

## Original Research Article

# Prevalence of obesity in patients suffering from migraine

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## ABSTRACT

**Background:** Migraine is one of the most common primary headaches, accounting for significant morbidity in patients suffering from it. An association between obesity and migraine has been documented in the past, despite some studies pointing to the contrary. Author's purpose is to calculate the prevalence of obesity in migraine patients in order to contribute to the existing concepts. A positive correlation could lead to the employment of weight loss interventions in the management of obese patients with migraine.

**Methods:** In this cross-sectional study, 400 patients, recently diagnosed with migraine, attending the Neurology Outpatient Department at the Dr. Ruth KM Pfau Civil Hospital Karachi were enrolled after taking informed consent. Migraine was diagnosed using International Classification of Headache Disorders III (ICHD III) criteria. Height (meters) and weight (kilograms) were measured and body mass index calculated. This data was kept confidential. The results were tabulated and analyzed using SPSS version 19. Continuous quantitative data were analyzed using chi square test. A p Value of less than or equal to 0.05 was considered significant.

**Results:** The mean age of enrolled participants was 30.69±6.96 years, 204(51%) were >30 years of age, 159(39.8%) were male and 241(60.3%) were female, mean height was 1.55±0.1 meters, mean weight was 56.26±12.98 kg, and mean duration of migraine was 5.04±2.02 weeks. The prevalence of obesity in patients with migraine was 108 (27%).

**Conclusions:** It was concluded that the prevalence of obesity in patients with migraine was 27%.

**Keywords:** Headache, International classification of headache disorders III, Migraine, Obesity, Prevalence

## INTRODUCTION

Headache is a prevalent complaint across the globe. The lifetime prevalence of all forms of headache is 66% with no gender predisposition (male 65%, female 69%). The 1-year period prevalence is approximately 47% which is slightly more common in females (male 37%, female 52%).<sup>1</sup> In Pakistan headache has been estimated to affect up to 81.7% of the population at some point in their lives.<sup>2</sup>

The lifetime prevalence of migraine is 14% in the general population and the 1-year period prevalence of migraine is between 12% and 15%.<sup>3,4</sup> Migraine is one of the common primary headaches and among the top ten causes of disability globally.<sup>5</sup> Migraine contributes to poor quality of life in affected patients.<sup>6</sup> Studies have revealed that approximately 80.8% of patients presenting with headache in Karachi suffer from migraine.<sup>7</sup>

Obesity is defined as having a total body fat percentage of greater than 25% in men and greater than 35% in women.<sup>8</sup> The definition for obesity, with reference to the

body mass index, for adults in the Asia-Pacific region, was altered according to the provisional recommendations of The WHO Regional Office for the Western Pacific, the International Association for the study of obesity and the international obesity task force in February 2000. A BMI greater than 23 kg/m<sup>2</sup> was considered overweight and obesity was labeled at a BMI greater than 25 kg/m<sup>2</sup>.<sup>9</sup>

The prevalence of obesity is rapidly increasing worldwide.<sup>10,11</sup> In the United States alone, during an eight-year period from 1999-2000 to 1997-1998, the prevalence of obesity increased from 33% to 35% in women and from 27% to 32% in men.<sup>10</sup> Similarly, in Pakistan, there has also been an increase in the proportion of overweight (BMI  $\geq$ 25) women from 22.5% (1993-94 National Health Survey of Pakistan) to 34% (2011 National Health Survey of Pakistan) and 39% (2012-13 Pakistan Demographic and Health Survey) according to the National Health Survey of Pakistan.<sup>12</sup>

Obesity is associated with multiple medical co-morbid conditions such as hyperlipidemia, cardiovascular disease, and depression.<sup>13,14</sup> Obesity causes significant personal distress to the patients as well as increasing their financial burden. It is estimated that approximately 9.6% of migraine patients are obese.<sup>14</sup> Recent data has also supported an association between obesity and pain disorders, such as headache, particularly migraine.<sup>15</sup>

It is now known that weight reduction interventions have been successful in reducing the frequency of migraine episodes in the treated population.<sup>16</sup>

## METHODS

The objectives of the study were to determine the prevalence of obesity in patients suffering from migraine and the correlation between obesity and age, gender and duration of headache in migraine patients.

This cross-sectional study was conducted in the Neurology OPD, Dr. Ruth KM Pfau Civil Hospital Karachi from 1<sup>st</sup> June 2016 to 30<sup>th</sup> November 2016. This study was approved by the ethical review committee of the institute. Informed consent was taken from patients in front of a witness.

