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RESEARCH SUBMISSION

Evaluation of the 6-item Identify Chronic Migraine screener in a large medical group

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Abstract

Objective: To evaluate the sensitivity and specificity of the 6-item Identify Chronic Migraine screener (ID-CM[6]), designed to improve the detection of chronic migraine (CM).

Background: CM is often undertreated and underdiagnosed. Survey-based studies have found that approximately 75–80% of people meeting criteria for CM do not report having received an accurate diagnosis.

Methods: This study used claims data of patients enrolled in a large medical group who had at least one medical claim with an International Classification of Diseases 9th/10th revision diagnostic code for migraine in the 12-month prescreening period. The Identify Chronic Migraine survey was administered by e-mail, in-person, or over the telephone to all enrolled patients. A Semi-Structured Diagnostic Interview (SSDI) was administered by telephone by a trained physician. The ID-CM(6) and SSDI classifications of CM status were compared to evaluate sensitivity and specificity of the ID-CM(6) screening tool.

Results: The analysis of the ID-CM(6) screening tool included 109 patients, with 65/109 (59.6%) positive for CM based on the SSDI. The mean (standard deviation) age of the patient sample was 49 (15) years and 100/109 (91.7%) were female. Using the SSDI as the diagnostic gold standard, the ID-CM(6) had a sensitivity of 70.8% (46/65) and a specificity of 93.2% (41/44).

Conclusion: The ID-CM(6) demonstrated acceptable sensitivity and good specificity in determining CM status. The results of this analysis support the real-world utility of the ID-CM(6) as a simple and useful tool to identify patients with CM.

KEYWORDS
assessment, headache disorders, screening tool, symptom evaluation, validated

Abbreviations: CM, chronic migraine; ID-CM(12), 12-item Identify Chronic Migraine screener; ID-CM(6), 6-item Identify Chronic Migraine screener; NSAIDs, nonsteroidal anti-inflammatory drugs; SSDI, Semi-Structured Diagnostic Interview; ICHD-3, International Classification of Headache Disorders, 3rd edition; ICD-9/10, International Classification of Diseases 9th/10th revision; SD, standard deviation.

Justin S. Yu and Hema N. Viswanathan are former employees.

1 | INTRODUCTION

Historically, individuals with chronic migraine (CM) are often underdiagnosed and undertreated.[1,2] Survey-based studies have found that approximately 75–80% of patients meeting criteria for CM do not report having received a diagnosis of CM or related diagnoses (transformed migraine or chronic daily headache).[3,4] While monthly headache days are an important aspect of a CM diagnosis, communication is challenging between patients and clinicians, as many confuse headache days and migraine attacks, which may lead to underestimation of headache days.[5] Several barriers to providing optimal treatment for individuals with migraine have been identified, including seeking care, obtaining an accurate diagnosis, and receiving an individualized treatment plan.[2,3] Only 4.5% of individuals with CM traverse all three barriers.[3] Thus, better tools and resources are needed to identify and diagnose individuals with CM[1–4,6] and ease the substantial burden it imposes on individuals and society.

The 12-item Identify Chronic Migraine screener (ID-CM[12]) was recently developed (Table S1) as a patient-reported tool to identify undiagnosed CM in individuals with severe headache.[1] This screener assesses both CM status (positive or negative) and headache frequency, headache symptoms, medication use for headache, interference with activities due to headache, and planning disruption because of headache.[1] Results from the validation study of the ID-CM(12) screener demonstrated strong sensitivity (80.6%) and specificity (88.6%) and accurately classified most migraine cases.[1] The ID-CM(12) has been used to develop a claims-based algorithm to identify potentially undiagnosed persons with CM.[7]

A shorter screener may have utility in the clinical practice setting, enabling health-care providers with or without training in headache, neurology, or pain to correctly identify individuals with CM. The objective of this study was to evaluate the sensitivity and specificity of the 6-item version of the ID-CM (ID-CM[6]) screener in a large medical group.

2 | METHODS

2.1 | Study design

This was an observational study that included a retrospective analysis of claims data and prospective administration of a survey and in-person patient interview. Claims data were analyzed from a large medical group in the United States that delivers care through an employed staff model and a contracted independent physician association model. Patients with any diagnosis of migraine within the last 12 months (i.e., screening date to 364 days prior to screening) and who met the inclusion/exclusion criteria (described in the Study Population Section) from October 2015 to November 2016 (Figure 1) were identified. Every 2 months, a query was run on the medical group claims data to identify patients eligible for the study.

