Healthcare Resource Utilization and Associated Costs by Opioid Use and Dependence Status among Persons with Migraine in the US Population: Results of the American Migraine Prevalence and Prevention (AMPP) Study

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BACKGROUND

Use of opioids as an acute treatment for migraine is controversial. It may be related to opioid dependence, as well as greater healthcare resource utilization (HRU) and higher related costs.

OBJECTIVE

To report and compare rates of health care visits and associated costs among persons with episodic migraine (EM) in the US population stratified by opioid use and dependence

METHODS

- The AMPP is a longitudinal, population-based, mailed questionnaire study.
- Respondents were identified in 2004 by screening 120,000 US households to identify individuals with severe headache. A sample of 24,000 respondents have been followed annually between 2005-2009.
- Respondents to the 2009 AMPP survey who met ICHD-2 criteria for migraine, had ≥1 headache in the preceding year, and provided the necessary data were categorized into 4 groups based on opioid use:
  - Non-users: denied use in all AMPP surveys between 2005-2009
  - Previous users: history of use reported in at least one AMPP survey between 2005 and 2008, but non-use in 2009
  - Current users: use of opioids in the 3 months preceding the 2009 AMPP survey
    - Current opioid users were divided into two groups according to *Diagnostic and Statistical Manual of Mental Disorders-4th edition [DSM-IV]* criteria for dependence:
      - Current non-dependent
      - Current-dependent
- Respondents were asked to report the number of visits to a range of healthcare providers including primary care providers (PCPs), physician's assistants (PAs), nurse practitioners (NPs), neurologists, headache (HA) specialists, pain clinics, the emergency department (ED), urgent care clinics (UCC), overnight hospital stays, MRIs, and CT scans for headache in the preceding year.
- Groups were compared on mean number of visits/ services.
- Descriptive statistics were used to summarize data, t-tests were utilized to compare group differences. A *p*-value of <0.05 was used to demarcate statistically significant differences.
- Associated costs were estimated for healthcare visits and imaging using 2009 US Medicare reimbursement rates. Rate ratios (RRs) were generated along with *p*-values to compare group differences.

RESULTS

- In a sample of 5,796 persons from the US population who met criteria for migraine, 4,076 (70.3%) were opioid non-users, 798 (13.8%) were previous users, and 922 (15.9%) were current opioid users.
- Among current users, 153 (16.6%) met DSM-IV criteria for dependence and 769 (83.4%) did not.
- Rates of healthcare visits were higher among both opioid use groups, and highest among the current-dependent group. Significant differences were found (p<0.001) for both opioid use groups compared to non-users for number of visits to PCPs, headache and pain specialists, and the ED/UCC in the preceding year. (Figure 1)
- Using the non-user group as a reference, current users had significantly greater odds for healthcare visits to primary care providers (current not-dependent, RR=3.37, p<0.001; current-dependent RR= 8.91, p<0.001); nurse practitioners/physician assistants (current not-dependent RR=4.21, p<0.001; current-dependent RR= 11.95, p<0.001); neurologists/headache specialists (current not-dependent RR=5.68, p<0.001; current-dependent RR= 10.36, p<0.001); and the ED/UCC (current not-dependent RR=4.83, p<0.001; current-dependent RR= 23.83, p<0.001.) (Figure 1)
- Costs were consistently higher for HCP visits as well as ED/UCC use, hospital stays, MRIs, and CT scans among current opioid users compared with the non-user group. Among current users, related costs were highest among those who met criteria for dependence. (Table 1)

Figure 1. Healthcare Visits for Headache in the Preceding Year by Opioid Use Group

