The Health Care Cost of Primary Headache and Associated Comorbidities

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Introduction

Primary headache, a common neurological condition, often presents with a variety of additional functional disorders.[1] These may include asthma, psychiatric disorders, sleep disorders, pain, and irritable bowel syndrome.[2,3,4]

- Primary headache patients utilize a seemingly disproportionate amount of health care resources.[1]
- Increased knowledge of primary headache and associated comorbidities may improve disease diagnosis and treatment strategies, increasing quality of life and efficiency of care.[2]

Objective

Calculate the prevalence and mean annual health care cost of patients diagnosed with primary headache conditions and understand the impact of associated comorbidities on these costs.

Methods

Data Source

- Data were drawn from 20,730,344 adult patients (18-65 years) with records during the period from January 1, 2011 to December 31, 2011 in the Truven Health Analytics MarketScan® Commercial and Medicare Supplemental Databases.
- The MarketScan Commercial and Medicare Supplemental Databases contain administrative claims and enrollment records for approximately 81 million unique individuals covered by large self-insured employers. Data are fully de-identified and compliant with the Health Insurance Portability and Accountability Act of 1996 (HIPAA).[5]

Sample Selection

- Two samples were selected for this study:
  - *Functional disorders sample.* Patients were selected if they were between 18 and 65 years old during the 2011 calendar year, had 12 months continuous enrollment during the calendar year, and had at least one medical claim with a functional disorder ICD-9 diagnosis during the calendar year. Functional disorders were primary headache, asthma/allergy, psychiatric disorders, gastric motility disorders, tinnitus, sleep disorders, and widespread chronic pain disorders.
  - *Control sample.* Patients were selected if they were between 18 and 65 years old during the calendar year, had 12 months continuous enrollment during the calendar year, and did not have a medical claim for a functional disorder diagnosis during the calendar year.

Cohort Selection

- *Primary headache cohort.* The functional disorders patients were stratified into a primary headache cohort. The primary headache cohort was further stratified into seven cohorts based on number of comorbid functional disorders (0 to 6).
- *Matched cases.* The primary headache cohort was matched to healthy controls without functional disorders using age, gender, and region. Comorbid cohorts were matched controls using similar demographics and functional disorder comorbidities.

Study Measures

- Primary outcomes: Annual total health care costs were examined for the functional disorders cohorts and comorbid cohorts for each calendar year from the combined perspective of the insurer and patient. Costs were based on reimbursements and copayments.
- Demographics: Gender was assessed on the date of the first medical claim with a functional disorder diagnosis within the calendar year.

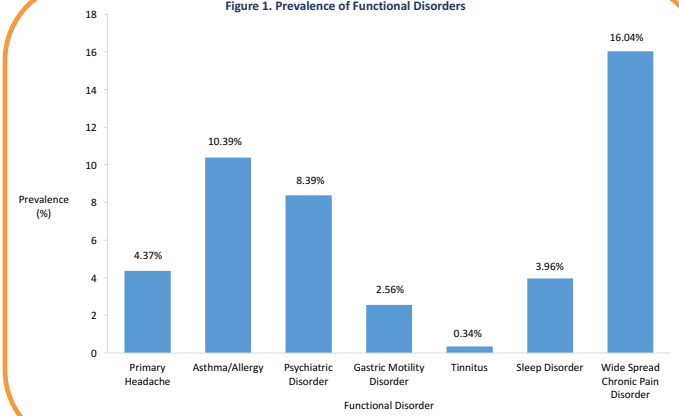
Statistical Analyses

- Prevalence was calculated for patients diagnosed with primary headache and other functional disorders.
- Descriptive analyses of demographics and annual total health care costs for patients diagnosed with primary headache, primary headache with comorbid functional disorders, and control patients were calculated.
- Each functional disorder cohort was matched to controls using age group, gender, and region. Matching was performed up to 20:1; individuals were sampled randomly with replacement as to avoid any bias.
- Statistical significance was tested for demographic and cost variables between functional disorder cohorts and control cohorts.
  - To examine whether there was a statistically significant difference between demographic variables and functional disorder status, a X^2 test was used; a Wilcoxon signed-rank test was used to examine a statistically significant difference between cost variables and functional disorder status. A Wilcoxon signed-rank test was used to adjust for the skewed nature of cost data. Statistical significance was defined as p-value < 0.05.
- Costs were adjusted using the annual medical care component of the Consumer Price Index (CPI) to reflect inflation 2011.
- Indirect health costs were not captured, as only direct costs based on plan and patient out-of-pocket payment were assessed. Findings may not be generalizable to other patient populations as this study only included a commercially insured population aged 18-65 years.

Results

- Primary headache was found in 4.37% (n=905,590) of the population. Wide spread chronic pain disorder was the most common functional disorder (16.04%, n=3,325,605), followed by asthma/allergy (10.39%, n=2,154,479) and psychiatric disorder (8.39%, n=1,738,248, Figure 1).