Claims data were used to assess the treatments that patients received, which included the number of claims, number of days' supply, quantity of acute treatments plus opioids, acute treatments alone, preventive treatments, unique preventive drug classes (classes defined as antidepressants, antiepileptics, antihypertensives, and nonsteroidal anti-inflammatory drugs [NSAIDs]), and both acute and preventive treatments.

Demographic characteristics were derived from surveys that the patients completed after enrolling in the study. The ID-CM(12) was administered to all patients as part of the survey. In this analysis, CM status was assessed in enrolled patients using a 6-item subset of the ID-CM(12), namely, the 6-item Identify Chronic Migraine screener (ID-CM(6)), and the Semi-Structured Diagnostic Interview (SSDI). The ID-CM(6) screener consisted of six questions that assessed headache frequency and symptoms, as these are the core criteria for diagnosing CM (Table 1).

The SSDI served as the gold standard for diagnosing CM and was administered by a trained physician to a convenience sample of eligible patients identified in the claims database. Clinical interviews to

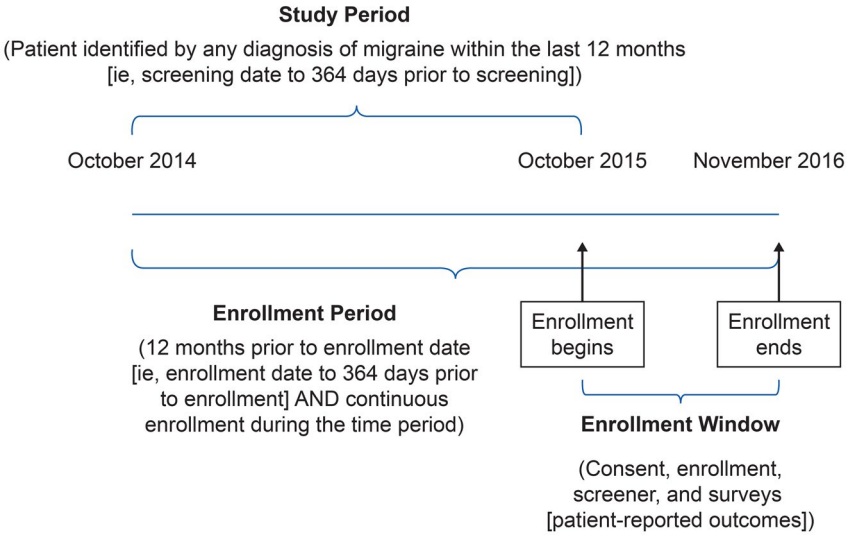

FIGURE 1 Study design [Color figure can be viewed at wileyonlinelibrary.com]

TABLE 1 Six-item ID-CM tool

What is the FREQUENCY of your headaches?
1. In the last 3 months (past 90 days), on how many days did you have a headache of any type?
2. In the last month (past 30 days), on how many days did you have a headache of any type?
What were your SYMPTOMS when you had headaches in the last month (past 30 days)? (Options: never; rarely; less than half the time; or half the time or more)
3. How often were you unusually sensitive to light (e.g., you felt more comfortable in a dark place)?
4. How often were you unusually sensitive to sound (e.g., you felt more comfortable in a quiet place)?
5. How often was the pain moderate or severe?
6. How often did you feel nauseated or sick to your stomach?

Abbreviation: ID-CM, Identify Chronic Migraine.

administer the SSDI were conducted by eight headache physicians who had completed or enrolled in an accredited headache fellowship. Interviewers were trained, practiced mock interviews, and received feedback from neurologists with expertise in these methods. Their interviews were audio-recorded and reviewed randomly for quality. Diagnoses were assigned by the interviewer and a computerized algorithm. The recorded interview was reviewed if there was a discrepancy between the clinician diagnosis and algorithm-based diagnosis and was resolved by an independent clinician (JP). The SSDI assesses headache symptoms, frequency, disability, and medication use based on 30-day and 90-day patient recall. It should be noted that the SSDI does not strictly adhere to the criteria for CM outlined in the International Classification of Headache Disorders, 3rd edition (ICHD-3) and instead follows the modified Silberstein-Lipton criteria for diagnosing CM, which focuses on headache days in individuals with migraine rather than the criterion of ≥8 migraine days per month.[1] The SSDI consists of a series of 31 predetermined questions and produces two types of assessments for diagnosis: one from the physician and one from a computer assessment based on the physician data entry and a scoring algorithm. The physician was required to ask the questions as written but could, based on clinical judgment, probe the patient to obtain accurate information, and the interview was extensively branched.

