

References

1. Florencio LL, de Oliveira AS, Carvalho GF, et al. Cervical Muscle Strength and Muscle Coactivation During Isometric Contractions in Patients With Migraine: A Cross-Sectional Study. *Headache*. 2015; 55(10): 1312-1322
2. Florencio LL, de Oliveira AS, Lemos TW, Carvalho GF, Dach F, Bigal ME, Falla D, Fernández-de-las-Peñas C, Grossi DB. Patients With Chronic, but not Episodic, Migraine Display Altered Activity of Their Neck Extensor Muscles. *J Electromyogr Kinesiol*. 2016; (30): 66-72
3. Falla D, Lindstrom R, Rechter L, Boudreau S, Petzke F. Effectiveness of an 8-week exercise programme on pain and specificity of neck muscle activity in patients with chronic neck pain: A randomized controlled study. *Eur J Pain*. 2013. (17): 1517-1528
4. Jull GA, Falla D, Vicenzino B, Hodges PW. The effect of therapeutic exercise on activation of the deep cervical flexor muscles in people with chronic neck pain. *Man Ther* 2009;14(6):696-7
5. Edmondston SJ, Wallumrød ME, MacLéid F, Kvamme LS, Joebges S, Brabham GC. Reliability of isometric muscle endurance tests in subjects with postural neck pain. *J Manipulative Physiol Ther* 2008; (31):348-354

Table 1 (abstract P77). Sample characterization

	Control (n=15)	Migraine (n=15)
Age (y)	25.06(4.07)	29.93 (7.17)
Weight(kg)	64.38(11.35)	68.4 (11.28)
Height (cm)	164(8)	165 (7)

Data are expressed by mean (standard deviation)

Table 2 (abstract P77). Holding time of endurance tests

Endurance	Control (n=15)	Migraine (n=15)	P
Flexion (s)	81.33(51.06)	46.73(31.34)	0.03
Extension (s)	351(138.42)	242.20(169.24)	0.07

Data are expressed by mean (standard deviation)

P78**Light-induced discomfort changes semi-static posture control of migraine patients**Carina F Pinheiro¹, Renato Moraes², Lais Sestari¹, Gabriela F Carvalho¹, Anamaria S Oliveira¹, Fabiola Dach¹, Débora B Grossi¹¹Department of Biomechanics, Medicine and Rehabilitation of Locomotor Apparatus, Ribeirão Preto Medical School, University of São Paulo, Ribeirão Preto, São Paulo, 14049-900, Brazil; ²School of Physical Education and Sports of Ribeirão Preto, University of São Paulo, Ribeirão Preto, São Paulo, 14049-900, Brazil**Correspondence:** Carina F Pinheiro (carinafp@hotmail.com)*The Journal of Headache and Pain* 2017, **18**(Suppl 1):P78

Background: Patients with migraine have showed balance deficits with increased postural oscillation during quiet stance, alterations in gait mobility, reaction time, and movement velocity in comparison to control subjects [1,2]. Light sensibility is a migraine feature that happens mostly during headache attacks, but also can be present in lower intensity during the interictal period, contributing to migraine disability [3]. However, it has not been established if the exposition to different light intensities modifies the semi-static posture control of migraine patients in the interictal period. Our purpose was to investigate bipedal postural control of migraine women under different light intensities.

Materials and Methods: Fourteen woman with migraine [4] were selected from a headache tertiary clinic and from general population. All participants aged between 18 and 55 years-old (mean 29.3, 95% CI 23.6 to 35.0) with body mass index lower than 30 kg/cm² (mean 23.6, 95%CI 23.2 to 24.0). The exclusion criteria were: volunteers affected by vascular and/or neurological

systemic conditions, presence of other concomitant headache, movement coordination impairment or any musculoskeletal disability that could interfere in the test performance. Participants were exposed to gradual light increase from 300 to a maximum of 2000 lux, and were asked about the visual discomfort intensity (VAS) induced by the light. For balance assessment, participants stood upright in a bipedal position on a force platform for 30 seconds in the following light conditions: 1) visual threshold, in which light induce the minimal visual discomfort; 2) visual discomfort, in which light induce moderate-to-intense visual discomfort; and 3) control, with only ceiling light room (270 lux). Participants performed three trials for each condition. Light intensity was measured by a digital luximeter positioned at participant's eye level. All participants were assessed during the interictal period.

