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STUDY OF THE INFLUENCE OF BODY MASS INDEX ON MIGRAINE CLINICAL FEATURES

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ABSTRACT

Background: Both migraine and obesity are common disorders in the general population, which are characterized by disability and a deterioration in the quality of life. Although many studies have studied the relationship between them, there is still no complete knowledge about this relationship, especially in regard to chronic migraine. **Objective:** To evaluate the association between body mass index and clinical features of migraine headache. **Methods & Materials:** We conducted a prospective cohort study of migraine patients attending the Neurological Diseases Clinic and the Internal Ambulance Department at Tishreen University Hospital in Latakia, during the period from May 1, 2021 to May 1, 2022. The sample included (215) patients, who were divided into 4 groups based on their BMI value. **Results and Discussion:** The mean age was (33.3 ± 9.3) years, and the percentageof females was 73.5%. The average number of attacks during the three months of the study was (10.87 ± 8.4 attacks) for obese patients, and for normal weight patients (2.91 ± 1.2 attacks) (P-value = 0.0001). The aura phase occurredin 59.2% of the obese patients, and in 24.2% of the normal-weight patients (P-value = 0.0001). The average severity of headache attacks was (7.99 ± 1.9) for obese patients, and (6.57 ± 1.9) for normal weight patients (P-value = 0.003). Severe disability from work occurred in 83.7% of obese patients, and in 49.5% of normal weight patients (P-value = 0.0001). The incidence of chronic migraine was 36.7% in obese patients and 2.2% in normal-weight patients (P-value = 0.0001). **Conclusion:** Obesity is an exacerbating factor for migraine in terms of frequency, severity, disability from work, and occurrence of the aura phase, and it is also an important factor in increasing the incidence of migraine chronicity.

KEYWORDS: Migraine - body mass index - obesity – aura.

INTRODUCTION

Migraine is one of the most frequent consultation syndromes at headache clinics with various neurological, gastrointestinal, and autonomic changes and has a worldwide prevalence which ranges from 5 to 35% in females and from 3 to 20% in males.[1] Obesity is a global health problem, affecting more than half a billion people, and is a predisposing factor for many comorbidities, including type 2 diabetes, cancer, cardiovascular disease, and premature death.[2-4]

The relationship between obesity and migraine has been the focus of clinical research in recent years. Previous studies had revealed that obesity was related with migraine patients with high frequency, greater severity, and some increased associated symptoms: higher disability grades, aura and an increased frequency of photophobia and phonophobia.[5-7] The aim of study is to evaluate the association between body BMI and the clinical features of migraine headache, in terms of frequency, intensity, duration, and the presence of photophobia and/ or phonophobiaand its association with aura, in addition to studying the effect of body mass index on migraine chronicity] chronic migraine: A headache that occurs 15 or more days per month, of which at least eight meet the criteria for migraine, and lasts for at least three months.[8]

METHODS

We conducted a prospective cohort study of migraine patients attending the Neurological Diseases Clinic and the Internal Ambulance Department at Tishreen University Hospital in Latakia, during the period from May 1, 2021 to May 1, 2022. Inclusion criteria: All patients presented with a headache complaint fulfilled the criteria for migraine according to ICHD-III and were between 18 and 65 years of age. Exclusion criteria: Pregnant women and patients younger than 18 years and older than 65 due to weight changes. Confined patients who suffer from malnutrition or malabsorption. The presence of another reason for the headache. Pain intensity was assessed on the11-point pain scale (no pain: 0, mild: 1–3, moderate: 4–6, severe: 7–10). Both body height and weight were measured on subjects with light clothing and without shoes. BMI was calculated as the following formula: BMI= weight (kg)/height (m)2. Using WHO guidelines, we defined five categories based on BMI: underweight (<18.5), normal weight (18.5 to 24.9), overweight (25 to 29.9), obese (30 to 34.9), and morbidly obese (35). We combined the data of obese and morbidly obese patients as one group due to the small number of morbidly obese.

Disability was assessed by MIDAS (Migraine Disability Assessment Test**)**. The patients were re-questioned after three months and a comprehensive story was taken of the following data: the number of migraine attacks, the severity and duration of each attack during the three months, in addition to the accompanying symptoms (nausea,vomiting, photophobia and phonophobia).

Statistical study:

Study design: Retrospective cohort study.

Qualitative variables were expressed in percentages and confidence intervals. Quantitative variables were expressed as the mean ± standard deviation.

One Way Anova test to study the differences of means between several independent groups. Chi-square test to study the relationship between qualitative variables.

The results were considered statistically significant with a p-value of < 5%.

IBM SPSS statistics (version20) is adopted for calculating statistical coefficients and analyzing results.

RESULTS

215 patients were enrolled in the present study. The mean age (+SD) was (33.3 ± 9.3) years, and the percentage of females was 73.5%.

The average number of attacks during the three months of the study was (10.87 ± 8.4 attacks) for obese patients, and for normal weight patients (2.91 ± 1.2 attacks) (P-value = 0.0001).

