

The Burden of Migraine in the United States: Current and Emerging Perspectives on Disease Management and Economic Analysis

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ABSTRACT

Objectives: Migraine is often perceived as a low-impact condition that imposes a limited burden to society and the health-care system. This study reviews the current understanding of the burden of migraine in the U.S., the history of economic understanding of migraine treatment and identifies emergent trends for future studies evaluating clinical and economic outcomes of migraine treatment.

Methods: This study traced the history of economic articles published on migraine by performing a literature search using PubMed MEDLINE database and ancestral searches of relevant articles. The intention was not to provide an exhaustive review of every article or adjudicate between studies with different findings.

Results: Migraine affects millions of individuals worldwide, generally during the most productive years of a person's life. Studies show that migraineurs are underdiagnosed, undertreated, and experience substantial decreases in functioning and productivity, which in turn translates into

diminished quality of life for individuals, and financial burdens to both health-care systems and employers. Economic evaluations of migraine therapies have evolved with new clinical developments beginning with cognitive-behavioral therapy, introduction of triptans, concern over medication overuse, and emergence of migraine prophylaxis. Now recent clinical studies suggest that migraine may be a progressive disease with cardiovascular, cerebrovascular, and long-term neurologic effects.

Conclusions: Migraine imposes a substantial burden on patients, families, employers and societies. The economic standards by which migraine and treatment are evaluated have evolved in response to clinical developments. Emerging evidence suggests that migraine is a chronic and progressive disease. If confirmed, approaches to acute and prophylactic treatments and economic evaluations of migraine treatment may require major reconsideration.

Keywords: burden of illness, economic, migraine, United States.

Introduction

Migraine is often perceived as a low-impact condition that imposes a limited burden to society and the health-care system. This misperception persists in part because the disorder is episodic, does not shorten life expectancy, and rarely causes long-term physical disability. Because it is underdiagnosed and undercoded, analyses of claims data underestimate prevalence [1–3]. Although the percentage of adults with migraine is markedly less than that of tension-type headache (11% vs. 42%, respectively) [4], migraine nevertheless affects millions of individuals worldwide and significantly impairs sufferers' ability to function. It is most prevalent between the ages of 25 and 55, generally the most productive years of a person's life, generating substantial lost work time. Quantitative evidence also shows that migraineurs and other headache sufferers experience substantial decreases in functioning and productivity, which in turn translates into significant health-related quality of life (HRQoL) burdens on individuals and financial burdens to employers [5–7].

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Furthermore, emerging evidence indicates that migraine is sometimes a progressive disease with cardiovascular, cerebrovascular, and long-term neurologic effects [8,9]. If this is the case, a rethinking of approaches to both acute and preventive therapy, as well as a reconsideration of economic evaluations of the utility of migraine treatment, is required. As with most other diseases, the understanding of and research about migraine has changed significantly, as shown in Table 1. The changes in efficacy of treatment with the introduction of triptans generated a relatively large body of literature on the economics of migraine and migraine treatments. Now, new developments in the understanding of migraine will generate new studies on the economics of migraine prevention, and our understanding of the cost-effectiveness of prophylactic treatments will continue to develop as the long-term clinical consequences of migraine are studied.

In this article, we first present a review of our current understanding of the burden of migraine in the United States, and then turn to the history of our economic understanding of the treatment of migraine.

Methods

To accomplish our goal, we traced the history of economic articles published on migraine by performing a literature search using the PubMed MEDLINE database, as well as ancestral searches of relevant articles. The first article on the burden of migraine in the United States appeared in 1994 [10]. Articles on the cost of the first triptan began appearing in 1992 [11], with the first economic comparison of sumatriptan with nontriptan

Table 1 History of migraine treatment and clinical and economic understanding

Disease model	Years	Treatment	Burden of illness	Benefit of treatment
Acute pain disorder	Prior to 1990 1991–	Analgesics Triptans	Lost time during the acute attack	Sedation often offset pain relief
Acute neurovascular disorder			Lost time during the acute attack	Productivity gains during attacks
CDEM	1998–	Triptans Preventives	Lost time during attacks Disrupted HRQoL between attacks	Productivity gains during attacks Improved HRQoL
Chronic episodic and sometime chronic progressive disorder	2006–	Triptans Preventives Intervention to prevent progression	Lost time during attacks Disrupted HRQoL between attacks Consequences of progressive disease Long-term brain impact	Productivity gains during attacks Improved HRQoL Value of slowing or halting disease progression

CDEM, chronic disorder with episodic manifestations; HRQoL, health-related quality of life.

treatment appearing in Clinical Therapeutics in 1994 [12]. This was followed by tens of articles, published through the present, reporting different studies of the impact of triptans on direct and indirect costs and patient-reported outcomes. In this review, we highlight the issues raised by this now very large body of literature by focusing on a subset of key articles. Our intention is to highlight the change in focus over time rather than provide an exhaustive review of every article or adjudicate between studies with different findings.