Institutional review board approval was obtained from IRB Company, Inc. (Buena Park, CA, USA). Written informed consent was provided by all participants.

2.2 | Study population

Inclusion criteria included: adult patients aged ≥18 years, one or more medical claims with an International Classification of Diseases 9th/10th revision (ICD-9/10) code for migraine (346.xx/G43.xxx) in the 12-month period from the screening date to 364 days prior to screening (i.e., screening period), ability to provide an active e-mail address for transmission of a secure electronic link or a physical mailing address for a mailed paper version of the questionnaires, continuous enrollment in the 12-month period from the enrollment date to 364 days prior to enrollment (i.e., enrollment period), and completion of the ID-CM(12) screener. The exclusion criteria included: one or more medical claims with an ICD-9/10 code for CM (346.7x/G43.7xx) in the 12-month prescreening period because the authors sought to identify previously undiagnosed CM; one or more migraine-related onabotulinumtoxinA claims in the 12-month preenrollment period (suggesting prior diagnosis or treatment specifically for migraine); head injury, head or neck surgery, or illicit drug use in the 12-month screening period; and noncompletion of the SSDI.

2.3 | Statistical analysis

This is a secondary analysis of data from a larger study. The study was designed to meet multiple research objectives, and this analysis focuses on the development and evaluation of the shorter version of the ID-CM screener. There was no predetermined sample size calculation. Normally distributed ratio scale variables (e.g., age and body mass index) are described by means and standard deviations (SD). Results for nominal scale variables (e.g., sex and race) and ordinal scale variables (e.g., pain and anxiety) are presented as frequencies and percentages. Contingency tables were constructed to compare ID-CM(6) and SSDI classifications of CM status to evaluate sensitivity and specificity of the ID-CM(6) screener. Sensitivity was defined as the probability of a positive test result given a positive CM diagnosis. Specificity was defined as the probability of a negative test result given a negative CM diagnosis. Positive predictive value (PPV) was defined as the probability of a positive CM diagnosis given a positive ID-CM(6) result, and the negative predictive value (NPV) was defined as the probability of a negative CM diagnosis given a positive result on the ID-CM(6). Confidence intervals (CI) for sensitivity and specificity are "exact" Clopper–Pearson confidence intervals. Analyses were conducted using SAS version 9.3 (SAS Institute Inc., Cary, NC, USA).

2.4 | Data availability

AbbVie is committed to responsible data sharing regarding the clinical trials we sponsor. This includes access to anonymized, individual, and trial-level data (analysis data sets), as well as other information (e.g., protocols and Clinical Study Reports), as long as the trials are not part of an ongoing or planned regulatory submission. This includes requests for clinical trial data for unlicensed products and indications.

This clinical trial data can be requested by any qualified researchers who engage in rigorous, independent scientific research, and will be provided following review and approval of a research proposal and Statistical Analysis Plan (SAP) and execution of a Data Sharing Agreement (DSA). Data requests can be submitted at any time and the data will be accessible for 12 months, with possible extensions

considered. For more information on the process, or to submit a request, visit the following link: https://www.abbvie.com/our-science/clinical-trials/clinical-trials-data-and-information-sharing/data-and-information-sharing-with-qualified-researchers.html.

