Effects of Demographic and Socioeconomic Characteristics on Barriers to Chronic Migraine Consultation, Diagnosis, and Treatment: Results From the CaMEO (Chronic Migraine Epidemiology & Outcomes) Study

David W. Dodick, MD,[1] Richard B. Lipton, MD,[2,3] Dawn C. Buse. PhD,[2,3] Michael L. Reed, PhD,[4] Kristina M. Fanning, PhD,[4] Aubrey Manack Adams, PhD,[5] Adrian Holden, MB[5]

[1]Department of Neurology, Mayo Clinic, Phoenix, AZ, [2]The Saul R. Korey Department of Neurology, Albert Einstein College of Medicine, Bronx, NY, [3]Montefiore Medical Center, Bronx, NY, [4]Vedanta Research, Chapel Hill, NC, [5]Allergan, Inc., Irvine, CA

Scan to obtain PDF of poster

INTRODUCTION

- Individuals who meet *International Classification of Headache Disorders, 3rd edition (beta version) (ICHD-3b)* diagnosis of migraine are classified as chronic migraine (CM) if they experience headache (HA) on ≥15 days per month for >3 months (including ≥8 days per month of migraine).[1]
- CM prevalence is reported to be between 1.4% and 2.2% within the overall population.[3]
- CM represents approximately 7.7% of all migraine cases.[2]
- Because of the frequency of attacks, CM causes substantial disability[2] and is burdensome to the individual, society, and healthcare resources.[4]
- Previously established barriers to care for effective treatment of episodic migraine include appropriate medical consultation, proper diagnosis, and adequate prescribed treatment.[5] These barriers likely also apply to CM.
- The Chronic Migraine Epidemiology & Outcomes (CaMEO) Study aimed to characterize HA frequency, symptoms, and disability, aspects of family burden, and barriers to care (e.g., consultation, diagnosis, appropriate treatment) in persons with CM.

OBJECTIVE

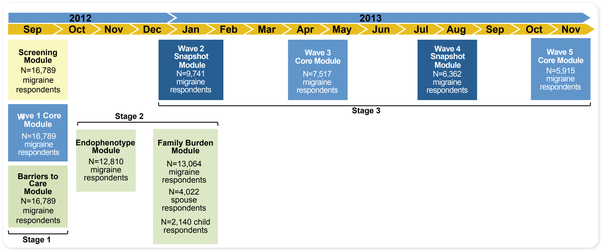
- The objective was to estimate the rate of appropriate treatment among those with CM and to determine the effect of demographic, socioeconomic, and HA variables on barriers to care in persons with CM.

METHODS

Study Design

- The CaMEO Study was a prospective, Web-based study with cross-sectional modules embedded in a longitudinal design **(Figure 1)**.
- The study sample was identified from a Web panel and constructed to be representative of the US population demography on age, gender, and income.
- From September 17, 2012–October 30, 2012, respondents meeting modified *ICHD-3b* migraine criteria were invited to participate; the first modules included the baseline Screening, Core, and Barriers to Care modules.
  - The Barriers to Care module built upon previous work from the American Migraine Prevalence and Prevention (AMPP) Study.[5]
- This analysis included respondents meeting study criteria for CM (modified *ICHD-3b* migraine diagnosis + ≥15 HA days/month for past 3 months, *ICHD-3b* criteria A–B for migraine, criterion C for CM not assessed) who self-reported demographic, socioeconomic, and HA-specific data; had a Migraine Disability Assessment Scale (MIDAS) Grade ≥2; and who provided health insurance status.

Figure 1. CaMEO Study Design and Data Collection Timeline



N=number of returns for that module only and does not represent a running total of participation in previous modules.
All assessments of headache day frequency, headache treatment, and burden were evaluated over the previous 3 months.

