Headache Medicine

Physical Activity and Inflammation Mediates the Job Stress-Migraine Relationship. A sequential mediation analysis in the ELSA-Brasil study

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Background
Primary headaches are common brain disorders associated with psychosocial job stress, lower leisure-time physical activity (LTPA) levels, and inflammatory mediators, while their interplay is poorly known. Objective: To conduct a sequential mediation analysis to test whether there would be indirect mediating effects of LTPA and high-sensitivity C-reactive protein (hs-CRP) in the associations of migraine and tension-type headache (TTH) with job stress.

Methods
In a cross-sectional study with the ELSA-Brasil baseline data, we measured the Demand, Control, and Support (DCSQ) subscales of job stress, self- reported LTPA, and high-sensitivity C-reactive protein (hs-CRP). Conditional process analyses with a sequential mediation approach computed the path coefficients with a 95 % confidence interval (CI) for the direct effects of headache disorders on DCSQ subscales and the CIs of the indirect effects of LTPA and hs- CRP levels. Sociodemographic, lifestyle, and comorbidities variables were included in the fully adjusted models.

Results
Of 15,105 participants, 7,466 (45.6% women) current workers with a mean age of 49.3 (95%CI: 49.3-49.6) years provided full data. The frequency of migraine and TTH was 13.1% (985/4,766) and 49.4% (3,692/4,766). Age- and sex-adjusted models showed that migraine was associated with higher job stress in all DCSQ subscales, TTH was associated with higher Control, and both headache disorders were associated with lower LTPA levels. LTPA levels were inversely associated with hs-CRP levels. Only the association of migraine with lower Control was mediated by LTPA levels [effect = -0.035(-0.055, -0.017)] and by the inverse association between LTPA and hs-CRP levels [effect = -0.0009(-0.002, -0.0001)]. Socioeconomic factors and comorbidities abrogated the sequential mediating indirect effect of LTPA and hs- CRP levels but not the direct effect of migraine on lower Support [β = -0.41(-0.66, -0.16)], the effect of migraine [β = -24.86(-39.90, -9.83)] and TTH [β = -14.58(-24.14, -5.02)] on lower LTPA levels, or the effect of LTPA on hs-CRP levels [β = -0.0004(-0.0007,-0.0002)].

Conclusion
In this study, the inverse association of LTPA with hs-CRP levels mediated the link between psychosocial job stress and migraine, while this effect was mostly determined by sociodemographic and comorbidities factors. These findings have potential clinical implications by helping to design workplace behavioral interventions through physical exercise and stress management to reduce migraine burden.

Keywords: Physical Activity; Migraine; Tension-type Headache; C-reactive Protein; Occupational Health; Occupational Stress.