



# Body Mass Index and Episodic Headaches: Results from the American Migraine Prevalence and Prevention (AMPP) Study

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## BACKGROUND

Obesity and migraine with aura are independent risk factors for cardiovascular disease.

Additionally, obesity seems to be a risk factor for headache frequency among migraineurs, as well as a risk factor for chronic daily headaches.

The influence of the body mass index (BMI) on the other primary headaches, as well as on the patterns of treatment for migraine, probable migraine (PM) and severe episodic tension type headache (S-ETTH), have not been studied.

## OBJECTIVE

To explore the influence of the BMI on the frequency, severity, and patterns of treatment for migraine, PM, and S-ETTH.

## METHODS

A validated questionnaire was mailed to 120,000 households selected to be representative of the U.S. population. Individuals were screened based on the presence of at least one severe headache in the past year. Headaches were classified according to the International Headache Society criteria. Headache-related disability was obtained via MIDAS.

Participants were divided into five BMI categories: underweight (<18.5), normal weight (18.5-24.9), overweight (25-29.9), obese (30-34.9), and morbidly obese (≥35).

Based on survey responses, migraine sufferers were divided into four categories of preventive medication use: Never users; Current users taking preventive medication specifically prescribed for their headaches at the time of the survey; Lapsed users had used preventive medications for headache in the past, but were not using at the time of the survey; Coincident users were using medications that are accepted to be effective preventive migraine medications.

Logistic regression was used to assess the influence of obesity on headache frequency and disability, and on patterns of acute medication use and, in separate models, patterns of preventive treatment. Analyses were adjusted by demographic covariates.

## RESULTS

Survey response rate was 65% and included 18,968 individuals with migraine, 7,564 with PM, and 2,051 with S-ETTH. The distribution of very frequent headache (10-14 days/month) was assessed by BMI and headache type.

For migraine, contrasted to the normal weighted (6.5% had 10-14 days of headache) the proportion was non-significantly higher in the overweight (7.4%), and higher in the obese (8.2%, p<0,001) and morbidly obese (10.4%, p<0.0001). For PM, and S-ETTH, the differences were not significant in the adjusted analyses (Table 1).

The MIDAS-based disability of migraineurs, but not PM or S-ETTH sufferers, varied as a function of BMI: 32% of those with normal weight had some disability, vs. 37.2% of the overweight (p<0.01), 38.4% of the obese (p<0.001) and 40.9% of the morbidly obese (p<0.001).

BMI Category	Migraine N=15,958*		Probable Migraine N=5,376*		Severe Episodic Tension-Type Headache N=1,325*	
	n/N (%) <sup>a</sup>	OR (95% CI)	n/N (%) <sup>a</sup>	OR (95% CI)	n/N (%) <sup>a</sup>	OR (95% CI)
Underweight	43/536 (8.0%)	1.44 (0.98-1.96)	12/154 (7.7%)	1.1 (0.6-1.4)	2/57 (3.5%)	1.2 (0.2-1.6)
Normal Weight	358/5487 (6.5%)	Reference	127/1883 (6.7%)	Reference	9/445 (2.0%)	Reference
Overweight	331/4489 (7.4%)	1.15 (0.98-1.13)	100/1628 (6.1%)	0.9 (0.7-1.2)	6/408 (1.4%)	0.7 (0.3-1.9)
Obese	228/2787 (8.1%)	1.3 (1.1-1.5)	52/917 (5.6%)	0.8 (0.6-1.2)	11/226 (4.8%)	0.6 (0.2-2.2)
Morbidly Obese	279/2689 (10.3%)	1.7 (1.4-1.9)	74/794 (9.3%)	1.5 (1.1-1.9)	3/189 (1.5%)	0.7 (0.2-2.7)

Table 1: The Proportion of Headache Sufferers with Very Frequent Headache (10 to 14 days per month) as a Function of BMI Category

The analysis of preventive treatment use found 51% of the normal weight cases ever used a preventive treatment (pooling together the current, lapsed and coincident user groups). In contrast, 57% of the overweight (OR=1.3, 95% CI=1.2-1.4), 62% of the obese (OR=1.6, 95% CI=1.4-1.8) and 72% of the morbidly obese (OR=2.5, 95% CI, 2.3-2.8) ever used preventive medication (Figure 1). The same pattern was seen for PM respondents (Figure 2).

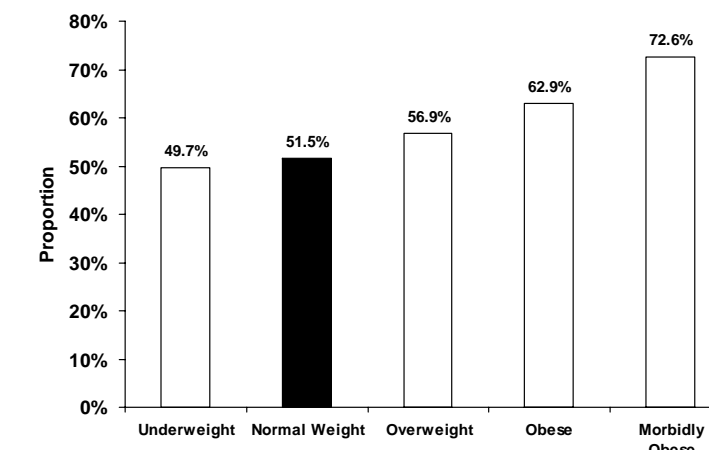


Figure 1: Proportion of Individuals With Migraine That Ever Used a Migraine Preventive Medication (for migraine purposes or for other medical reasons) According to the Body Mass Index.

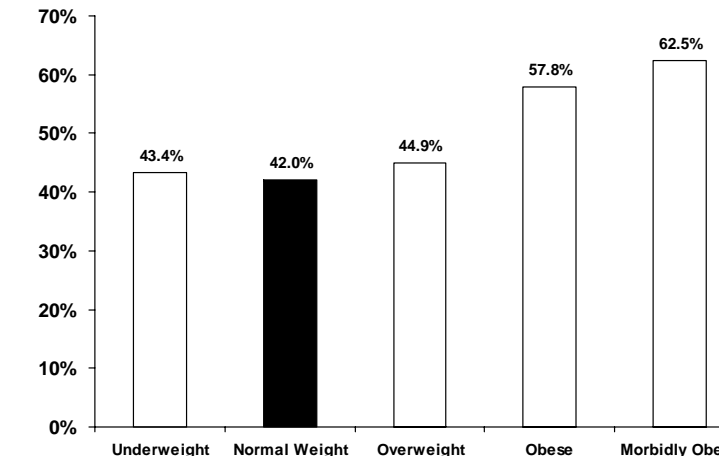


Figure 2: Proportion of Individuals With Probable Migraine That Ever Used a Migraine Preventive Medication (for migraine purposes or for other medical reasons) According to the Body Mass Index.

## CONCLUSION

**Obesity is an exacerbating factor for migraine, but not for headaches overall.**

**The relationship between obesity and preventive medication use may have several explanations.**

1. Since obesity is associated with frequent and disabling migraines, prevention may be more commonly prescribed in obese migraineurs.
2. Migraine is associated with comorbidities, such as depression, which may increase the probability of coincidental preventive treatment.
3. Obesity is associated with hypertension which also increases the probability of coincident preventive treatment for migraine.
4. In some, obesity is a consequence of treatment with migraine preventive medications that may potentially increase weight.