Figure 1. Prevalence of Functional Disorders



Source: Truven MarketScan Commercial and Medicare Supplemental Databases were used for data from January 1, 2011 to December 31, 2011.
Note: The starting population in 2011 was 20,730,344 patients. Cohorts were not mutually exclusive.

- Both cohorts had a higher proportion of females than males (Table 1).

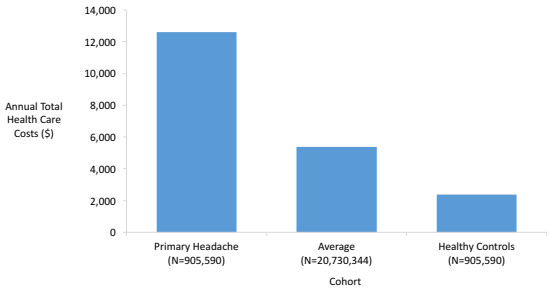
Table 1. Gender by Primary Headache Cases and Controls

Variable	Primary Headache	Controls	P-value
Number of patients (N)	905,590	905,590	
Female, %	73.47	73.47	1.00

Data Source: Truven MarketScan Commercial and Medicare Supplemental Databases were used for data from January 1, 2011 to December 31, 2011.

- The mean total annual health care costs for all patients with and without primary headache diagnoses were $12,621.73 and $2,373.66, respectively (p<0.0001, Figure 2). In comparison, the mean total annual health care costs for the average patient from the full population drawn from the MarketScan database were $5,384.28 (SD: $21,407.22).

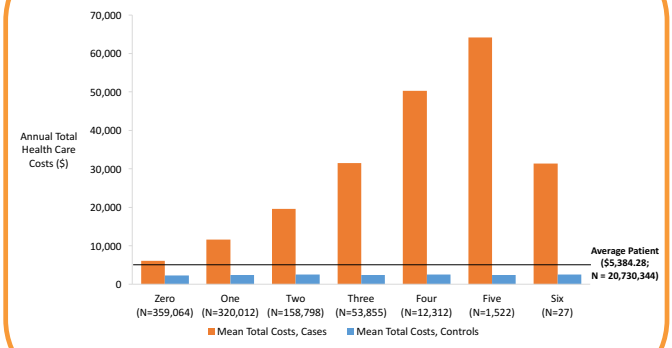
Figure 2. Mean Total Annual Health Care Costs, Primary Headache vs. Healthy Controls



Data Source: Truven MarketScan Commercial and Medicare Supplemental Databases were used between January 1, 2011 to December 31, 2011.

- Mean annual total health care costs were higher for all primary headache patients, regardless of the number of comorbid functional disorders, compared to healthy controls and average patients (Figure 3).

Figure 3. Mean Annual Total Health Care Costs of Primary Headache with Comorbid Functional Disorders vs. Healthy Controls



Data Source: Truven MarketScan Commercial and Medicare Supplemental Databases were used between January 1, 2011 to December 31, 2011.
Note: Functional disorder cohorts were defined as: functional disorder category (FDC) with 0 comorbidities, FDC X and any 1 other FDC, FDC X and any 2 other FDCs, FDC X and any 3 other FDCs, FDC X and any 4 other FDCs, FDC X and any 5 other FDCs, and FDC X and any 6 other FDCs. Cohorts were not mutually exclusive. Within patients with a headache diagnosis only, 359,064 (39.6%) have no additional functional disorders diagnosed. N represents N for cases and matched controls and is not a total N.

Conclusions

- Patients with primary headache and associated comorbid functional disorders have significantly higher costs than the average patient population.
- In addition to health care costs, the lost work days and decreased quality of life highlight the importance of a considered treatment strategy for primary headache and the commonly associated comorbid functional disorders.

References

1. Pesa J, Lage M. The Medical Costs of Migraine and Comorbid Anxiety and Depression. *Headache*. 2004; 44:562-570.
2. Wang S-J, Chen P-K, Fuh J-L. Comorbidities of Migraine. *Frontiers in Neurology*. 2010;1:16. doi:10.3389/fneur.2010.00016.
3. Boardman HF, Thomas E, Millson, DS, Croft, PR. Psychological, Sleep, Lifestyle, and Comorbid Associations With Headache. *Headache: The Journal of Head and Face Pain*. 2005;45:657–669. doi:10.1111/j.1526-4610.2005.05133.x
4. Chang F-Y, Lu C-L. Irritable Bowel Syndrome and Migraine: Bystanders or Partners? *Journal of Neurogastroenterology and Motility*. 2013;19:301-311. doi:10.5056/jnm.2013.19.3.301.
5. Quint BQ. White Paper on Health Research Data for the Real World: The MarketScan® Databases. Truven Health Analytics. 2015.

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