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Epidemiology

Migraine care practices in primary care: results from a national US survey

Elisabeth Callen[1,*], Tarin Clay[1], Jillian Alai[1], Paul Crawford[2], Adam Visconti[3], Andrea Nederveld[4], Inez Cruz[5], Bailey Perez[6], Karen L. Roper[7], Tamara K. Oser[4], May-Lorie Saint Laurent[8], Yalda Jabbarpour[9]

[1]American Academy of Family Physicians, Leawood, KS, United States,
[2]Department of Family Medicine, Uniformed Services University of the Health Sciences, Bethesda, MD, United States,
[3]Department of Family Medicine, MedStar Georgetown University, Washington, DC, United States,
[4]Department of Family Medicine, University of Colorado School of Medicine, Aurora, CO, United States,
[5]Department of Family and Community Medicine, University of Texas Health San Antonio, San Antonio, TX, United States,
[6]University of Texas Health Science Center at San Antonio, San Antonio, TX, United States,
[7]Department of Family and Community Medicine, University of Kentucky College of Medicine, Lexington, KY, United States,
[8]Georgetown University Medical Center, Washington, DC, United States,
[9]The Robert Graham Center, Washington, DC, United States

*Corresponding author: American Academy of Family Physicians, 11400 Tomahawk Creek Parkway, Leawood, KS 66211 USA. Email: ecallen@aafp.org

Background: Primary care clinicians play a critical role in diagnosis and treatment of migraine, yet barriers exist. This national survey assessed barriers to diagnosis and treatment of migraine, preferred approaches to receiving migraine education, and familiarity with recent therapeutic innovations.

Methods: The survey was created by the American Academy of Family Physicians (AAFP) and Eli Lilly and Company and distributed to a national sample through the AAFP National Research Network and affiliated PBRNs from mid-April through the end of May 2021. Initial analyses were descriptive statistics, ANOVAs, and Chi-Square tests. Individual and multivariate models were completed for: adult patients seen in a week; respondent years since residency; and adult patients with migraine seen in a week.

Results: Respondents who saw fewer patients were more likely to indicate unclear patient histories were a barrier to diagnosing. Respondents who saw more patients with migraine were more likely to indicate the priority of other comorbidities and insufficient time were barriers to diagnosing. Respondents who had been out of residency longer were more likely to change a treatment plan due to attack impact, quality of life, and medication cost. Respondents who had been out of residency shorter were more likely to prefer to learn from migraine/headache research scientists and use paper headache diaries.

Conclusions: Results demonstrate differences in familiarity with migraine diagnosis and treatment options based on patients seen and years since residency. To maximise appropriate diagnosis within primary care, targeted efforts to increase familiarity and decrease barriers to migraine care should be implemented.

Key words: neurology; primary care; quality of care; quality of life; survey research; statistical modeling

Introduction

Migraine is a common neurological disorder which is estimated to affect approximately 50 million people in the United States, and at least 1% of the global population.[1–4] It is often a cause of disability and poor quality of life, yet previous studies have revealed that migraine is frequently misdiagnosed and undertreated[2] in the primary care setting.[5] This can be problematic for persons with migraine, as the majority first seek treatment from primary care clinicians.[1,6] Previous studies have demonstrated that primary care clinicians are aware of migraine prevalence and associated decreased quality of life; however, knowledge of disease management, including diagnosis, and treatment is uncertain.[7–10] Furthermore, a growing diversity of medications have added complexity to migraine care.[2,6,11,12]

Given the primary care clinicians' critical role in the diagnosis and treatment of migraine, it is important to understand gaps in knowledge and identify barriers to providing optimal care. While studies have examined knowledge and attitudes of primary care clinicians in providing migraine care, they have been limited to select populations of patients[9], a single institution[8], or to one aspect of migraine care[7,10]. This study utilises a holistic approach to explore barriers to diagnosis and treatment of migraine (including both preventative and acute management), preferred approaches to receiving migraine education, and familiarity with recent therapeutic innovations in a nationwide sample through multiple Practice-Based Research Networks (PBRNs). The analysis focuses on number of adult patients seen in a week, number of adult patients with migraine seen in a week, and years since residency, which could be seen as contributors to depth of migraine knowledge and confidence.

Key messages

- Clinicians need more time to reach a diagnosis and migraine treatment plan.
- Primary care clinicians, as first contacts, are integral to migraine care.
- Clinicians who had been out of residency a shorter time favoured paper diaries.

