Sociodemographic, Disability, and Employment Differences Between Persons With Chronic and Episodic Migraine: Results of the CaMEO (Chronic Migraine Epidemiology & Outcomes) Study

INTRODUCTION

- Chronic migraine (CM) is a common condition affecting approximately 1% of the US population.¹ Females experience CM at a higher rate than males (1.3% vs 0.5%, respectively).^{1,2}
- Migraineurs experience symptoms in various combinations and with variation in frequency and consequent disability. Among those with an International Classification of Headache Disorders, Second Edition (ICHD-2) diagnosis of migraine, headache frequency ranges from episodic migraine (EM; occurring <15 days per month), to CM (occurring \geq 15 days per month).³ Migraine impact on daily function ranges from minimal to completely incapacitating.
- Previous research has demonstrated the existence of sociodemographic, headache-related disability, and employment status differences between individuals with CM and EM.^{1,4,5}
- CaMEO (Chronic Migraine Epidemiology & Outcomes) is a prospective, web-based cohort study to characterize migraine clinical course and assess aspects of family burden, barriers to care, endophenotypes, and comorbidities among those with CM and EM.

OBJECTIVES

To characterize headache-related disability, sociodemographic characteristics, and employment status in individuals with CM or EM who are participating in the CaMEO study

METHODS

Study Population

- In the screening phase of the study, individuals with migraine were identified from a 2.4-million member web-based panel (Research Now) using a validated questionnaire.⁶
- Quota sampling was employed to ensure that the study sample resembled the US population (according to US Census data) in terms of key sociodemographic variables.
- Participants were screened for headaches within the previous year, symptoms relating to the *ICHD-2*⁷ migraine criteria, and overall migraine frequency. Respondents meeting *ICHD-2* criteria for migraine were classified as follows:
- − CM: \geq 15 headache days/month for past 3 months.
- EM: <15 headache days/month for past 3 months.
- Participating migraineurs recruited family members (spouse and adolescent/adult children) living in the household to help assess aspects of headache-related burden and family unit impact.
- Spouse/significant other and children were required to be living in the Proband's (i.e., migraineur's) household for ≥ 2 months.
- Spouse/significant other was defined for the Proband as "currently in a relationship with a spouse, partner, or significant other."

Study Design

Figure 1. Study Design and Data Collection Timeline



data are collected.

- validated instruments.

Assessments

- Family Burden Modules:

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- Children included adolescent/adult children, grandchildren, and stepchildren aged 13–29 years. All qualifying children were invited.

• CaMEO is a prospective web-based cohort study, initiated in September 2012. Participants received an email notification to participate in a multi-component web-based survey module (e.g., Core or Snapshot module, described below) at 3-month intervals for 1 year (Figure 1).

*All assessments of headache day frequency, headache treatment, and burden will be evaluated over the previous 3-months as 12 months of

oband refers to each migraine subject; spouse/significant other and children must be living in the household for \geq 2 months; children include adolescent/adult children, grandchildren, and stepchildren aged 13–29 years; spouse/significant other is defined for the Proband as "currently in a relationship with a spouse, partner, or significant other."

- Questionnaire development was based on focus groups with item analysis, input of expert clinicians and scientists, and inclusion of items from the American Migraine Study,⁸ the American Migraine Prevalence and Prevention Study,² and other

CaMEO was approved by Albert Einstein Medical Center Institutional Review Board.

Screening Module: Approximately <5-minute survey to qualify participants (migraineurs) using the Migraine Symptom Severity Score (ICHD-2 criteria), measure baseline headache frequency, and collect demographic characteristics. The survey topic was characterized as regarding "overall health and lifestyle."

 Core Module: Approximately 12- to 15-minute survey with 10 assessments monitoring headache frequency, depression, anxiety, interictal burden, headache-related disability, quality of life, stressful life events, treatments, and healthcare resource utilization.

• Snapshot Module: Approximately 3- to 5-minute survey assessing headache frequency, headache-related disability, and any changes in headache treatments in the last 3 months.

Barriers to Care Module: Approximately 12- to 15-minute survey relating to the participants' knowledge, attitudes, and behaviors about medical practice related to headache.

Endophenotypes and Comorbidities Module: Approximately 12- to 15-minute survey relating to migraine symptom profiles as well as medical and psychiatric comorbidities. These will be used to identify natural subgroups of migraine sufferers and to assess the aggregation of these migraine profiles within families.

– Proband Module: Approximately 12- to 15-minute survey relating to the impact of migraine on family well-being, including family and social interactions, quality of life, and burden caused by the Proband's migraines. This includes lost productive time (absenteeism/presenteeism) and lost time from family/social activities.

Proband survey (from the point of view of the Spouse/Child), plus depression, anxiety, overall health, and headache (not migraine) frequency for themselves.

Statistical Analyses

- Data have been collected from the baseline screening survey.
- Descriptive and inferential statistics were used to contrast those with CM and EM according to baseline survey responses.

RESULTS

- Screening Results: 16,789 of 80,783 (20.8%) respondents met ICHD-2 criteria for migraine and were eligible for inclusion.
- Of the eligible respondents, 1,476 (8.8%) had CM and 15,313 (91.2%) had EM.
- Mean ages were comparable between the 2 groups: participants with CM had a mean age of 41.0 years, and those with EM had a mean age of 40.6 years (P=0.32; Table 1).