The sample size was calculated using software package WHO for determination of sample size. The frequency of obesity (BMI  $\geq$ 25) in patients suffering from migraine was 28.9%.<sup>14</sup> At least 316 patients were required to achieve 5% level of significance and 5% bound on the error of estimation, 400 patients were enrolled in the study for more accurate results.

### Inclusion criteria

- Age 18-40 years,
- Either gender,

- Case of migraine diagnosed for the first time within past 3 months as per ICHD III criteria.

### Exclusion criteria

- Patients with a tension-type headache, trigeminal autonomic cephalgia, secondary headaches according to the ICHD III criteria confirmed by CT or MRI Scan of Brain
- Patients of disorders leading to obesity, like diabetes or hypothyroidism, confirmed on the basis of history, clinical examination, past medical records and laboratory investigations if required
- Patients on steroids or other medicines causing obesity
- Patients with chronic liver disease, chronic renal disease, congestive cardiac failure confirmed by history, clinical examination, past medical records and laboratory investigations if required
- Pregnant females

### Diagnosis of Migraine

Migraine was diagnosed by the following criteria:

- At least five attacks fulfilling criteria B-D
- Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated)
- Headache has at least two of the following four characteristics:
  - Unilateral location
  - Pulsating quality
  - Moderate or severe pain intensity
  - Aggravation by or causing avoidance of routine physical activity (e.g. walking or climbing stairs)
- During headache at least one of the following:
  - Nausea and/or vomiting
  - Photophobia and phonophobia

### Statistical analysis

Data entry and analysis was done using SPSS version 19. Frequency and percentage were computed for categorical variables like gender and obesity. Mean and standard deviations were computed for continuous variables like age, weight, height, and BMI. Effect modifiers like age, duration of migraine and gender were controlled through stratification by applying chi-squared test and p-value  $\leq$ 0.05 was considered significant.

## RESULTS

A total of 400 patients were enrolled in this study during the study period. The mean age of enrolled participants was 30.69 $\pm$ 6.96 years, 204(51%) were  $>$ 30 years of age, 159(39.8%) were male and 241(60.3%) were female, mean height was 1.55 $\pm$ 0.1 meters, mean weight was 56.26 $\pm$ 12.98 kg, and mean duration of migraine was

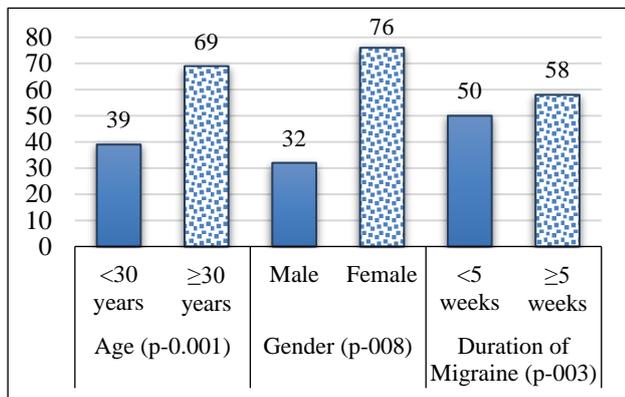
5.04±2.02 weeks (Table 1). The prevalence of obesity in patients with migraine was 108(27%).

**Table 1: Characteristics of the enrolled participants (n-400).**

Age (years)	Mean ± SD	30.69±6.9
	<30 years	196(49%)
	>=30 years	204(51%)
Gender	Male	159(39.75%)
	Female	241(60.25%)
Height (m)	Mean±SD	1.55±0.1
Weight (kg)	Mean±SD	56.26±12.9
Obesity	Obese	108(27%)
	Normal	292(73%)
Duration of disease	Mean±SD	5.04±2
	<5 weeks	231(57.75%)
	>=5 weeks	169(42.25%)

Stratified analysis by age, the prevalence of obesity in patients with migraine patients <30 years of age was 39 (19.9%) compared to 69(33.8%) cases among patients of age ≥30 years (p=0.001). Stratified analysis by gender, the prevalence of obesity in male patients with migraine was 32(20.1%) compared to 76(31.5%) cases among female patients (p=0.008).

Stratified analysis by the duration of migraine, the prevalence of obesity in patients with duration of migraine <5 weeks, was 50(21.6%) compared to 58(34.3%) cases among patients with duration of migraine ≥5 weeks (p=0.003) (Figure 1).



