Indian J Physiol Pharmacol 2018; 62(4) : 453–457

Original Article

Association between Generalized Obesity and Migraine Features in Indian Females

Pooja Ojha[1,]*, Varun Malhotra[2] and Nitin Pandey[1]

Departments of [1]Physiology and [2]Medicine,
Era's Lucknow Medical College and Hospital,
Lucknow, Uttar Pradesh, India

Abstract

Introduction: One of the most common headache disorders today is migraine. It affects about one fifth population globally. Association between Migraine and generalized obesity (as assessed by body mass index) has been studied recently in various parts of globe, but the results are inconclusive. Purpose of this study is to find any association between generalized obesity and clinical features of migraine.

Methods: Female patients between 18-55 years of age, diagnosed with migraine, according to the International Classification of Headache Disorder, were recruited. Clinical interview regarding migraine features was taken by trained neurologist. It included age of onset of headache in years, frequency of headache per month, history of presence of aura, duration of headache in hours, severity or disability due to disease. Severity of migraine was assessed through Migraine disability assessment questionnaire (MIDAS). Anthropometric measurements including height and weight were taken and Body mass index was calculated. Patients were divided into four categories underweight, normal BMI, overweight and obese, according to revised guidelines for BMI cutoffs for Asian population. Comparison of clinical features of migraine in different body mass index categories was done using one way ANOVA. P value less than 0.05 was considered significant.

Results: Study group comprised of 168 female migraine patients [Age mean (SD) = 32.7(9.9)yr]. Frequency of headache per month and MIDAS score significantly varied in different BMI categories (F value = 6.2, P value <0.05 and F value = 3.1, p value <0.05 respectively). No statistically significant association was found between duration of headache and obesity.

Discussion: Clinical features of migraine are affected by generalized obesity in female migraineurs. These features include frequency and severity of migraine. Therefore weight reduction may find a potential role in improvement of migraine symptoms.

***Corresponding author :**

Pooja Ojha, Assistant Professor, Department of Physiology, Era's Lucknow Medical College and Hospital, Lucknow, Uttar Pradesh, India; Email id: drpojha@gmail.com

(Received on February 14, 2018)

Introduction

Migraine, a common headache disorder, affects about 10-20% of population all over the world (1) and has a prevalence of 25.2 % in south India (2). A typical

Migraine headache is recurrent, unilateral, pulsating quality, moderate or severe intensity, aggravated by routine physical activity and associated with nausea and/or photophobia and phonophobia, lasting 4-72 hours (3). Some patients experience alteration in sensory sensitivity, focal neurological symptoms and autonomic dysfunction (4).

The exact cause of Migraine is not known. One of the factors which has recently been associated with migraine is obesity (5, 6). Obesity is a chronic, multifactorial disorder, better defined as a condition in which there is excessive deposition of adipose tissue in the body causing adverse effects on health of the individual (7). Previous work shows significant association between migraine and abdominal obesity (8). It is also shown that obesity in migraineurs is associated with increased frequency, severity of migraine and photophobia, phonophobia also increase with obesity (9, 10). Others do not report any association between obesity and characteristics of migraine (11).

Frequently used method to objectively determine the degree of fatness or thinness in an individual is body mass index (BMI), which is determined by dividing the weight in kilograms by the square of height in meters for the subject (kg/m^2). BMI determines the general obesity in a person. Individuals can be divided on the basis of BMI into various categories ranging from underweight to obese. It has been associated with the increased risk of mortality and morbidity in various populations (12). Obesity and migraine have some common pathogenic determinants and may affect each other (13).

As there is not much work from our region showing association between general obesity and migraine. Therefore, it is the need to ascertain the relationship between various BMI categories and migraine features in India.

Methods

Participants

This cross sectional study included all female patients in the age group of 18-55 years, diagnosed with common migraine, by the expert neurologist, according to the International Classification of Headache Disorder, third edition (3) from the neurology outpatient clinic of the associated hospital, between December 2016 and November 2017. Those having any other type of headache disorder, neurological or psychiatric comorbidities, hypertension, diabetes mellitus were excluded from the study. This study was approved by the ethical committee of the Institute. Written informed consent was obtained from all participants before clinical interview and measurements.

Assessment of characteristics of migraine

Basic information such as age and marital status were recorded, following which a structured interview was conducted by a neurologist. Particulars of Migraine history such as age of onset of headache in years, frequency of headache per month, history of presence of aura, duration of headache in hours, severity & disability due to disease followed by clinical neurological examination. Details of Migraine severity were assessed according to MIDAS questionnaire, which is used to assess the actual impact of headache in last three months on patients life (14).