Methods

Survey creation

The American Academy of Family Physicians (AAFP) National Research Network (NRN), in conjunction with Eli Lilly and Company, developed a survey to assess primary care clinician understanding of migraine. Survey domains included presenting symptoms, understanding severity of attacks, barriers to diagnosis and treatment, types of assessments used (e.g. paper headache diaries), familiarity with new treatments, and where respondents obtain education about migraine. No previously validated scales were used (none exist for these questions). Question types included multiple choice, rank, matrix, and text boxes. The survey questions are included in Supplement 1. After creation, the survey was approved by the AAFP Institutional Review Board (IRB) and was established in Qualtrics (Provo, Utah) for distribution. The survey went through multiple rounds of review by the team before distribution. The final survey had 8 pages with an average of 3 questions per page with only the Informed Consent question forced and no back button included.

Survey administration

The AAFP NRN distributed the voluntary survey to their network members using individualised links. Members receiving the link to the survey had previously consented to receiving surveys from the AAFP NRN. Furthermore, the project team asked affiliated PBRNs if they would be willing to distribute the survey throughout their networks. A detailed list of PBRNs that distributed the survey and the number of links distributed is located in Table 1. A total of 3,134 individualised and anonymous links were distributed for a convenience sample. Informed consent, including survey purpose and investigator information, was obtained on the first page of the survey. Due to the nature of the survey distribution (i.e. anonymous links), we cannot calculate a response rate and do not know the open rate of the survey. Also, it is likely a select number of people received the survey link from more than 1 PBRN as membership between the PBRNs can overlap. The respondents were offered an incentive—a chance at one of 40 $100 gift cards for completing the survey where the respondent also had to provide their email address. For all networks, the survey was open for approximately 6 weeks from mid-April 2021 through the end of May 2021. All data were stored in Qualtrics or Egnyte (password protected with limited access to only project personnel with Qualtrics or Egnyte access).

Statistical analyses

After the data were cleaned for errors and duplicate entries (based on email address for incentive), descriptive statistics were computed for every question as appropriate. Initial ANOVAs and Chi-Square (X^2) tests were completed for all available data (list-wise) for each question/demographic combination. All tests with a $P < 0.10$ were retained for inclusion in the multivariate analyses and for covariate identification. We completed a series of individual regressions and a multivariate model. For the 2-category demographic variables (adult patients seen in a week; respondent years since residency), we used a binomial probability distribution with a logit link function using all retained tests and complete data (case-wise). For the 3-category demographic variable (adult patients with migraine seen in a week), we used a multinomial probability distribution with a cumulative complementary log-log link function using all retained tests and complete data (case-wise). For final significance in the multivariate models, a 2-sided alpha of 0.05 was used. All analyses were performed using SPSS 25 (Armonk, NY).

Results

Demographics

After cleaning for known duplicates, we had 71 respondents in our final dataset. Over half of the respondents saw 0–50 adult patients per week (52%), saw 1–5 adult patients with

Table 1. Distributed links.

Full network name	Abbreviated network name	Link type	Number of links distributed
American Academy of Family Physicians National Research Network	AAFP NRN	Individualized	1,963
WWAMI Region Practice and Research Network	WPRN	Anonymous	41
Minnesota Academy of Family Physicians	MAFP	Anonymous	157
Kentucky Ambulatory Network	KAN	Anonymous	210
Residency Research Network of Texas	RRNeT	Anonymous	28
Partners Engaged in Achieving Change in Health	PEACHnet	Anonymous	51
High Plains Research Network	HPRN	Anonymous	203
Capital Area Primary Care Research Network	CAPRICORN	Anonymous	81
Military Primary Care Research Network	MPCRN	Anonymous	400

migraine per week (72%), and had been out of residency for a minimum of 21 years (57%). The respondents worked at a variety of different practices (respondent could have selected more than 1 practice type): hospital/health system-owned medical practice (32%); academic health centre/faculty practice (28%); independently owned medical practice (23%); or primary care only (198%; Table 2).

Adult patients seen in a week

Respondents who saw fewer adult patients in a week (0–50 patients) were more likely to indicate an unclear patient history was a barrier to diagnosing (47% vs. 19%; $X^2(1, N = 66) = 5.945$; $P = 0.015$) and a lack of knowledge of available treatments was a barrier to treating (29% vs. 12%; $X^2(1, N = 67) = 3.029$; $P = 0.082$). However, respondents who saw more adult patients in a week (51+ patients) were more likely to indicate the severity of attacks would trigger a change in treatment plan (91% vs. 74%; $X^2(1, N = 66) = 3.239$; $P = 0.072$) and were more likely to use paper headache diaries (not including mobile apps [separate selection in question]) (55% vs. 32%; $X^2(1, N = 65) = 3.344$; $P = 0.067$). Respondents who saw fewer adult patients in a week were more likely to indicate their preferred approach for receiving information about migraine was through online resources (82% vs. 63%; $X^2(1, N = 66) = 3.276$; $P = 0.070$) but were less likely to indicate they were familiar with the new Calcitonin Gene-Related Peptide (CGRP) receptor antagonists (known as gepants) (59% vs. 36%; $X^2(1, N = 65) = 3.541$; $P = 0.060$).