**Figure 1: Stratified analysis of the prevalence of obesity in patients with migraine by age, gender and duration of illness.**

**DISCUSSION**

Obesity is now considered a modifiable factor for migraine and needs to be identified and systematically treated, especially as, given the tendency for obesity prevalence itself to increase decade after decade, the prevalence of migraine might actually increase in future epidemiological studies.<sup>17</sup> Large studies have explored

the correlation between BMI (Body Mass Index) and headache or migraine prevalence in the general population but they lead to opposite results. Most of them define obesity according to Body Mass Index (BMI).<sup>18,19</sup>

The prevalence of obesity in patients with migraine was 108(27%). A review from Evans et al, explored data which was summarized in two groups whether obesity influences migraine prevalence or migraine profile. Four main studies conclude that high BMI is responsible for increased migraine prevalence. The finding of this study is consistent with the result of this review.<sup>15</sup>

Similarly, Horev et al, reported that 63% of 27 patients with total body obesity reported episodic headache and 48% fulfilled migraine criteria. The results of those studies showed that migraine was the most common diagnosis and was as prevalent in obesity grade III as in overweight and obesity grades I and II.<sup>20</sup>

Ford’s et al, work was to study the cross-sectional association between body mass index and the prevalence of severe headaches or migraines in a national sample of US adults. They evaluated 7601 participants in the National Health and Nutrition Examination Survey (NHANES), ranging from 20 to 85 years of age. Migraine and severe headache were self-reported, showing that those who were underweight (BMI<18.5) or obese (BMI>30) were at higher risk for having severe headaches or migraine compared with those of normal weight.<sup>20</sup>

The prevalence of obesity in patients with migraine among participants of age ≥30 years was 33.8% compared to 19.9% in those <30 years of age (p=0.001) and prevalence of obesity in patients with migraine among female was 31.5% compared to 20.1% in male patients (p=0.008).

Similarly, Peterlin’s analysis included a total of 21,783 participants to evaluate the prevalence of migraine/severe headaches in those with and without general obesity and abdominal obesity and the effect of gender and age on this relationship. They found in men and women aged 20-55 years that higher migraine prevalence was associated with both total and abdominal obesity. This was the first study which suggested and clearly demonstrated that older individuals or those of post-reproductive age who have migraine do not have an association with obesity while those of reproductive age do, which also suggested that both obesity and migraine are modulated by reproductive status.<sup>21</sup> The finding that migraine and obesity is associated with those of reproductive age by Peterlin et al, this association was also later supported by data from Vo et al, and Robberstad et al.<sup>21-23</sup>

Vo et al, found a significant association between migraine and obesity and that the odds of migraine increased with increasing obesity status. Robberstad et al,

found that recurrent headache was associated with increased weight (Odds Ratio [OR] = 1.4, 95 % CI 1.2-1.6,  $p=0.0001$ ).<sup>22,23</sup>

Keith et al, reviewed 11 epidemiologic datasets in order to evaluate the association between BMI and headache in women. In total 220,370 US women, aged 18 years old or older had self-declared migraine or headache, the condition not being confirmed by a physician. High BMI was positively associated with headache in general but not with migraine. Authors suggest that the absence of a definite link with migraine could be due to several biases: the type of analysis (mixing cross-sectional and longitudinal studies), the heterogeneity of the population tested, and the fact that migraine would be underestimated because it is poorly known.<sup>24</sup>

Nevertheless, not all studies found a positive correlation between migraine and obesity. In fact, Mattsson et al, failed to detect a significant correlation between obesity and migraine in 684 women aged 40-74 years.<sup>25</sup> Similarly, in the study of Keith et al, migraine prevalence was not related to obesity but obese women (BMI of 30) had increased risk for headache (but not specifically migraine) as compared with those with normal BMI. Similarly, Tellez-Zenteno et al, found that there was no association between the disability and severity of migraine and BMI.<sup>26</sup> No correlation between BMI and the frequency and prevalence of migraine was found in the study of Bigal et al, in which 176 subjects (79.5% women, mean age of 44.4 years) with normal weight ( $\leq 24.9$ ), overweight (25-29.9), or obesity ( $\geq 30$ ) were observed before and after headache preventive treatment. After treatment, frequency declined in the entire population, but no significant differences were found by BMI group.

## CONCLUSION

Obesity and migraine are both highly prevalent disorders in the general population, influenced by genetic and environmental risk factors. This study concluded that the prevalence of obesity in patients of migraine is 27%.

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