Assessment of Total body obesity

All measurements were taken in the morning, in the research lab of department of Physiology.

Body weight was measured using digital weighing machine to the nearest 0.1 kg, with patient wearing light clothing and standing on the centre of the scale without support and weight distributed evenly on both feet. Standing stature was measured using a standard stadiometer to the nearest 0.1 cm with patient standing with feet approximated, heels, buttocks and upper back touching the scale and patient looking in the Frankfort plane. Total body obesity was determined from Body mass index (BMI), which was calculated as weight in kg divided by the square of height in meters (kg/m^2). Patients were divided into four groups according to various body mass index categories as per the revised guidelines into underweight: <18.0 kg/m^2, Normal BMI: 18.0-22.9 kg/

m^2, Overweight: 23.0-24.9 kg/m^2, Obesity: >25 kg/m^2 (15). Clinical features of migraine were compared in these groups.

Statistical analysis

Descriptive statistics was used to assess frequencies and distributions. Qualitative data was presented as number (percentage) and Quantitative data was presented as Mean±Standard deviation. Comparison of clinical features of migraine in different body mass index categories was done using One way ANOVA. P value less than 0.05 was considered significant. All analysis was performed using SPSS software (version 16).

Result

Total 168 female patients, were finally selected for the study. Demographic features, clinical details of migraine and Anthropometric measurements of patients is presented in Table I. Average age of patients was 33 years and almost more than two third of them were married. Average age of onset of headache was 26 years and aura was present in only thirteen percent of patients. Figure 1 shows the distribution of patients in various body mass index categories. According to the current guidelines for BMI cutoffs for Asian Indians, majority of patients were obese. Table II shows comparison between characteristics of Migraine in various BMI categories, using one way ANOVA. Frequency of headache per month and MIDAS score significantly correlated with total body obesity (F value = 6.2, P value <0.05 and F value = 3.1, p value <0.05 respectively). No statistically significant association was found between duration of headache and obesity.

TABLE I: Demographic, Clinical details and Anthropometric parameters of the patients (n=168).

Characteristics	*Number (percentage) or Mean+Standard deviation*
Age (y)	32.7±9.9
Marital status	
Married	118(70.2)
Unmarried	50(29.8)
Age of onset of headache (years)	26.1±9.6
Aura present	22(13.1)
Frequency (per month)	6.1±3.3
Duration of headache (hours)	7.9±7.0
Migraine Disability Assessment Score	17.7±9.4
Weight (kilogram)	54.1±9.4
Height (meter)	1.5±0.07
Body mass index	23.7±4.3

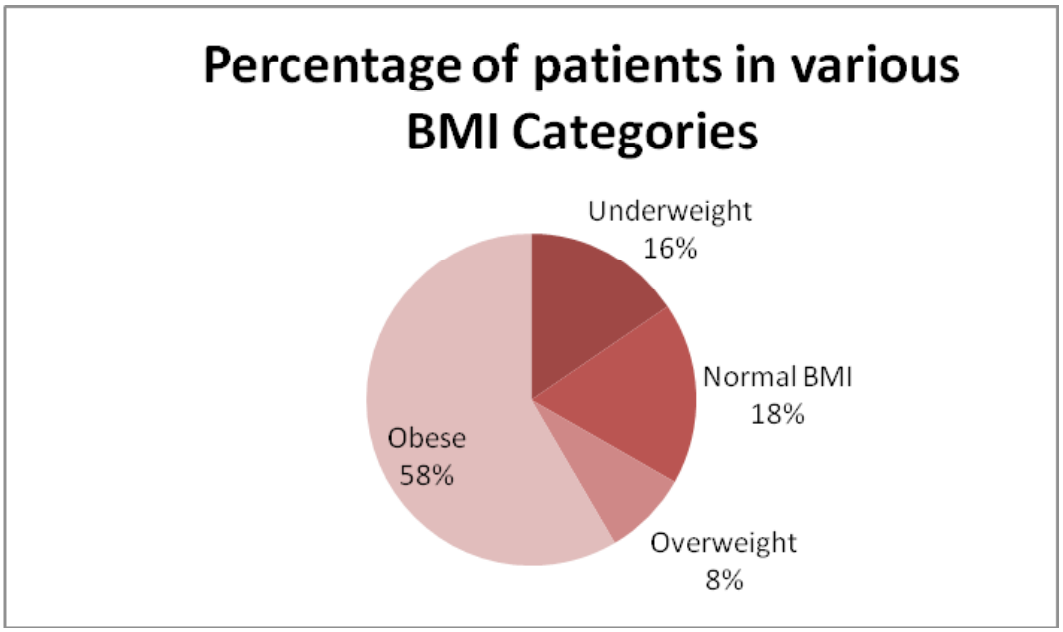

Fig. 1: Distribution of patients in various Body mass index categories.