3 | RESULTS

3.1 | Patient disposition, demographics, and clinical characteristics

A total of 536 patients met the inclusion criteria and completed the ID-CM screener. Among these patients, a convenience sample of 196 completed the SSDI. Patients with a claims-based diagnosis of CM in the 12-month screening period and those with a migraine-related onabotulinumtoxinA claim were excluded, resulting in a final sample of 109 patients with migraine who were included in the study, with 59.6% (65/109) who were SSDI (gold standard) positive for CM and 40.4% (44/109) who were SSDI negative. The overall sample had a mean (SD) age of 49 (15) years and body mass index of 28.5 (5.9) kg/m^2; 91.7% (100/109) of patients were female (Table 2). Approximately, 46% (50/109) of patients were white; most had private insurance (67/109; 61.5%); and most reported an education level less than a bachelor's degree (64/109; 58.7%). Approximately, half (51/109; 46.8%) of patients were employed full or part time, and the majority of patients (66/109; 60.6%) had annual income less than or equal to $100,000. Despite small sample sizes, the demographics and clinical characteristics were similar between patients who were SSDI positive and SSDI negative at baseline. All 109 patients were included in analyses of sensitivity, specificity, PPV, and NPV.

3.2 | Treatment patterns

A total of 65.1% (71/109) of the patients in the sample were prescribed both acute and preventive treatments, and 51.4% (56/109) had opioid claims in the 12-month preenrollment period (Table 3). Few patients (3/109; 2.7%) were prescribed only preventive treatments, and 11.0% (12/109) were not prescribed any acute or preventive treatments. In addition, 67.9% (74/109) of patients were prescribed preventive treatments from one or more unique drug classes. Patients who were SSDI positive had numerically more opioid claims and were prescribed numerically more of both acute and preventive treatments (Table 3).

3.3 | ID-CM(6) screener

Based on the ID-CM(6) screener, 45.0% (49/109) of patients were ID-CM(6) positive and 55.0% (60/109) were ID-CM(6) negative. Using the SSDI as the diagnostic gold standard for CM, the ID-CM(6) screener had a sensitivity of 70.8% (46/65) and a specificity of 93.2% (41/44) (Table 4). Based on the SSDI categories for CM diagnosis, the ID-CM(6) had a PPV of 93.9% and NPV of 68.3%. The ID-CM(12) had 72.3% sensitivity, 90.9% specificity, PPV of 92.2%, and NPV of 69.0%.

4 | DISCUSSION

This study evaluated the sensitivity and specificity of the newly developed 6-item ID-CM screener in comparison to the SSDI, as the gold standard for CM diagnosis. The ID-CM(6) demonstrated a high level of specificity (93.2%; 41/44) and a reasonable level of sensitivity (70.8%; 46/65) in identifying patients with CM in the real-world setting compared with the SSDI.

We have previously published a full psychometric validation of the 12-item ID-CM and discussed in detail the development process, evolution, and validation of this tool. In the original validation study, the SSDI was also used as the gold standard as a comparison for the ability to diagnose patients with CM. The sensitivity and specificity for the 6-item screener (ID-CM[6]) were also calculated alongside the 12-item screener (ID-CM[12]). The sensitivity for the ID-CM(6) in the previous validation study was 76.1% (compared with 70.8% in the current study) and the specificity was 90.9% (compared with 93.2% in the current study).[1] The differences in the sensitivity and specificity for the ID-CM(6) between the two studies are comparable and consistent across these two patient populations. However, when comparing the sensitivity and specificity of the ID-CM(6) in this real-world sample to results of the ID-CM(12), the sensitivity of the ID-CM(6) is lower (70.8%) compared with that for the ID-CM(12) in the validation study (80.6%) and this study (72.3%), and the specificity is higher (93.2% compared with 88.6% and 90.9%).[1] These results are expected and may be explained by the removal of six questions from the ID-CM(12) to create the ID-CM(6). Specifically, the ID-CM(6) does not include questions on medication use for headache, interference with activities due to headache, and planning disruption due to headache, which may help distinguish CM from other possible headache disorders. Consistent with the ICHD-3 criteria for CM, the ID-CM(6) screener focuses heavily on headache frequency and symptoms, while the additional questions from the ID-CM(12) are sufficient for differentiating migraine from other headache disorders.