Assessments

- Data were collected on employment status (full-time/part-time/not employed), health insurance (yes/no), healthcare visits, diagnoses, current/past treatments, and knowledge, attitudes, and behaviors that may be barriers to optimal care.
- HA-related disability was rated using MIDAS. Responses were summed to a total score that fell into 4 categories: Grade 1, little to no disability (score 0–5); Grade 2, mild disability (score 6–10); Grade 3, moderate disability (score 11–20); and Grade 4, severe disability (score 21–270).
- The severity of HA symptoms was assessed using the Migraine Symptom Severity Score (MSSS), which is the sum of responses to questions of how frequently each of the 7 *ICHD-3b* criteria migraine symptoms were experienced with severe HAs; response options ranged from 1 (never) to 4 (≥half the time) (total score: 7–28).
- Symptoms of depression and anxiety were measured using the 9-item Patient Health Questionnaire (PHQ-9) or the 7-item Generalized Anxiety Disorder (GAD-7) scale, respectively. Respondents with scores ≥10 were classified as having major depression or generalized anxiety disorder.

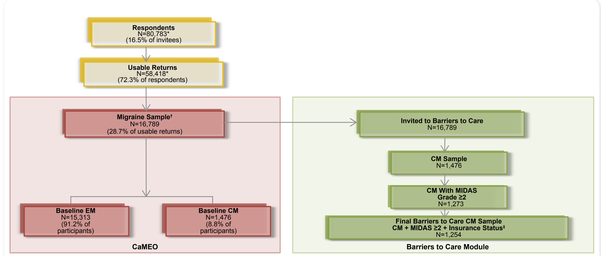
Appropriate Consultation, Diagnosis, and Treatment

- Respondents also identified the healthcare professionals (HCPs) currently managing their HAs. In this study, HCPs appropriate for the diagnosis and treatment of migraine were defined as primary care providers (general practitioner, obstetrician/gynecologist, nurse practitioner, physician assistant) or specialists (neurologist, pain specialist, HA specialist).
  - "Consulter": respondents reporting HA management with an appropriate HCP
  - "Non-consulter": respondents not currently consulting any HCP or consulting an inappropriate specialist (e.g., allergist, otolaryngologist, dentist)
- Diagnosis was defined as respondents who self-reported receiving a diagnosis of CM or transformed migraine (TM) from an appropriate HCP.
- Minimally appropriate care was defined as receiving *both*
  - Acute prescription treatment (e.g., nonsteroidal anti-inflammatory drugs, triptans, isomeptheptene), and
  - Preventive treatment to prevent or reduce frequency of HAs (e.g., antidepressant medications, antiseizure medications, blood pressure or heart medications, onabotulinumtoxinA, other botulinum toxin, nerve blocks, trigger point injections).
- Multivariate binary logistic modeling assessed predictors of consultation, CM/TM diagnosis, and receiving effective acute and preventive treatment.

RESULTS

Sample Disposition

Figure 2. Barriers to Care Analysis Sample

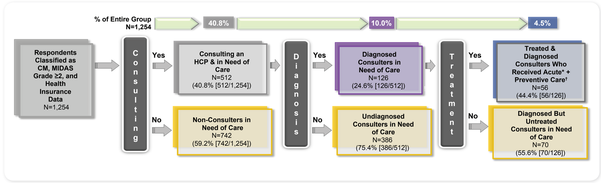


CM=chronic migraine; EM=episodic migraine; *ICHD-3b=International Classification of Headache Disorders, 3rd edition (beta version)*; MIDAS=Migraine Disability Assessment Scale.
*N=22,365 respondents either (1) abandoned the survey, (2) were over quota, or (3) had invalid (unusable) data and were removed during data cleaning.
†Met inclusion criteria: agreed to participate, screened positive for modified *ICHD-3b* migraine, were ≥18 years old, and had ≥1 headache in previous 12 months.
‡This analysis from the barriers to care module included those respondents who met study criteria for CM, provided insurance information (insured/not insured), and had a MIDAS Grade ≥2.

- 1,254 persons met the criteria for CM and reported a MIDAS Grade ≥2 and health insurance information **(Figure 2)**.

Consulting Behavior

Figure 3. Respondents Who Traversed All 3 Barriers to Care



CM=chronic migraine; HCP=healthcare professional; MIDAS=Migraine Disability Assessment Scale.
*Acute treatment=respondent reported currently using nonsteroidal anti-inflammatory drugs, triptans, or isomethepene to treat their headaches.
†Preventive treatment=respondent reported currently using medications to prevent or reduce headache frequency, including antidepressants, antiseizure medications, blood pressure/heart medications, or other migraine-specific preventive medications, including onabotulinumtoxinA, abobotulinumtoxinA, other botulinum toxins, nerve blocks, or trigger point injections.