A repeated measures ANOVA with LSD post-hoc ($p < 0.05$) was used to compare the center of pressure (CoP) ellipse area and the CoP speed among the three light conditions.

Results: We found a median visual threshold equal to 450 lux (IQR 400 to 600) and a median visual discomfort of 2000 lux (IQR 1900 to 2000). Migraineurs showed larger CoP area at the visual discomfort condition compared to the visual threshold and control conditions ($p < 0.05$). CoP speed at the visual discomfort condition was higher than the other conditions tested, but with no statistical difference (Table 1).

Conclusion: Visual discomfort induced by light intensity manipulation increased the CoP area of migraineurs patients in bipedal quiet stance.

References

1. Carvalho GF, Chaves TC, Dach F, Pinheiro CF, Gonçalves MC, Florencio LL, et al. Influence of migraine and of migraine aura on balance and mobility - A controlled study. *Headache*. 2013;53(7):1116-22.
2. Carvalho GF, Bonato P, Florencio LL, Pinheiro CF, Dach F, Bigal ME, et al. Balance Impairments in Different Subgroups of Patients With Migraine. *Headache J Head Face Pain*. 2017; Mar;57(3):363-374
3. Harriott AM, Schwedt TJ. Migraine is Associated With Altered Processing of Sensory Stimuli. *Curr Pain Headache Rep*. 2014;18(11).
4. Olesen J. The International Classification of Headache Disorders, 3rd edition. *Cephalgia*. 2013;33(9):629-808.

Table 1 (abstract P78). CoP area and CoP speed at three light conditions - mean and 95% confidence interval

	Visual threshold	Visual discomfort	Control
CoP area (cm ²)	3.54 (0.87 to 6.20)*	5.03 (1.82 to 8.25)	1.52 (0.99 to 2.06)*
CoP speed (cm/sec ²)	1.74 (1.35 to 2.14)	1.78 (1.45 to 2.10)	1.49 (1.39 to 1.59)

*different from the visual discomfort condition ($p < 0.05$)**P79****Poor sleep quality in probable migraine: a population-based study**Tae-Jin Song¹, Soo-Jin Cho², Won-Joo Kim³, Kwang Ik Yang⁴, Chang-Ho Yun⁵, Min Kyung Chu⁶¹Department of Neurology, Ewha Womans University School of Medicine, Seoul, Korea; ²Department of Neurology, Dongtan Sacred Heart Hospital, Hallym University College of Medicine, Hwaseong, Korea;³Department of Neurology, Gangnam Severance Hospital, Yonsei University, College of Medicine, Seoul, Korea; ⁴Department of Neurology, Soonchunhyang University College of Medicine, Cheonan Hospital, Cheonan, Korea; ⁵Clinical Neuroscience Center, Department ofNeurology, Seoul National University Bundang Hospital, Seongnam, Korea; ⁶Department of Neurology, Kangnam Sacred Heart Hospital, Hallym University College of Medicine, Seoul, Korea**Correspondence:** Min Kyung Chu (chumk@hallym.ac.kr)*The Journal of Headache and Pain* 2017, **18**(Suppl 1):P79

Background: Although sleep problems are common among headache sufferers,[1] there is little knowledge of the association of poor sleep quality with probable migraine (PM) in general population. In the present study, we aimed to 1) describe the prevalence of poor sleep quality in PM in a general population-based sample; 2) compare the prevalence of poor sleep quality and components of Pittsburgh Sleep Quality Index (PSQI) score among migraineurs, participants with PM, and non-headache individuals and 3) assess the clinical impact of poor sleep quality among participants with PM.