Table 2. Respondent demographics*.

Years since residency ($n = 69$)	
0	4 [6]
1–20	26 [38]
≥21	39 [57]
Number of adult patients seen per week ($n = 68$)	
0–50	35 [52]
51+	33 [49]
Number of adult patients with migraine seen per week ($n = 68$)	
0	8 [12]
1–5	49 [72]
6+	11 [16]
Respondent practice type ($n = 69$)+	
Hospital/Health system-owned medical practice (not including managed care or HMO)	22 [32]
Independently owned medical practice	16 [23]
Academic health center/faculty practice (residency or university teaching environment)	19 [28]
Federally qualified health center or look alike	7 [10]
Government clinic, non-federal (e.g. state, county, city, maternal and child health, public health center, etc.)	3 [4]
Workplace clinic	2 [3]
Primary care only	13 [19]
Multi-specialty group (primary and specialty physicians)	2 [3]
Other	4 [6]

*Percentages in brackets.
+Categories with no responses were removed.

From the individual regressions, 6 questions were retained for further analysis (Supplement 2). The final model for adult patients seen in a week with the 6 included questions from above, was significant (likelihood ratio X^2: 18.185; $P = 0.006$). This model characterises the difference between the respondents who see 0–50 adult patients in a week and the respondents who see 51+ adult patients in a week. Out of the 6 questions, only 1 added significantly to the model. Respondents who saw fewer patients in a week were more likely to indicate unclear patient histories were a barrier to diagnosing ($P = 0.009$; Table 3).

Adult patients with migraine seen in a week

Respondents who saw any patients with migraine in a week were more likely to indicate a barrier to diagnosing was the priority of other comorbidities managed during the office visit (0: 38%, 1–5: 70%, 6+: 91%; $F(2, 15.709) = 3.717$; $P = 0.048$) and the severity of attacks would trigger the initiation of a treatment plan (0: 50%, 1–5: 85%, 6+: 91%; $F(2, 63) = 3.381$; $P = 0.040$). Respondents who saw 6+ patients with migraine in a week were more likely to indicate a barrier was the insufficient time to properly diagnose (0: 25%, 1–5: 21%, 6+: 55%; $F(2, 63) = 2.581$; $P = 0.084$). Respondents who saw 1–5 patients with migraine in a week were more likely to indicate they preferred to receive information from their peers about the diagnosis and treatment of migraine (0: 13%, 1–5: 44%, 6+: 18%; $F(2, 17.063) = 2.949$; $P = 0.079$). However, respondents who saw 6+ patients with migraine in a week were most satisfied with how they received information about migraine (0: 2.38 ± 0.74, 1–5: 2.61 ± 0.65, 6+: 2.91 ± 0.30; scale: 1(lowest) – 5 (highest); $F(2, 16.789) = 3.494$; $P = 0.054$). Lastly, the more patients with migraine a respondent saw in a week, the more familiarity the respondent had with the CGRP receptor antagonists (gepants) (0: 1.88 ± 0.35, 1–5: 1.46 ± 0.50, 6+: 1.30 ± 0.48; scale: 1 (most familiar) –5 (least familiar); $F(2, 15.683) = 5.208$; $P = 0.018$).

From the individual regressions, three of the above 6 questions were retained for further analysis (Supplement 2). This final model for the number of patients with migraine seen in a week by respondents with the 3 questions (barriers of priority of other comorbidities managed during an office visit; insufficient time to properly diagnose; and familiarity with recent therapeutic innovations (CGRP receptor antagonists/gepants) for acute treatment) was significant (Likelihood Ratio X^2: 14.057; $P = 0.003$). This model characterises the difference between the respondents who saw no patients, 1–5 patients, and 6+ patients with migraine in a week in the diagnosis and treatment of migraine. Out of the 3 questions, 2 added significantly to the model. Respondents who saw more patients with migraine were more likely to indicate the priority of other comorbidities during an office visit ($P = 0.029$) and insufficient time to properly diagnose ($P = 0.027$) were barriers to the diagnosing of migraine (Table 4).