- 40.8% (512/1,254) reported currently consulting an appropriate HCP **(Figure 3)**.
- Among current consulters, 24.6% (126/512) self-reported having received a CM/TM diagnosis from an appropriate HCP.
- Among those reporting a CM/TM diagnosis, 44.4% (56/126) received minimally appropriate treatment.
- Only 4.5% (56/1,254) of the CM population passed all 3 barriers to care (e.g., medical consultation, correct diagnosis, appropriate prescribed treatment).

Univariate Modeling

Table 1. Univariate Examination of Differences for Consulting, Diagnosis, and Treatment Among Chronic Migraineurs

	Consulting Status Among CM Eligible Sample (N=1,254)			Diagnostic Status Among Current Consulters (N=512)			Appropriate Acute and Preventive Treatment Among Diagnosed Current Consulters (N=126)		
	Not Currently Consulting (n=742)	Currently Consulting (n=512)	Contrast (95% CI)	No CM or TM Diagnosis (n=386)	CM or TM Diagnosis (n=126)	Contrast (95% CI)	No Treatment (n=70)	Treatment (n=56)	Contrast (95% CI)
Female, n (%)*†	622 (83.83)	419 (81.84)	0.87 (0.65–1.17)	309 (80.05)	110 (87.30)	1.71 (0.96–3.06)	60 (85.71)	50 (89.29)	1.39 (0.47–4.09)
Age (years), mean (SD)‡	**38.88 (13.66)**	**42.76 (12.75)**	**3.87 (2.37–5.37)**	42.69 (13.10)	42.97 (11.63)	0.28 (–2.29 to 2.85)	42.99 (12.36)	42.95 (10.76)	–0.04 (–4.18 to 4.11)
Body mass index, mean (SD)	29.49 (8.18)	30.28 (8.46)	0.79 (–0.14 to 1.73)	30.33 (8.63)	30.13 (7.94)	–0.2 (–0.191 to 1.51)	29.49 (8.29)	30.92 (7.48)	1.43 (–1.39 to 4.25)
Employed full-time/part-time, n (%)*†	438 (59.03)	274 (53.52)	0.80 (0.64–1.00)	**219 (56.74)**	**55 (43.65)**	**0.59 (0.39–0.89)**	28 (40.00)	27 (48.21)	1.40 (0.69–2.84)
Income ($) n (%)									
<30,000	237 (32.20)	133 (26.28)	Reference	98 (25.65)	35 (28.23)	Reference	20 (28.99)	15 (27.27)	Reference
30,000–49,999	154 (20.92)	105 (20.75)		80 (20.94)	25 (20.16)		15 (21.74)	10 (18.18)	
50,000–74,999	154 (20.92)	119 (23.52)		93 (24.35)	26 (20.97)		15 (21.74)	11 (20.00)	
≥75,000§	191 (25.95)	149 (29.45)	0.87 (0.71–1.06)	111 (29.06)	38 (30.65)	1.14 (0.79–1.64)	19 (27.54)	19 (34.55)	1.11 (0.59–2.09)
Insured, n (%)*†	**576 (77.63)**	**479 (93.55)**	**4.18 (2.82–6.20)**	363 (94.04)	116 (92.06)	0.73 (0.34–1.59)	64 (91.43)	52 (92.86)	1.22 (0.33–4.55)
MIDAS, mean (SD)‖	**64.32 (65.38)**	**77.74 (77.50)**	**1.21 (1.08–1.35)**	**73.67 (75.15)**	**90.21 (83.36)**	**1.22 (1.00–1.50)**	97.63 (94.90)	80.95 (65.84)	0.83 (0.58–1.18)
MSSS, mean (SD)‡	**23.67 (2.91)**	**24.70 (2.79)**	**1.03 (0.71–1.35)**	**24.33 (2.89)**	**25.86 (2.08)**	**1.53 (0.98–2.08)**	25.76 (2.20)	25.98 (1.93)	0.23 (–0.52 to 0.97)
Major depression, n (%)*†	436 (58.76)	314 (61.33)	1.11 (0.88–1.40)	237 (61.40)	77 (61.11)	0.99 (0.65–1.49)	42 (60.00)	35 (62.50)	1.11 (0.54–2.29)
Generalized anxiety disorder, n (%)*†	383 (51.62)	251 (49.02)	0.90 (0.72–1.13)	188 (48.70)	63 (50.00)	1.05 (0.70–1.57)	36 (51.43)	27 (48.21)	0.88 (0.44–1.78)
Consulted a specialist, n (%)†			inestimable	**122 (31.61)**	**68 (53.97)**	**2.54 (1.68–3.83)**	33 (47.14)	35 (62.50)	1.87 (0.91–3.82)