Materials and methods: We used the data of Korean Headache-Sleep Study (KHSS) in the present study.[2] The KHSS is nation-wide population-based survey regarding headache and sleep for adults aged 19 – 69 years. The KHSS used 2-stage clustered random sampling method which was proportional to population distribution in all Korean territories. Diagnoses of migraine and PM were based on criteria A to D for migraine without aura (code 1.1) in the International Classification of Headache Disorders-3 beta.[3] We investigated the components of PSQI and defined poor sleep quality as PSQI score > 5.[4]

Results: In a representative sample of 2,695 individuals, 143 (5.3%), 379 (14.1%) and 715 (26.5 %) had migraine, PM, and poor sleep quality, respectively (Table 1). The PM participants with poor sleep quality were noted in 134 (35.4%). The prevalence of poor sleep quality was lower among individuals with PM compared to those with migraine (35.4% vs. 47.6%, $p = 0.011$) but higher than those with non-headache (17.9%, $p < 0.001$). Among components of PSQI, sleep latency ($p < 0.001$), sleep duration ($p < 0.001$), sleep disturbance ($p < 0.001$), daytime functioning ($p < 0.001$), and use of sleeping medication ($p < 0.001$) scores were higher in participants with PM compared to non-headache participants (Table 2). The PM participants with poor sleep quality had more frequent headache (median [interquartile range]) (2.0 [0.3 – 4.0/month] vs. 1.0 [0.3 – 2.0]/month, $p = 0.001$), visual analogue scale score for headache intensity (6.0 [4.0 – 7.0] vs. 5.0 [3.5 – 6.0], $p = 0.003$), and headache impact test-6 score (50.0 [44.0 – 58.0] vs. 44.0 [40.0 – 50.0], $p < 0.001$) than those who without poor sleep quality.

Conclusions: Approximately 35% of participants with PM had poor sleep quality. Poor sleep quality was associated with increased headache frequency, intensity and impact of headache among PM in general population setting.

References

1. Rains JC, Poceta JS, Penzien DB. Sleep and headaches. *Curr Neurol Neurosci Rep.* 2008;8(2):167-75.
2. Song TJ, Cho SJ, Kim WJ, Yang KI, Yun CH, Chu MK. Anxiety and depression in probable migraine: A population-based study. *Cephalalgia.* 2016 Jun 1. pii: 0333102416653235
3. Headache Classification Committee of the International Headache S. The International Classification of Headache Disorders, 3rd edition (beta version). *Cephalalgia.* 2013;33(9):629-808.
4. Buysse DJ, Reynolds CF, 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res.* 1989;28(2):193-213.

Table 1 (abstract P79). Sociodemographic characteristics of survey participants; the total Korean population; and cases identified as migraine, probable migraine and poor sleep quality