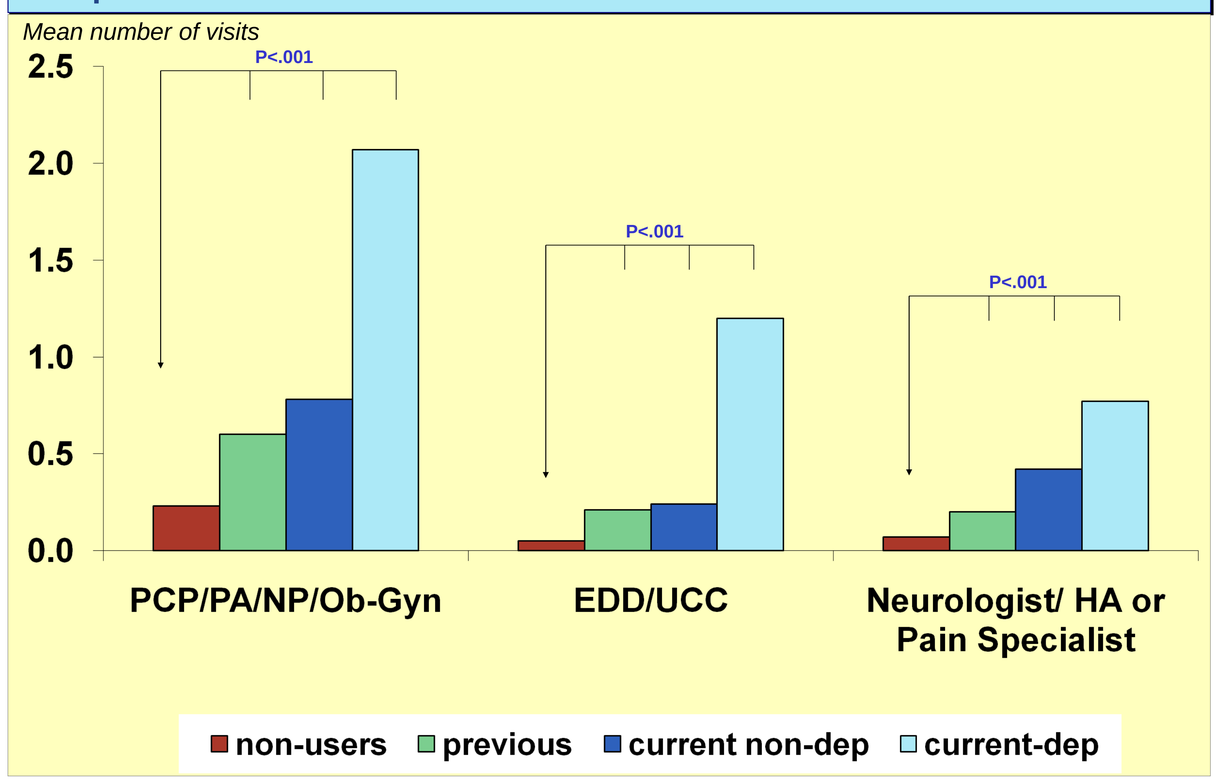

Table 1. Average Annual Cost Per Person by HCP Visit Type by Opioid Use Group (Costs estimated from 2009 Medicaid Reimbursement Rates)

Health Care Provider/ Medical Service	2009 Medicare Reimbursement Rate	Non-Users	Previous Users	Current Not-Dependent Users	Current-Dependent Users
PCP	$66	$17.16	$50.82	$64.02	$182.16
OB-GYN	$153	43.06	$4.59	$7.65	$30.60
NP/PA	$19	$0.76	$1.90	$3.23	$9.12
ED	$447	$22.35	$107.28	$102.81	$572.16
Neurologist HA-Specialist	$98	$8.82	$20.58	$40.18	$84.28
Pain Clinic	$99	$2.97	$11.88	$30.69	$41.58
Psychiatrist/ Psychologist	$74	$0.74	$8.14	$21.46	$49.58
Acupuncture	$35	$15.40	$15.75	$31.85	$39.90
MRI	$424	$18,265.92	$24,867.60	$28,946.48	$30,205.76
CT Scan	$239	$8,678.09	$12,669.39	$14,514.47	$17,026.36
Overnight Hospital Stay	$2,819	$1,494.07	$2,480.72	$2,875.38	$6,709.22

CONCLUSIONS

- Opioids were reportedly used by 15.9% of the sample at the time of the survey, and had been used by 29.7% over the preceding 5 years. 16.6% of current users met DSM-IV criteria for dependence.
- Current opioid users had significantly greater HRU as seen in number of visits to primary care providers, specialists, and the ED/UCCs. They also had higher monetized costs for healthcare visits, ED/UCC use, overnight hospital stays and imaging related to headache in the preceding year.
- Current users meeting criteria for dependence had the greatest number of healthcare visits and the highest costs, demonstrating the greatest burden to the healthcare system.
- Directionality can not be determined in this cross sectional study. Longitudinal studies are needed to more fully understand the directionality and causality of effects between opioid use, burden and cost among persons with migraine. Opioid use may be a marker for disease severity. The relationships between opioid use, disease severity, and outcomes needs to be explored in more detail. However these data demonstrate that opioid use is associated with greater healthcare costs, and dependence is associated with the greatest cost and burden on the healthcare system.

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