The utility of the ID-CM(6) screener in clinical practice is to rapidly identify patients who self-screen as positive for CM. This case-finding tool may be particularly useful in general practice, urgent care, or in the emergency department, where patients are likely to present with moderate to severe headache but treating health-care providers are not necessarily headache specialists. Whether a health-care provider chooses to use the 6-item or the 12-item screener depends on several factors, such as time available, next steps after screening, and clinical setting. If a health-care provider has time available, the 12-item screener is likely the better option because the sensitivity is higher and, after a clinical assessment, there will be greater clarity regarding the need to treat. Conversely, if the time is very limited, for example, in an urgent care setting, the

TABLE 2 Patient demographics and clinical characteristics

Variable	SSDI positive (*n* = 65)	SSDI negative (*n* = 44)	Total (*N* = 109)
Age, mean (SD), years	49 (13)	48 (16)	49 (15)
Female, *n* (%)	63 (96.9)	37 (84.1)	100 (91.7)
Body mass index, mean (SD), kg/m^2	29.2 (6.2)	27.5 (5.4)	28.5 (5.9)
ID-CM(6) positive, *n* (%)	46 (70.8)	3 (6.8)	49 (45.0)
Deyo-CCI score, mean (SD)	0.3 (0.7)	0.2 (0.5)	0.3 (0.6)
Pain, *n* (%)	12 (18.5)	5 (11.4)	17 (15.6)
Anxiety, *n* (%)	7 (10.8)	9 (20.5)	16 (14.7)
Depression, *n* (%)	17 (26.2)	6 (13.6)	23 (21.1)
Race, *n* (%)			
White	29 (44.6)	21 (47.7)	50 (45.9)
Black	3 (4.6)	1 (2.3)	4 (3.7)
Hispanic	17 (26.2)	10 (22.7)	27 (24.8)
Asian[a]	2 (3.1)	5 (11.4)	7 (6.4)
Other	2 (3.1)	1 (2.3)	3 (2.8)
Prefer not to answer/missing	12 (18.5)	6 (13.4)	18 (16.5)
Marital status, *n* (%)			
Married[b]	30 (46.2)	23 (52.3)	53 (48.6)
Other	24 (36.9)	16 (36.4)	40 (36.7)
Prefer not to answer/missing	11 (16.9)	5 (11.4)	16 (14.7)
Employment, *n* (%)			
Full time or part time	24 (36.9)	27 (61.4)	51 (46.8)
Other	31 (47.7)	12 (27.3)	43 (39.5)
Prefer not to answer/missing	10 (15.4)	5 (11.4)	15 (13.8)
Education, *n* (%)			
Bachelor's degree or higher	12 (18.5)	17 (38.6)	29 (26.6)
Other	42 (64.6)	22 (50)	64 (58.7)
Prefer not to answer/missing	11 (16.9)	5 (11.4)	16 (14.7)
Income, *n* (%), $			
≤20 k	14 (21.5)	7 (15.9)	21 (19.3)
>20 k to ≤50 k	10 (15.4)	9 (20.5)	19 (17.4)
>50 k to ≤100 k	15 (23.1)	11 (25.0)	26 (23.9)
>100 k	10 (15.4)	7 (15.9)	17 (15.6)
Prefer not to answer/missing	16 (24.6)	10 (22.7)	26 (23.9)
Insurance, *n* (%)			
Private[c]	36 (55.4)	31 (70.5)	67 (61.5)
Public[d]	19 (29.2)	8 (18.2)	27 (24.8)
Missing	10 (15.4)	5 (11.4)	15 (13.8)

Note: The preenrollment period was defined as the 12-month time period from the enrollment date to 364 days prior to enrollment.

Abbreviations: CCI, Charlson Comorbidity Index; CM, chronic migraine; HMO, health maintenance organization; ID-CM, Identify Chronic Migraine; POS, point of service; PPO, preferred provider organization; SD, standard deviation; SSDI, Semi-Structured Diagnostic Interview.

[a]Asian, American Indian or Alaska Native, Native Hawaiian, or other Pacific Islander.

[b]Married; living together, not married.

[c]HMO/PPO/POS coverage (provided by your employer); private insurance coverage (purchased on your own).

[d]Medicaid/Medicare coverage (provided by your government).

6-item screener may be more useful as it can quickly identify those individuals with probable CM. Rapid and early identification of CM can provide an opportunity for physicians to prescribe appropriate treatment and, therefore, reduce the burden of CM on the individual and society.[4] Ideally, both screeners could be used in different settings and followed by the physician taking a more detailed history from the patient, and in assessments of change in headache status over time.