	Survey participants N (%)	Total population N (%)	p	Migraine N, % (95% CI)	PM N, % (95% CI)	Poor sleep quality N, % (95% CI) (PSQI > 5)
Sex						
Men	1,345 (49.3)	17,584,365 (50.6)	0.854 ^a	36, 2.7 (1.8-3.5)	136, 10.1 (8.5-11.8)	334, 24.8 (22.5-27.1)
Women	1,350 (50.7)	17,198,350 (49.4)		107, 7.9 (6.5-9.4)	243, 17.9 (15.8-19.9)	381, 28.2 (25.8-30.6)
Age						
19–29	542 (20.5)	7,717,947 (22.2)	0.917 ^a	25, 4.5 (2.7-6.2)	69, 12.6 (9.8-15.4)	153, 28.3 (24.4-32.0)
30–39	604 (21.9)	8,349,487 (24.0)		42, 7.0 (4.9-9.1)	102, 16.8 (13.7-19.8)	136, 22.5 (19.2-25.9)
40–49	611 (23.1)	8,613,110 (24.8)		39, 6.5 (4.5-8.4)	102, 16.8 (13.9-19.8)	167, 27.3 (23.8-30.9)
50–59	529 (18.9)	6,167,505 (17.7)		22, 4.1 (2.4-5.9)	62, 11.6 (8.8-14.4)	160, 30.2 (26.3-34.2)
60–69	409 (15.6)	3,934,666 (11.3)		15, 3.9 (2.0-5.7)	44, 11.2 (8.1-14.2)	99, 24.2 (20.0-28.4)
Size of residential area						
Large city	1,248 (46.3)	16,776,771 (48.2)	0.921 ^a	76, 6.1 (4.8-7.5)	180, 14.4 (12.4-16.3)	338, 27.1 (24.6-29.6)
Medium-to-small city	1186 (44.0)	15,164,345 (43.6)		48, 4.0 (2.9-5.2)	174, 14.7 (12.7-16.7)	303, 25.5 (23.1-28.0)
Rural area	261 (9.7)	2,841,599 (8.2)		19, 7.4 (4.2-10.6)	25, 9.7 (6.1-13.3)	74, 28.4 (22.8-33.9)
Education level						
Middle school or less	393 (14.9)	6,608,716 (19.0)	0.752 ^a	22, 5.5 (4.2-7.7)	44, 11.5 (8.4-14.7)	110, 28.0 (23.5-32.4)
High school	1,208 (44.5)	15,234,829 (43.8)		60, 5.0 (3.8-6.3)	178, 14.7 (12.7-16.7)	317, 26.2 (23.8-28.7)
College or more	1,068 (39.6)	12,939,170 (37.2)		60, 5.6 (4.3-7.0)	155, 14.4 (12.3-16.5)	281, 26.3 (23.7-29.0)
Not responded	26 (9.6)			1, 3.8 (0.0-11.8)	2, 7.7 (0.0-18.7)	7, 26.9 (8.7-45.2)
Total	2695 (100.0)	34,782,715 (100.0)		143, 5.3 (4.5-6.2)	379, 14.1 (12.7-15.4)	715, 26.5 (24.9-28.2)

N number, CI 95% confidence interval, PM probable migraine, PSQI Pittsburgh Sleep Quality Index. Variables are presented as number (%) or number, % (95% confidence interval)

^aCompared gender, age group, size of residential area, and education level between the sample of the present study and the total population of Korea

Table 2 (abstract P79). Total and subcomponents score of PSQI of individual with non-headache, PM and migraine

	Non-headache individuals N = 1,422 (52.8%)	PM N = 379 (14.1%)	Migraine individuals N = 143 (5.3%)	p value
Subjective sleep quality	2.0 (2.0-2.0)	2 (2.0-2.0)	2.0 (2.0-2.0)	0.879
Sleep latency	1.0 (0.0-1.0)	1.0 (0.0-2.0) ^a	1.0 (0.0-2.0) ^a	<0.001
Sleep duration	0.0 (0.0-1.0)	0.0 (0.0-1.0) ^a	0.0 (0.0-1.0)	<0.001
Habitual sleep efficacy	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.244
Sleep disturbance	1.0 (0.0-1.0)	1.0 (1.0-1.0) ^{ab}	1.0 (1.0-2.0) ^a	<0.001
Use of sleeping medication	0.0 (0.0-0.0)	0.0 (0.0-0.0) ^a	1.0 (0.0-1.0) ^a	<0.001
Daytime functioning	0.0 (0.0-1.0)	1.0 (0.0-1.0) ^a	1.0 (0.0-1.0) ^a	<0.001
Total	4.0 (3.0-5.0)	5.0 (4.0-6.0) ^a	5.0 (4.0-7.0) ^a	<0.001

PSQI Pittsburgh Sleep Quality Index, PM probable migraine, Variables are presented as median (interquartile range)

^aSignificantly different compared to individuals with non-headache

^bSignificantly different compared to individuals with migraine