The duration of the attacks in most patients ranged between 4 and 72 hours, with an average of 24 hours for each attack, and we did not find any statistically significant differences between the groups of patients.

The aura phase occurred in 59.2% of the obese patients, and in 24.2% of the normal-weight patients (P-value = 0.0001).

Photophobia and/or Phonophobia was present in most of the patients in our study, as the percentage was 87.9% in normal weight, 100% in overweight, and 95.9% in obese, (P-value 0.07), meaning that there were no statistically significant differences between the groups of patients.

The average severity of headache attacks was (7.99 ± 1.9) for obese patients, and (6.57 ± 1.9) for normal weightpatients (P-value = 0.003).

Severe disability from work occurred in 83.7% of obese patients, and in 49.5% of normal weight patients (P-value = 0.0001).

The incidence of chronic migraine was 36.7% in obese patients and 2.2% in normal-weight patients (P-value = 0.0001).

DISCUSSION

The relationship between obesity and migraines in general has been studied in clinical research in recent years.[9] The main results of our study are as follows: Obesity is an exacerbating factor for migraine in terms of frequency, severity, disability from work, and occurrence of the aura phase, and it is also an important factor in increasing the incidence of migraine chronicity. However, we did not find a statistically significant relationship between obesity and the duration of attacks or their association with photophobia or phonophobia.

The relationship between obesity and migraine was still controversial. Previous studies have shown that obesity is an exacerbating factor for migraine in terms of disability, severity, and frequency.[17-19]

It also proved that obesity is more associated with chronic migraine.[18]

In contrast, the Mexican study did not find a clear association between body mass index and migraine.[20]

Several mechanisms supported that there may exist a possible link between BMI and headaches.

Inflammatory factors such as interleukins and tumor necrosis factor play a role in this association, as studies haveshown that they are elevated in obese people and in migraine patients.[10-12]

calcitonin gene-related peptide (CGRP) plays a major role in the pathophysiology of migraine, and obese women have higher serum levels of CGRP than controls.[13]

Cortical spread depression (CSD) is considered one of the strongest theories proposed to explain migraine with Aura, and it has been proven that obese mice have an increased number of these waves, and the infusion of the hormone leptin (which is elevated in obese people) into the central nervous system of lean mice led to an increase in the number of these waves, suggesting that obesity affects cortical excitability.[14-16]

Table 1: The relationship between BMI and the number of migraine attacks.

BMI	Mean ± SD For the number of attacks	P-value
Underweight	2.87±1.5	0.0001
Normal weight	2.91±1.2	
Overweight	8.26±8.1	
Obese	10.87±8.4	

Table 2: The relationship between BMI and duration of attacks.

BMI	Mean ± SD For the duration of attacks	P-value
Underweight	26.50±6.2 hours	0.06
Normal weight	29.31±24.4 hours	
Overweight	32.40±21.8 hours	
Obese	30.06±20.9 hours	

Table 3: The relationship between BMI and the occurrence of Aura.

Aura	The research sample				P-value
	underweight	normalweight	overweight	Obese	
Existing	0(0%)	22(24.2%)	25(37.3%)	29(59.2%)	0.0001
Not existing	8(100%)	69(75.8%)	42(62.7%)	20(40.8%)	

Table 4: The relationship between BMI and The incidence of Photophobia and Phonophobia.

Photophobiaand/or Phonophobia	The research sample				P-value
	underweight	normal weight	overweight	Obese	
existing	0(0%)	80(87.9%)	67(100%)	47(95.9%)	0.07
not existing	8(100%)	11(12.1%)	0(0%)	2(4.1%)	

Table 5: The relationship between BMI and headache severity.

BMI	Mean ± SD For the severity of attacks	P-value
Underweight	6.12±1.2	0.003
normal weight	6.57±1.9	
Overweight	7.47±1.6	
obese	7.99±1.9	

Table 6: The relationship between BMI and disability from work and daily activities.

Disability fromwork and dailyactivities	The research sample				P-value
	underweight	normalweight	overweight	Obese	
Mild	4(50%)	28(30.8%)	7(10.4%)	1(2%)	0.0001
Moderate	3(37.5%)	13(14.3%)	5(7.5%)	7(14.3%)	
Severe	1(12.5%)	45(49.5%)	55(82.1%)	41(83.7%)	
No disability	0(0%)	5(5.5%)	0(0%)	0(0%)	

Table 7: The relationship between BMI and Migraine chronicity.

Migraine classification	The research sample				P-value
	Underweight	Normalweight	Overweight	Obese	
Episodic	8(100%)	89(97.8%)	41(61.2%)	31(63.3%)	0.0001
chronic	0(0%)	2(2.2%)	26(38.8%)	18(36.7%)	

CONCLUSION

BMI has an important effect on migraines, whether in terms of frequency, severity, disability, or aura occurrence, in addition to the chronicity of migraine.

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