TABLE 3 Patient treatment patterns and clinical characteristics based on claims from 12-month preenrollment period

Variables	SSDI positive (*n* = 65)	SSDI negative (*n* = 44)	Total (*N* = 109)
Acute treatments only, *n* (%)	9 (13.8)	14 (31.8)	23 (21.1)
Preventive treatments only, *n* (%)	3 (4.6)	0 (0)	3 (2.7)
Both acute and preventive treatments, *n* (%)	49 (75.4)	22 (50.0)	71 (65.1)
No acute or preventive treatments, *n* (%)	4 (6.2)	8 (18.2)	12 (11.0)
Unique preventive drug classes, *n* (%)[a]			
0	13 (20.0)	22 (50.0)	35 (32.1)
1	25 (38.5)	17 (38.6)	42 (38.5)
≥2	27 (41.5)	5 (11.4)	32 (29.4)
Opioids, *n* (%)[b]	40 (61.5)	16 (36.4)	56 (51.4)
Opioid claims, mean (SD)	4.14 (5.98)	1.20 (2.62)	2.92 (5.07)
Opioid claims, *n* (%)[b]	**(*n* = 62)**	**(*n* = 44)**	**(*n* = 106)**
0	22 (35.5)	28 (63.6)	50 (45.9)
1	8 (12.9)	8 (18.2)	16 (14.7)
2	5 (8.1)	3 (6.8)	8 (7.3)
≥3	27 (43.6)	5 (11.4)	32 (30.2)

Abbreviations: SD, standard deviation; SSDI, Semi-Structured Diagnostic Interview.

[a]Classes defined as antiepileptics, antidepressants, antihypertensives, and nonsteroidal anti-inflammatory drugs.

[b]Based on outpatient pharmacy claims only.

TABLE 4 Sensitivity and specificity results from the ID-CM screener versus the SSDI

	SSDI positive (CM)	SSDI negative (non-CM)
ID-CM(6) positive (CM)	46 (**70.8%**)	3 (6.8%)
	95% CI 58.2–81.4	
ID-CM(6) negative (non-CM)	19 (29.2%)	41 (**93.2%**)
		95% CI 81.3–98.6
Totals	65	44

Bold indicates the important specificity and sensitivity values.

Abbreviations: CM, chronic migraine; ID-CM, Identify Chronic Migraine; SSDI, Semi-Structured Diagnostic Interview.

There is a trade-off between the 6-item and 12-item ID-CM screeners with regard to the sensitivity and specificity. The 6-item screener is more specific for CM, whereas the 12-item screener provides slightly higher sensitivity. Thus, the 12-item screener will likely identify more CM cases, but there will be more false positives. On the other hand, the 6-item tool will have fewer false positives, but there is the potential for more false negatives (i.e., missing potential cases of individuals with CM).

It is of interest that the sample population from this study had a high percentage (65.1%; 71/109) of individuals who had claims for both acute and preventive treatments. This suggests that in the preenrollment period a number of individuals sought care for symptoms that were bothering them but were underdiagnosed for CM. In addition, for the individuals who had prescriptions for preventive medications, approximately, 29% had prescriptions for multiple classes of preventive medications (e.g., antidepressants, antihypertensives, antiepileptics, and NSAIDs). Thus, the clinical characteristics identified through review of pharmacy and insurance claims are consistent with those of other patient populations evaluated for CM, with both acute and preventive medications being prescribed.

This study has several limitations. First, these results may not be fully generalizable to other populations; despite this, the findings of this study support those of the original validation study. This study population had a much higher rate of private insurance compared with populations in other CM studies, which assessed insurance status and other demographic information.[8] In addition, this study population had a wider range of income, employment, and education than is typically found in individuals with CM. Previous studies have discussed that individuals with CM have higher disability and tend to be of lower socioeconomic status.[8,9] Second, the sample size was limited to only 109 patients; despite this, the sample size is similar to that of the original validation study for the ID-CM(12) with 111 patients.[1] Third, in the validation study the sample population was from a web-based panel, whereas the current study population was from a large medical group and selected through claims analysis. Fourth, patient recall when responding to questions on the ID-CM screener and SSDI could be limited or inaccurate, or the patient could be confused about how long ago their symptoms and frequency of headache occurred (i.e., in the past month/30 days or in the past 3 months/90 days). However, these are also limitations intrinsic to history-based clinical diagnosis. Finally, the study period occurred during the transition from ICD-9 to ICD-10 codes, which may impact these findings.

