

Migraine in Obesity: Is It Prevalent?

Aso Sabir Saeed (FRCP (Ed))¹ and Osama Mohammad Amin Shukr (MRCP (UK),FRCP (Ed), FRCP (London))²

Abstract

Background: Several studies have demonstrated an association between obesity and migraine. It's still unclear whether migraine is the cause or it's the result of obesity.

Objective: We investigated the prevalence of migraine among obese and non-obese individuals and analyzed the relationship between migraine prevalence and obesity.

Patients and Methods: This is cross-sectional observational study was carried out at the neurology outpatients' department of the Rizgary Teaching Hospital in Erbil, Iraq, from July 1st, 2018 to September 30, 2019. We interviewed and examined 300 persons, both obese (n=154) and non-obese (n=146), and of both gender. All of them were adults (>18 years old). Each person's weight, height, body mass index (BMI), and waist circumference were measured. The diagnosis of migraine was made according to the International Headache Society's criteria. Obesity was present if the individual's BMI is ≥ 30 and/or waist-to-hip ratio is >0.9 in females and >1.0 in males.

Results: Out of the 300 persons, 14 males (8.5%) got migraines while migraine was found in 37 females (27.4%), irrespective of their weight. Out of the 300 persons, the prevalence of migraine among obese individuals was 21.4% (n=33) and while in non-obese individuals was 12.3% (n=18). There was a statistically significant difference between the groups (p-value=0.045). The overall prevalence of migraine was 16.9% of the persons interviewed.

Conclusion: The results showed that migraine is more prevalent among obese persons than non-obese persons and the difference was statistically significant.

Keywords: Migraine, obesity, BMI, headache

Corresponding Author: drasobzeni@yahoo.com

Received: 23th December 2019

Accepted: 12th March 2020

DOI: <https://doi.org/10.26505/DJM.19025121223>

^{1,2} Kurdistan Council for Medical Specialties - Erbil- Iraq

Introduction

Migraine headaches are recurrent and episodic headaches which may occur ipsilaterally or bilaterally. The symptomatology may include a variable combination of nausea, vomiting, photophobia, and personality changes. Not all patients have auras. Migraine frequently

begins in childhood, adolescence, or early adult life and recurs with a lower rate with advancing age. Migraine prevalence is estimated to be around 4-6% in males, 13-18% in females among Caucasians with a lower prevalence among Asians. Male to female ratio is 1:3 in adults and adolescents

while it's slightly more common in males among children. More than 80% of cases occur before 30 years old[1-5].

It is difficult how to define obesity precisely. Body mass index (BMI), which is equal to weight/height² (in kg/m²) is used for measuring obesity; a BMI of up to 24 is considered normal while a BMI of 25-29 is overweight and a BMI of ≥ 30 is obesity. With respect to the waist-to-hip ratio, a ratio of >0.9 in women and >1.0 in men indicates obesity. However, there are many other ways to define obesity; anthropometry, densitometry, CT scans, MRIs, and electrical impedance can be used for this purpose[6,7].

Patients and Methods

This is cross-sectional observational study was carried out at the neurology outpatients' department of the Rizgary Teaching Hospital in Erbil, Iraq, from July 1, 2018 to September 30, 2019. A total of 300 persons, both obese (n=154) and non-obese (n=146) and of both genders who had attended the clinic were enrolled consecutively. All of them were adults (>18 years old). Each person's weight, height, body mass index (BMI), and waist circumference were measured. The diagnosis of migraine was made according to the International Headache Society's criteria[8].

Table (1): The prevalence of migraine according to gender

Gender	Migraine (n; %)	Non-migraine (n; %)	Total (n)
Male	14 (8.5%)	151 (91.5%)	165
Female	37 (27.4%)	98 (72.6%)	135

*n=number; %=percent

The prevalence of migraine among obese persons was 21.4% (n=33) and was significantly higher than the prevalence of

Obesity was present if the individual's BMI is ≥ 30 and/or waist-to-hip ratio is >0.9 in females and >1.0 in males.