Respondent years since residency

Respondents who had been out of residency longer (21+ years) were more likely to indicate the impact of migraine attacks on quality of life (53% vs. 31%; $X^2(1, N = 67) = 3.125$; $P = 0.077$) and the cost of medication after insurance (34% vs. 14%; $X^2(1, N = 67)=3.621$; $P = 0.057$) would initiate a change in treatment plan. They also indicated their preferred approach for receiving information about migraine

Table 3. Final combined binomial regression with Logit link function for adult patients seen in a week.

Variable	B	Std. error	95% Wald CI		Wald X^2	Sig
			Lower	Upper		
Intercept	1.744	0.987	−0.191	3.679	3.119	0.077
What are the barriers you experience when diagnosing a patient with migraine? Unclear patient histories. [Not selected]**	−1.716	0.655	−2.999	−0.432	6.858	0.009
What are the barriers you experience when treating a patient with migraine? Lack of knowledge of treatments available. [Not selected]**	−0.385	0.813	−1.978	1.208	0.224	0.636
When treating a patient with migraine, what circumstances trigger you to initiate a treatment plan? Severity of attacks. [Not selected]**	1.405	0.863	−0.286	3.096	2.652	0.103
What is your preferred approach for receiving information about the diagnosis and treatment of migraine? Online resources. [Not selected]**	−0.957	0.720	−2.369	0.454	1.766	0.184
What tools do you routinely use in obtaining a history from a patient with migraine? Paper headache diary. [Not selected]**	0.481	0.629	−0.752	1.713	0.584	0.445
How familiar are you with the recent therapeutic innovations for acute treatment of migraine? CGRP receptor antagonists/gepants. [More familiar]**	−1.018	0.642	−2.276	0.239	2.520	0.112

**The other option is the reference/redundant choice.

Table 4. Final combined multinomial regression with cumulative complementary log-log link function for adult patients with migraine seen in a week.

Variable		B	Std. error	95% Wald CI		Wald X^2	Sig
				Lower	Upper		
Threshold	0 patients with migraine seen in a week	−2.744	0.560	−3.841	−1.646	24.018	0.000
	1–5 patients with migraine seen in a week	0.174	0.380	-0.571	0.920	0.210	0.646
What are the barriers you experience when diagnosing a patient with migraine? Priority of other comorbidities managed during office visit. [Not Selected]**		−0.859	0.393	−1.629	−0.090	4.787	0.029
What are the barriers you experience when diagnosing a patient with migraine? Insufficient time to properly diagnose. [Not Selected]**		−0.875	0.396	−1.650	−0.100	4.895	0.027
How familiar are you with the recent therapeutic innovations for acute treatment of migraine? CGRP receptor antagonists/gepants. [More familiar]**		0.655	0.342	−0.015	1.326	3.666	0.056

**The other option is the reference/redundant choice.

Table 5. Final combined binomial regression with logit link function for respondent years since residency.

Variable	B	Std. Error	95% Wald CI		Wald X^2	Sig
			Lower	Upper		
Intercept	−0.013	1.507	−2.967	2.941	0.000	0.993
When treating a patient with migraine, what circumstances trigger you to change a treatment plan? Impact of attacks on quality of life. [Not selected]**	1.779	0.876	0.062	3.496	4.124	0.042
When treating a patient with migraine, what circumstances trigger you to change a treatment plan? Side effects experienced with current therapy. [Not selected]**	0.140	0.824	−1.475	1.755	0.029	0.865
When treating a patient with migraine, what circumstances trigger you to change a treatment plan? Cost of medication after insurance. [Not selected]**	1.971	0.879	0.248	3.694	5.030	0.025
What is your preferred approach for receiving information about the diagnosis and treatment of migraine? Online resources. [Not selected]**	1.046	0.752	−0.428	2.520	1.935	0.164
What type of instructor do you prefer to learn from about migraine diagnosis and treatment? Migraine/Headache research scientist. [Not selected]**	−2.401	0.924	−4.213	−0.589	6.744	0.009
What tools do you routinely use in obtaining a history from a patient with migraine? Paper headache diary. [Not selected]**	−1.720	0.688	−3.067	−0.372	6.252	0.012
How familiar are you with the recent therapeutic innovations for acute treatment of migraine? Selective 5-HT1F receptor agonists/ditans. [More familiar]**	−1.076	0.844	-2.730	0.577	1.628	0.202

**The other option is the reference/redundant choice.

was through online resources (81% vs. 62%; $X^2(1, N = 66) = 2.963$; $P = 0.085$). Respondents who had been out of residency shorter (1–20 years) were more likely to indicate side effects experienced with therapy would trigger a change in treatment (66% vs. 42%: $X^2(1, N = 67) = 3.613$; $P = 0.057$) as well as to indicate they preferred to learn about migraine from a migraine/headache research scientist (educational setting not specified; 35% vs. 11%; $X^2(1, N = 65) = 5.192$; $P = 0.023$), and use paper headache diaries (59% vs. 31%; $X^2(1, N = 65) = 5.159$; $P = 0.023$), but were less familiar with selective 5-HT1F receptor agonists/ditans (86% vs. 64%; $X^2(1, N = 65) = 4.142$; $P = 0.042$).