This study has several strengths. First, this tool was developed using information from experts in the field and from patients with

CM. Second, validation of this tool yielded strong psychometric properties and classification for the CM patients. Finally, this study was conducted in a real-world setting and demonstrated the feasibility and utility of the ID-CM tool to screen and identify patients with CM.

5 | CONCLUSIONS

An accurate diagnosis of CM is necessary for early identification, to optimize treatment for the disease, and outline a care pathway to support care. Based on the SSDI as the gold standard for CM diagnosis, the ID-CM(6) screener demonstrated acceptable sensitivity and good specificity in determining CM status. The results of this analysis support the real-world utility of the ID-CM(6) screener as a simple and useful tool to identify patients with CM. Using the ID-CM(6) screener can help prevent emergency department visits, hospitalizations, and unnecessary diagnostic costs, and can reduce the health-care costs for treating patients with CM.

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CONFLICT OF INTEREST

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AUTHOR CONTRIBUTIONS

Study concept and design: Robert P. Cowan, Michael L. Reed, Hema N. Viswanathan, Richard B. Lipton. *Acquisition of data*: Michael L. Reed. *Analysis and interpretation of data*: Robert P. Cowan, Firas Dabbous, Hema N. Viswanathan, Richard B. Lipton. *Drafting of the manuscript*: Robert P. Cowan, Firas Dabbous, Richard B. Lipton, Jelena M. Pavlovic, Riya Pulicharam, Michael L. Reed, Stephen D. Silberstein, Hema N. Viswanathan, Justin S. Yu. *Revising it for intellectual content*: Robert P. Cowan, Firas Dabbous, Michael L. Reed, Hema N. Viswanathan, Richard B. Lipton. *Final approval of the completed manuscript*: Robert P. Cowan, Firas Dabbous, Richard B. Lipton, Jelena M. Pavlovic, Riya Pulicharam, Michael L. Reed, Stephen D. Silberstein, Hema N. Viswanathan, Justin S. Yu.

REFERENCES

1. Lipton RB, Serrano D, Buse DC, et al. Improving the detection of chronic migraine: development and validation of Identify Chronic Migraine (ID-CM). *Cephalalgia*. 2016;36:203-215.
2. Diamond S, Bigal ME, Silberstein S, Loder E, Reed M, Lipton RB. Patterns of diagnosis and acute and preventive treatment for migraine in the United States: results from the American Migraine Prevalence and Prevention study. *Headache*. 2007;47:355-363.
3. Dodick DW, Loder EW, Manack Adams A, et al. Assessing barriers to chronic migraine consultation, diagnosis, and treatment: results from the Chronic Migraine Epidemiology and Outcomes (CaMEO) study. *Headache*. 2016;56:821-834.
4. Bigal ME, Serrano D, Reed M, Lipton RB. Chronic migraine in the population: burden, diagnosis, and satisfaction with treatment. *Neurology*. 2008;71:559-566.
5. Lipton RB, Hahn SR, Cady RK, et al. In-office discussions of migraine: results from the American Migraine Communication Study. *J Gen Intern Med*. 2008;23:1145-1151.
6. Lipton RB, Bigal ME, Diamond M, Freitag F, Reed ML, Stewart WF. Migraine prevalence, disease burden, and the need for preventive therapy. *Neurology*. 2007;68:343-349.
7. Pavlovic JM, Yu JS, Silberstein SD, et al. Development of a claims-based algorithm to identify potentially undiagnosed chronic migraine patients. *Cephalalgia*. 2019;39:465-476.
8. Burch R, Rizzoli P, Loder E. The prevalence and impact of migraine and severe headache in the United States: figures and trends from government health studies. *Headache*. 2018;58:496-505.
9. Adams AM, Serrano D, Buse DC, et al. The impact of chronic migraine: The Chronic Migraine Epidemiology and Outcomes (CaMEO) Study methods and baseline results. *Cephalalgia*. 2015;35:563-578.

SUPPORTING INFORMATION

Additional Supporting Information may be found online in the Supporting Information section.

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