Table 1. Sociodemographic Characteristics of Participants With EM and CM

				Chronic vs Episodic	
Variables	Episodic Migraine (n=15,313)	Chronic Migraine (n=1,476)	Contrast	Point Estimate (95% CI)	<i>P</i> value
Age (years), mean (SD)	40.6 (14.5)	41.0 (13.8)	Mean difference	0.39 (-0.38 to 1.16)	0.322
MIDAS score, mean (SD)	13.1 (22.2)*	60.5 (70.4)*	Rate ratio	4.63 (4.31–4.98)	<0.001
BMI, n (%) Obese (≥30 kg/m²)	5,305 (34.6)	614 (41.6)	Odds ratio [†]	1.34 (1.21–1.50)	<0.001
Sex, n (%) Female	11,298 (73.8)	1,197 (81.1)	Odds ratio [†]	1.52 (1.33–1.75)	<0.001
Race, n (%) White	12,752 (83.3)	1,292 (87.5)	Odds ratio [†]	1.41 (1.20–1.66)	<0.001
Ethnicity, n (%) Hispanic	2,039 (13.3)	191 (12.9)	Odds ratio [†]	0.97 (0.83–1.13)	0.685

BMI=body mass index; CM=chronic migraine; EM=episodic migraine; MIDAS=Migraine Disability Assessment. *Mean MIDAS score for chronic migraineurs falls into the Grade IV (severe disability) category; mean MIDAS score for episodic migraineurs falls into the Grade III (moderate disability) category. [†]Reference values were "not obese," "male," "other race," and "not Hispanic."

Mean difference obtained from analysis of variance model, rate ratio obtained from negative binomial regression model, and odds ratios obtained from logistic regression model.

 Spouse and Child Modules: Spouse and adolescent household members received an adapted version of the Proband survey (approximately 15–20 minutes each) via email. The Spouse and Child Modules included matching or similar questions to the

- Compared with the EM group, the CM group (Tables 1 and 2):
- Had a greater proportion of females (81.1% vs 73.8%; *P*<0.001).
- Had a greater proportion of whites (87.5% vs 83.3%, P < 0.001).
- Experienced higher headache-related disability (mean MIDAS score, 60.5 [Grade IV, severe disability] vs 13.1 [Grade III, moderate disability]; rate ratio = 4.63, *P*<0.001).
- Completed fewer years of education (34.9% vs 45.9% had bachelor's degree or higher; *P*<0.001).
- Were more likely to have lower annual individual incomes (cumulative odds ratio [OR], 0.65; *P*<0.001) and household incomes (cumulative OR, 0.63; *P*<0.001).
- Were less likely to be employed full- or part-time (56.4% vs 66.0%; P<0.001).

Table 2. Socioeconomic Characteristics of Chronic and Episodic Migraineurs

		Chronie		Chronic vs Episodic		
Variables	Episodic Migraine (n=15,313)	Chronic Migraine (n=1,476)	Contrast	Point Estimate (95% CI)	<i>P</i> value	
Number of household members, mean (SD)	2.9 (1.4)	3.1 (1.6)	Rate ratio	1.04 (1.01–1.08)	0.003	
Marital status, n (%) Married/civil union	7,561 (49.4)	703 (47.6)	Odds ratio*	0.93 (0.84–1.04)*	0.198	
Highest level of education, n (%) ≥Bachelors degree	7,032 (45.9)	515 (34.9)	Odds ratio*	0.63 (0.56–0.71)*	<0.001	
Current employment, n (%) Full- or part-time	10,112 (66.0)	832 (56.4)	Odds ratio*	0.66 (0.60–0.74)*	<0.001	
Annual individual income, n (%) < $25,000$ \$25,0000 \$25,000 \$25,000 \$25,0000 \$25,000 \$25,000 \$25,000 \$25,000 \$	6,426 (42.1) 4,032 (26.4) 3,769 (24.7) 1,022 (6.7)	761 (51.7) 400 (27.2) 243 (16.5) 67 (4.6)	Cumulative odds ratio	Reference 0.65 (0.59–0.72)	<0.001	
Annual household income, n (%) <25,000 \$25,000-\$49,999 \$50,000-\$99,999 \$100,000	2,571 (16.9) 3,424 (22.5) 5,945 (39.1) 3,262 (21.5)	365 (25.0) 372 (25.4) 513 (35.1) 212 (14.5)	Cumulative odds ratio	Reference 0.63 (0.57–0.69)	<0.001	

*Reference values "not married/civil union," "<bachelors degree," and "not employed full- or part-time." Rate ratio obtained from negative binomial regression model, odds ratios obtained from logistic regression model, and cumulative odds ratios obtained from cumulative logistic regression model.

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CONCLUSIONS

- CM is associated with a greater financial and occupational burden than EM.
- Participants with CM experienced higher levels of headache-related disability, unemployment, and underemployment, with corresponding reductions in personal and household income than those with EM.
- Ongoing data collection will allow us to characterize the longitudinal course and consequences of CM and EM.

REFERENCES

- **1.** Buse DC, et al. *Headache.* 2012;52(10):1456-1470.
- **2.** Natoli JL, et al. *Cephalalgia*. 2010;30(5):599-609.
- **3.** Lipton RB. *Neurology.* 2009;72(suppl 5):S3-7.
- **4.** Buse DC, et al. J Neurol Neurosurg Psychiatry. 2010;81(4):428-432.
- **5.** Bigal ME, et al. *Headache*. 2003;43(4):336-342.
- 6. Manack AN, et al. CaMEO (Chronic Migraine Epidemiology & Outcomes) Study: Design, Methodology and Baseline Cohort Characteristics. Presented at: International Headache Congress (IHC); June 27–30, 2013; Boston, MA, USA. Poster P60.
- 7. Headache Classification Subcommittee of the International Headache Society (IHS). Cephalalgia. 2004;24 (suppl 1)(England):9-160.
- 8. Lipton RB, et al. *Headache*. 2001;41(7):646-657.

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