Patients were excluded if they had a cause of headache other than migraine, pre-existent neurological diseases, they over-weight (BMI of 25-29), or they are taking a medication which increases weight (e.g., steroids).

Statistical analysis

The data were analyzed by an independent statistician using Statistical Package for Social Sciences version 19.0. The Chi-square test and student's t-test were used. A P-value of ≤ 0.05 was considered statistically significant.

Results

The study encompassed 300 persons; their ages ranged from 18-48 years old with a mean age of 28.18 (\pm SD of 7.5) years. Out of those 300 persons, 165 (55 %) ones were males and 135 (45%) were females. In that group of 165 males, 87 were obese while the rest (n=78) were non-obese. Out of the 135 females, 66 were obese and 69 were non-obese. The overall prevalence of migraine in males was 8.5% (n=14) and in females was 27.4% (n=37), irrespective of their weight (p-value=0.8) Table (1).

migraine among non-obese persons (12.3%; n=18) in males and females (p-value=0.045) Table (2).

Table (2): Prevalence of migraine among obese versus non-obese individuals

	Migraine (n; %)	Non-migraine (n; %)	Total (n)
Obese	33 (21.4%)	121 (78.6%)	154
Non-obese	18 (12.3%)	128 (87.7%)	146
Total (n; %)	51 (17%)	249 (83%)	300

* n=number; %=percent

The overall prevalence of migraine among obese and non-obese individuals, males and females, was 16.9% (n=51).

Discussion

In the current study, we tried to find if there is a link between obesity and migraine. The prevalence of migraine was significantly higher among obese persons (21.4%) than non-obese (12.3%) ones. This result is consistent with a study carried out in the USA, which had found that obese young and middle-aged people had migraines more than the general population. In addition, 37% of women who have had abdominal obesity (diagnosed by waist circumference) had headaches when compared to 29% of their non-obese counterparts. In obese males, about 20% have had migraine headaches while 16% of non-obese counterparts were diagnosed with migraine[9-11].

Obesity is considered a condition of status of low inflammation; an association with metabolic syndrome has been found, and this may have a role in the pathophysiology of migraine. Calcitonin gene-related peptide (CGRP) and other peptides are also involved. CGRP is released into the cranial circulation of humans during an acute migraine; serum values of CGRP are increased in obese persons and excess fat ingestion may also be linked with increased CGRP production. CGRP receptor antagonists are effective in the acute treatment of migraine attacks. Mast

cells and macrophages can be activated by trigeminal nerve stimulation which in turn secretes pro-inflammatory mediators leading to pain generation and this is so culprit as migraine cause[12].

Overeem et al found that the prevalence of migraines among obese women was 48%. Most of those cases were migraine with aura. The incidence of other co-pathologies differs significantly in migraine patients and those who have no migraine, such as hypothyroidism, hypertension, diabetes, and dyslipidemia. This suggests that the elevated incidence of migraine headaches in those individuals is not an end-result of such conditions. Migraine without aura has been associated with estrogen withdrawal while migraine with aura is usually associated with increased serum levels of estrogen. Several neurotransmitters and peptides (e.g., serotonin and leptin) have been implicated in the pathophysiology of migraine[13].

Some studies in pediatric obesity found that there was a strong relation between obesity with migraine. A study found that the frequency of migraine was more among obese children aged between 3-18 years; children with frequent migraine attacks may not perform much physical activity compared to other children, thus being more obese or they are attacked by migraine more often as overweight children have more emotional issues to handle [14].

Researchers have found that morbidly obese patients with migraine had significant improvement in headache frequency and severity following weight-reducing bariatric surgery. The average number of headache days improved from 18 in the three months before surgery to eight after surgery, but the amount of weight loss did not correlate with the likelihood or degree of improvement in migraine parameters[15].