From the individual regressions, the 7 questions were retained for further analysis (Supplement 2). The final model for respondents' years since residency with the 7 questions from above was significant (Likelihood Ratio X^2: 30.203; $P = 0.000$). This model characterises the difference between the respondents who have been out of residency for 120 years and respondents who have been out of residency for 21+ years in the diagnosing and treating of migraine. Out of the 7 questions, 4 added significantly to the model. Respondents who had been out of residency longer were more likely to change a treatment plan due to the impact of attacks on quality of life ($P = 0.042$) and due to the cost of medication after insurance ($P = 0.025$). However, respondents who had been out of residency shorter were more likely to prefer to learn from migraine/headache research scientists ($P = 0.009$) and use paper headache diaries to track patient histories ($P = 0.012$; Table 5).

Conclusions

Our models show that migraine diagnosis and treatment is influenced by the frequency of both overall patients and patients with migraine, as well as the length of time in clinical practice. Unclear patient histories were more of a barrier for respondents who saw fewer adult patients than those respondents who saw more adult patients, potentially indicating that clinicians who saw more patients had more familiarity with the nuances of how adult patients characterise their migraine attacks and had a greater ability to clarify the details of a patient's history related to migraine. The priority of other comorbidities during an office visit and insufficient time to explore migraine and reach a diagnosis was more of a barrier for respondents who saw more adult patients with migraine than those who saw fewer of these patients. As both are related to the lack of adequate time, this potentially indicates respondents need more time with their patients to reach a diagnosis and develop a treatment plan for migraine. While more time with patients has previously been associated with better outcomes,[13] it is unclear from the information collected in this survey as to why lack of adequate time was more of a barrier for clinicians who saw more patients in a week since time spent with patients and selected other practice characteristics was not specifically asked. One possibility is clinicians who saw fewer patients did so because they had longer patient visits overall. Either way, these results demonstrate more time with patients would be beneficial for many clinicians and patients, allowing them to better understand all the nuances, pain, disability, and complications related to migraine.

Duration since graduation from residency impacted diagnosis and treatment of migraine as well. Changes in treatment plans were more likely to occur when there was an impact on the quality of life and the cost of medications after insurance for respondents who had been out of residency longer. This could potentially indicate respondents who had been out of residency longer were more familiar with other migraine treatment options and were more willing to make the change. Also, respondents who had been out of residency for a shorter amount of time preferred paper headache diaries for diagnosis over the respondents who had been out of residency for a longer amount of time. This could be an indication either respondents who have been out of residency shorter focussed on the evidence-based headache diaries that they were familiarised with during their training, or the diaries themselves are a more tangible way to diagnose migraine when a clinician has less experience and is not sure based on history alone. Respondents who had been out of residency for a shorter amount of time were more likely to prefer to learn from migraine/headache research specialists with no setting specified. This could be because this cohort is more familiar with academic settings, as this has been their reference point for education. Further investigation is needed to understand learning preferences for different groups of physicians.

These results demonstrate there are differences in familiarity with migraine diagnosis and treatment options based on the number of patients a clinician sees and how long clinicians have been out of residency. Primary care clinicians are integral to the diagnosis and treatment of migraine given their role as the first contact providers and the volume of patients they see. To maximise appropriate diagnosis, targeted efforts to increase familiarity and decrease barriers to migraine care should be implemented by training programs, health systems, and societies play a role in clinician continuing education.

Limitations

While this survey does have a smaller set of responses than we hoped for, the responses are considered to be representative of primary care clinicians since the link was distributed through nine PBRNs. This survey was also distributed approximately 1 year into the COVID-19 pandemic, which could have affected the number of responses received. During COVID-19, clinicians had received numerous surveys which could have led to survey fatigue. There is also a potential for non-response bias and recall bias. We also did not offer an honorarium or incentive to complete the survey, which could have increased our response count. However, we are also confident we overcame these biases through our survey distribution methods since we distributed the survey through a variety of channels.

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Supplementary material

Supplementary material is available at *Family Practice* online.

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Conflict of interest

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Ethics

The American Academy of Family Physicians (AAFP) IRB approved this study under Exempt Category 2.

Data availability

The data will be shared on reasonable request to the corresponding author.

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