CI=confidence interval; CM=chronic migraine; MIDAS=Migraine Disability Assessment Scale; MSSS=Migraine Symptom Severity Score; TM=transformed migraine.
Significant *P* values are bolded (*P*<0.05).
*Reference values are male, unemployed, uninsured, no major depression, no generalized anxiety disorder. †Contrast calculated using binary logistic regression; presented as an odds ratio. ‡Contrast calculated using *t* test; presented as mean difference.
§Contrast calculated as ordinal regression. ‖Contrast calculated as negative binomial regression; presented as rate ratio.

- Those currently consulting an appropriate HCP were more likely to be older and have health insurance, and had higher MIDAS and MSSS scores (*P*<0.05; **Table 1**).
- Among current consulters, respondents with a correct diagnosis of CM/TM were less likely to be fully employed, had higher MIDAS and MSSS scores, and were more likely to report consulting a specialist for their HAs (*P*<0.05).
- Among persons reporting a diagnosis of CM/TM, there were no significant differences observed for those who received appropriate treatment compared with those who did not, possibly caused by low statistical power.

Multivariate Modeling

Table 2. Logistic Multivariate Models for Current Consulting, Diagnosis, and Treatment Among Chronic Migraineurs

Variables	Current Consulting Status, OR (95% CI) (N=1,254)	CM/TM Diagnosis Among Current Consulters, OR (95% CI) (N=512)	Acute and Preventive Treatment Among Diagnosed Current Consulters, OR (95% CI) (N=126)
Sex*	0.83 (0.60–1.14)	**1.93 (1.03–3.61)**	1.21 (0.38–3.89)
Age (1-year increments)	**1.02 (1.01–1.03)**	1.00 (0.98–1.02)	1.00 (0.97–1.04)
Employed part-time or full-time*	0.92 (0.72–1.19)	0.68 (0.43–1.07)	1.44 (0.66–3.14)
BMI (per-unit increase)	**1.01 (1.00–1.03)**	1.00 (0.97–1.03)	1.03 (0.98–1.08)
Income ≥$75,000*	1.00 (0.76–1.33)	1.33 (0.81–2.18)	1.58 (0.68–3.67)
Insurance*	**4.61 (3.05–6.96)**	0.76 (0.33–1.75)	1.37 (0.34–5.57)
MIDAS (10-point increments)	**1.02 (1.00–1.04)**	1.01 (0.98–1.03)	0.98 (0.93–1.03)
MSSS (1-point increments)	**1.16 (1.11–1.22)**	**1.25 (1.14–1.37)**	1.10 (0.91–1.34)
PHQ-9 (depression)*	1.22 (0.89–1.67)	0.90 (0.51–1.60)	1.49 (0.53–4.14)
GAD-7 (anxiety)*	0.79 (0.59–1.07)	1.08 (0.63–1.85)	0.70 (0.26–1.88)
Current specialist†	inestimable	**2.38 (1.54–3.69)**	1.86 (0.88–3.97)

BMI=body mass index; CI=confidence interval; CM=chronic migraine; GAD=Generalized Anxiety Disorder; MIDAS=Migraine Disability Assessment Scale; MSSS=Migraine Symptom Severity Score; OR=odds ratio; PHQ=Patient Health Questionnaire; TM=transformed migraine.
Significant *P* values are bolded (*P*<0.05).
*Reference values are male, unemployed, income <$75,000, uninsured, no major depression, no generalized anxiety disorder.
†Specialist=neurologist, headache specialist, pain specialist.

- Odds of consulting an appropriate HCP increased with age, symptom severity, and disability, and were higher for those with insurance than those without **(Table 2)**.
- Odds of correct diagnosis were greater for females, as symptom severity increased, and for those who consulted a specialist **(Table 2)**.