On the other hand, Olesen and colleagues found that migraine severity as well frequency did not differ between women who have obesity when compared with women without abdominal obesity, although the age of their sample was different from ours (40-74 years old). Obesity and migraine headaches are relatively common clinical disorders, which may result in a statistically but not pathophysiologically pertinent association of such disorders, and this is inconsistent with our study[16].

Body mass index was not associated with migraine prevalence in this study. Anyhow, it was linked to an increased headache frequency. The frequency, duration, and severity of the attacks' type of migraine may differ in relation to obesity [17].

In our study, we found that the prevalence of migraine in males was 8.5% and in females was 27.4%, irrespective of their weight. These figures are higher than those reported by other studies. The explanation may be that migraine is more prevalent among White Caucasians than in Asians or Africans. Socioeconomic factors may play a role, as migraine is more prevalent among low socioeconomic classes [18]. In our study, the sample size was relatively small, which

might have not allowed a very precise estimate of the rate of migraines among obese persons.

Conclusions

Migraine is more prevalent among obese persons than non-obese ones and migraine is more common in females than in males. It's not known whether migraine is the cause of obesity or it's the result of obesity.

Recommendations

Whether this prevalence is clinically significant or not, it needs further analytic studies to assess it.

References

- [1]DodickDW.Migraine.Lancet.2018;391:13-15-30.
- [2]Dussor G. New discoveries in migraine mechanisms and therapeutic targets. *Curr Opin Physiol* 2019;11:116-24.
- [3]Weatherall MW. The diagnosis and treatment of chronic migraine. *Ther Adv Chronic Dis* 2015; 6:115-23.
- [4]Burstein R, Nosedá R, Borsook D. Migraine: Multiple Processes, Complex Pathophysiology. *J Neurosci* 2015; 35:6619-29.
- [5]May A. Hints on Diagnosing and Treating Headache. *Dtsch Arztebl Int* 2018;115:299-308.
- [6]Hruby A, Hu FB. The Epidemiology of Obesity: A Big Picture. *Pharmacoeconomics* 2015;33:673-89.
- [7] Sarmiento Quintero F, Ariza AJ, Barboza García F, et al. [Overweight and obesity: review and update]. *Acta Gastroenterol Latinoam* 2016;46:131-59.
- [8]International Headache Society. The international classification of headache

disorders. *Cephalalgia*. 2018;38 (3rd edn.):1-211.

[9] Curat CA, Wegner V, Sengenès C, et al. Macrophages in human visceral adipose tissue: increased accumulation in obesity and a source of resistin and visfatin. *Diabetologia* 2006;49:744-7.

[10] Kaila B, Raman M. Obesity: a review of pathogenesis and management strategies. *Can J Gastroenterol*. 2008;22(1):61-8.

[11] Fruh SM. Obesity: Risk factors, complications, and strategies for sustainable long-term weight management. *J Am Assoc Nurse Pract*. 2017;29(S1):S3-S14.

[12] Hansen BC. The metabolic syndrome X. *Ann NY Acad Sci*. 1999;892:1-24.

[13] Overeem S, van Vliet JA, Lammers GJ, Zitman FG, Swaab DF, Ferrari MD. The hypothalamus in episodic brain disorders. *Lancet Neurol*. 2002;1:437-44.

[14] Abu-Arefeh I, Russell G. Prevalence of headache and migraine in schoolchildren. *BMJ*. 1994;309(6957):765-9.

[15] Bigal ME, Lipton RB, Holland PR, Goadsby PJ. Obesity, migraine, and chronic migraine. *Neurology*. 2007; 68(21):1851-61.

[16] Olesen J, Bousser MG, Diener HC, et al. New appendix criteria open for a broader concept of chronic migraine. *Cephalalgia*. 2006;26:742-6.

[17] Mattsson P. Migraine headache and obesity in women aged 40-74 years: a population-based study. *Cephalalgia*. 2007;27(8):877-80.

[18] Stewart WF, Roy J, Lipton RB. Migraine prevalence, socioeconomic status, and social causation. *Neurology*. 2013;81(11):948-55.