TABLE II: Comparison* between characteristics of Migraine in various BMI categories.

Parameters	*Group I Underweight N=26 (15.4%)*	*Group II Normal BMI N=30 (17.8%)*	*Group III Overweight N=14 (8.3%)*	*Group IV Obese N=98 (58.3%)*	*F value*	*P value*
Frequency (/month)	4.3±2.2	5.6±2.7	8.7±2.5	6.4±3.6	6.279	<0.05*
Duration of headache (h)	6.0±3.8	5.9±2.6	8.6±6.2	8.9±8.3	2.291	>0.05
MIDAS score	13.0±4.0	16.7±9.2	19.3±3.1	19.1±10.7	3.134	<0.05*

*One way ANOVA, MIDAS: Migraine Disability Assessment Score, BMI: Body mass index, *significant.

Discussion

Migraine remains the leading cause of primary headache disorder in India. Several factors have been implicated in the pathophysiology of migraine, obesity being a recent one. Therefore, this cross sectional study was done to ascertain any possible association between total body obesity and clinical features of migraine headache. Total body obesity was assessed with Body mass index using weight and height measurements of the patients.

Study group comprised of 168 female migraineurs. Previous studies have been done with similar sample size and gender consideration (16). Mean age of subjects in various studies has ranged from 25 to 37 years and mean age of migraineurs in our study was 33 years (17, 18). Mean body mass index of study group was 23.7 kg/m^2. We found that 58% of females were obese, 8% were overweight, 16% were underweight and 18 % had normal body mass index. The average body mass index of our study group is similar to the average BMI estimated in females in an Indian study (19). Guidelines for BMI cutoff values have been revised and lowered for Asian Indian Population. BMI >23 kg/m^2 is overweight and BMI >25 kg/m^2 is obese. This may account for higher percentage of obese individuals.

Differences in the means of frequency and severity scores, in various BMI categories, were statistically significant. This finding was similar to some of the studies which have shown that there is association between high frequency of migraine and BMI (9, 20, and 21). Also, one study found low severity scores in patients with normal BMI, which increased with increasing BMI (13). Bond et al (22) have shown that weight loss due to bariatric surgery, in obese migraineurs led to an improvement in their symptoms. It is reported that some inflammatory mediators are common to migraine and obesity which may account for the link between migraine and obesity. Various studies have estimated the levels of adipokines in migraineurs (23). Levels of certain proinflammatory cytokines such as tumor necrosis factors alpha (TNFα), Interleukin-1 and Interleukin-6 have been found increased in migraine patients (24, 25).

Strength of our study is that, standard diagnostic criteria was used for recruitment of patients by trained neurologists and standard methods were used for anthropometric measurements, instead of self reported height and weight. Lacunae of the study are that, we did not include male patients. Also, we assessed only common migraine. Future studies with male migraineurs and other headache disorders can be done to compare the effects of total body obesity on headache features in them.

The conclusion of our study is that, clinical features of migraine are affected by generalized obesity in female migraineurs. These features include frequency and severity of migraine. Therefore weight reduction may find a potential role in improvement of migraine symptoms.

References

1. Lipton RB, Bigal ME. The epidemiology of migraine. *Am J Med* 2005;118(Suppl 1):3 10S.

2. Girish B Kulkarni, Girish N Rao, Gopalkrishna Gururaj, Lars J Stovner, Timothy J Steiner. Headache disorders

and public ill-health in India: prevalence estimates in Karnataka state. *The Journal of Headache and Pain* (2015) 16: 67