DISCLOSURES

David W. Dodick, within the past 12 months, has served on advisory boards and has consulted for Allergan, Amgen, Alder, Arteaus, Pfizer, Merck, eNeura, NuPathe, Eli Lilly & Company, Autonomic Technologies, W. L. Gore, Ethicon, J&J, Zogenix, Supernus, Labrys, and Bristol-Myers Squibb. Dr Dodick has received funding for travel, speaking, or editorial activities from the following: CogniMed, Scientiae, IntraMed, SAGE Publications, Sun Pharma, Allergan, Lippincott Williams & Wilkins, Oxford University Press, Cambridge University Press, Miller Medical, and Annenberg for Health Sciences; he serves as Editor-in-Chief and on the editorial boards of *The Neurologist, Lancet Neurology,* and *Postgraduate Medicine*; and has served as Editor-in-Chief of *Headache Currents* and as an Associate Editor of *Headache.* He receives publishing royalties for *Wolff's Headache and Other Head Pain, 8th edition* (Oxford University Press, 2008) and *Headache (Cambridge Pocket Clinicians)* (Cambridge University Press, 2010). **Richard B. Lipton** has received grant support from the NIH, the National Headache Foundation, and the Migraine Research Fund. He serves as a consultant, advisory board member, or has received honoraria from Alder, Inc., Allergan, American Headache Society, Autonomic Technologies, Boston Scientific, Bristol-Myers Squibb, CogniMed, CoLucid, Eli Lilly, Endo, eNeura Therapeutics, GlaxoSmithKline, MAP, Merck, Novartis, NuPathe, and Pfizer. **Dawn C. Buse** has received grant support and honoraria from Allergan Inc./MAP Pharmaceuticals, Novartis, NuPathe, and Zogenix. She is an employee of Montefiore Medical Center, which has received research support funded by Allergan, Inc., Colucid, Endo Pharmaceuticals, GlaxoSmithKline, MAP Pharmaceuticals, Merck & Co., Inc., NuPathe, Novartis, Ortho-McNeil, and Zogenix, via grants to the National Headache Foundation. **Kristina M. Fanning** and **Michael L. Reed** are employees of Vedanta Research, which has received support funded by Allergan, Inc., CoLucid, Endo Pharmaceuticals, GlaxoSmithKline, MAP Pharmaceuticals, Merck & Co., Inc., NuPathe, Novartis, Ortho-McNeil, and Zogenix via grants to the National Headache Foundation. **Aubrey Manack Adams** and **Adrian Holden** are full-time employees of Allergan, Inc., and own stock in the company.

CONCLUSIONS

- Among persons with CM and disability, only 4.5% are currently consulting an appropriate HCP with an accurate diagnosis and minimally effective treatment.
- Receiving appropriate treatment is more likely among females and those with insurance, and with increasing age, symptom severity, and greater migraine disability.
- Several barriers need to be overcome for an individual with CM to receive minimally appropriate treatment, and public health efforts should focus on improving consultation, diagnosis, and effective acute and preventive treatment regimens.

REFERENCES

1. Headache Classification Committee of the International Headache Society. *Cephalalgia.* 2013;33(9):629-808.
2. Buse DC, et al. *Headache.* 2012;52(10):1456-1470.
3. Natoli JL, et al. *Cephalalgia.* 2010;30(5):599-609.
4. Buse DC, et al. *Headache.* 2012;52(1):3-17.
5. Lipton RB, et al. *Headache.* 2013;53(1):81-92.

ACKNOWLEDGMENT

This study was sponsored by Allergan, Inc., Irvine, CA; data collection and analyses were conducted by Vedanta Research (Chapel Hill, NC, USA). The authors would like to thank Daniel Serrano, PhD (formerly of Vedanta Research), who contributed to these analyses. Writing and editorial assistance was provided to the authors by Meghan Johnson, PhD, Kris Schuler, MS, and Amanda Kelly, MPhil, MSHN, of Complete Healthcare Communications, Inc., and was funded by Allergan Inc., Irvine, CA. All authors met the International Committee of Medical Journal Editors authorship criteria. Neither honoraria nor payments were made for authorship.

To obtain a PDF of this poster:

- Scan the QR code
- Send an SMS text message:
  Text: Allergan 416698 To: 43704 (USA) or 447860033051 (Non–USA)
  OR
- Visit: www.allergancongressposters.com/416698

Charges may apply. No personal information is stored.