Current Knowledge of Burden of Migraine

Migraine Epidemiology: Incidence and Prevalence

Estimating migraine incidence within a given population is challenging. Because of the episodic nature of the migraine disorder, and because migraine is frequently underreported and undertreated, it can be difficult to pinpoint the age of migraine onset or to retrospectively assess its incidence. As a result, migraine incidence has been assessed in few longitudinal studies and research evaluating migraine incidence is less common than prevalence studies [13,14].

Historically, it has also been challenging to quantify migraine prevalence. This has been because of variations in methodologies employed to obtain data, a lack of universal clinical standards for migraine diagnosis, and variations in age and sex distributions in evaluated populations [15,16]. The International Classification of Headache Disorders (ICHD) initially published in 1988 (ICHD-1) and revised in 2005 (ICHD-2), has standardized migraine diagnosis and provided a foundation for a series of community-based studies that have enabled us to obtain a more encompassing picture of the disorder's incidence and prevalence [17]. Linet and colleagues conducted a study of migraine with and without preceding visual aura through a Washington County, Maryland telephone survey of individuals aged 12 to 29 years ($n = 10,169$). A total of 392 men and 1018 women reported a history of migraine [18]. They found that migraine occurs more frequently in women compared with men, presents earlier in life in males than in females, and that migraine with aura presents at an earlier age than migraine without aura.

The 1989 American Migraine Study I (AMS I) concluded that approximately 23.6 million Americans, including 17.6% of women and 5.7% of men, suffered from migraine disorder [19]. The American Migraine Study II (AMS II), conducted in 1999, found that the number of migraineurs had grown to 27.9 million in 1999 commensurate with the corresponding increase in US population [20]. The 1-year prevalence of migraine based on data collected in 1999 in AMS II was 18.2% among females and 6.5% among males. The American Migraine Prevalence and Prevention (AMPP) study in 2004 found that the unadjusted

1-year prevalence was 11.7% (17.1% in females and 5.6% in males) [21]. Nevertheless, as shown in Figure 1, only a minority of those meeting the ICHD-2 criteria for migraine reported having received a diagnosis of migraine.

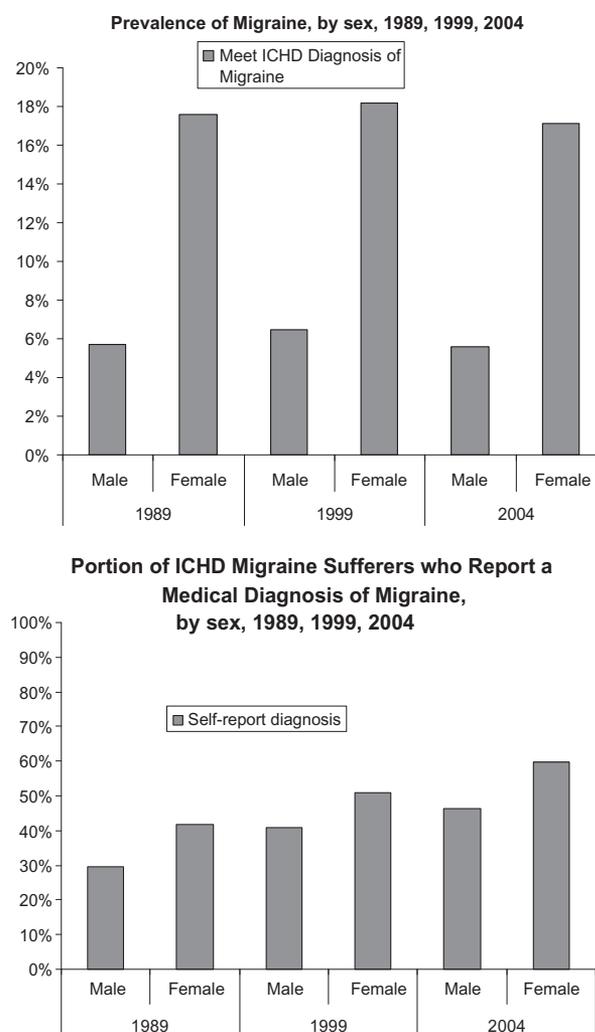


Figure 1 Prevalence of migraine and diagnosis of migraine: 1989, 1999 and 2004. Stewart 1992 represents diagnoses for 1989 (males, $n = 9,660$; females, $n = 10,808$), Lipton 2001 represents diagnoses for 1999 (males, $n = 14,260$; females, $n = 15,467$), and Lipton 2007 represents diagnoses for 2004 (males, $n = 77,185$; females, $n = 85,571$). Sources: Stewart et al. 1992 [19], Lipton et al. 2001 [20] and Lipton et al. 2007 [23]. ICHD, International Classification of Headache Disorders.

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