3. Headache Classification Committee of the International Headache Society (IHS) (2013) The International Classification of Headache Disorders, 3rd edition (beta version). *Cephalalgia* 33: 629–808.
4. Classification and diagnostic criteria for headache disorders, cranial neuralgias and facial pain. Headache Classification Committee of the International Headache Society. *Cephalalgia* 1988; 8(Suppl 7): 196.
5. Keith SW, Wang C, Fontaine KR, Cowan CD, Allison DB. BMI and headache among women: Results from 11 epidemiologic datasets. *Obesity* (Silver Spring) 2008; 16: 37783.
6. Yu S, Liu R, Yang X, Zhao G, Qiao X, Feng J, *et al*. Body mass index and migraine: A survey of the Chinese adult population. *J Headache Pain* 2012; 13: 5316.
7. World Health Organization. Obesity: preventing and managing the global epidemic. Report of a WHO consultation presented at: theWorld Health Organization; June 3-5, 1997;Geneva, Switzerland.Publication WHO/NUT/ NCD/98.1.
8. Ojha P, Malhotra V, Pandey N, Singh S. Effect of abdominal obesity on migraine features in Indian population. *Natl J Physiol Pharm Pharmacol* 2018; 8(6): 903–906.
9. Winter AC, Berger K, Buring JE, Kurth T. Body mass index, migraine, migraine frequency and migraine features in women. *Cephalalgia* 2009; 29: 269–278.
10. Bigal ME, Liberman JN, Lipton RB. Obesity and migraine: a population study. *Neurology* 2006; 66: 545–550.
11. Mattsson P. Migraine headache and obesity in women aged 40–74 years: a populationbased study. *Cephalalgia* 2007; 27: 877–880.
12. Willett WC, Dietz WH, Colditz GA. Guidelines for healthy weight. *N Engl J Med* 1999; 341(6): 427–434.
13. Bigal ME, Tsang A, Loder E, Serrano D, Reed ML, Lipton RB (2007) Body mass index and episodic headaches: a population-based study. *Arch Intern Med* 167: 1964–1970.
14. Stewart WF, Lipton RB, Dowson AJ, Sawyer J. “Development and testing of the Migraine Disability Assessment (MIDAS) Questionnaire to assess headache-related disability,” Neurology, vol. 56, no. 6, supplement 1, pp. S20–S28, 2001
15. A Misra et al. Consensus Statement for Diagnosis of Obesity, Abdominal Obesity and the Metabolic Syndrome for Asian Indians and Recommendations for Physical Activity, Medical and Surgical Management. *JAPI* February 2009; VOL. 57: 163–170.
16. Vanessa Rossoni de Oliveira, Fernanda Camboim Rockett, Kamila Castro, Alexandre da Silveira Perla, Márcia Lorena Fagundes Chaves 3, 4 and Ingrid D. Schweigert Perry Body mass index, abdominal obesity, body fat and migraine features in women. *Nutr Hosp* 2013; 28(3): 1115–1120.
17. Mohammed Momenuzzaman Khan, Md. Nazmul Huda, Manabendra Bhattacharjee, Md. Jalal Uddin, Mustofa Kamal Uddin Khan. Relationship of Migraine and Body Mass Index (BMI) *J Enam Med Col* 2016; 6(2): 80–87.
18. Kelman L. Migraine changes with age: IMPACT on migraine classification. *Headache* 2006; 46(7): 1161–1171.
19. Rajendra Pradeepa et al. Prevalence of generalized & abdominal obesity in urban & rural India- the ICMR - INDIAB Study (Phase-I) [ICMR - INDIAB-3]. *Indian J Med Res* 2015 Aug; 142(2): 139–150.
20. Scher AI, Stewart WF, Ricci JA, Lipton RB. Factors associated with the onset and remission of chronic daily headache in a population- based study. *Pain* 2003; 106: 81–89.
21. Bigal ME, Lipton RB. Obesity is a risk factor for transformed migraine but not chronic tension-type headache. *Neurology* 2006; 67: 252–257.
22. Bond DS, Vithiananthan S, Nash JM, Thomas JG, Wing RR. Improvement of migraine headaches in severely obese patients after bariatric surgery. *Neurology* 2011; 76: 1135–1138.
23. Chai NC, Bond DS, Moghekar A, Scher AI, Peterlin BL. Obesity andheadache: Part II - potential mechanism and treatment considerations. *Headache* 2014; 54: 459–471.
24. Sarchielli P, Alberti A, Baldi A, Coppola F, Rossi C, Pierguidi L, Floridi A, Calabresi P. Proinflammatory cytokines, adhesion molecules, and lymphocyte integrin expression in the internal jugular blood of migraine patients without aura assessed ictally. *Headache* 2006; 46: 200–207.
25. Yilmaz IA, Ozge A, Erdal ME, Edgünlü TG, Cakmak SE, Yalin OO. Cytokine polymorphism in patients with migraine: some suggestive clues of migraine and inflammation. *Pain Med* 2010 Apr;11(4):492-7. doi: 10.1111/j.1526-4637.2009.00791.x. Epub 2010 Jan 22.