori Monte Carlo power analysis was performed" should be accompanied by the software and version used, number of replications, assumed

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missing-data rate, hypothesized path coefficients for each component of the serial indirect effect, residual variances, covariate effects, and criterion used to define adequate power. Power for a serial indirect effect depends on the product of several paths and can be considerably lower than power for individual direct paths. The authors should report the estimated power for the serial indirect effect specifically rather than stating only that approximately 300 participants were required.

Authors revised the manuscript and uploaded the document.

2. Revised

Editor's decision: Accepted.
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