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A HOSPITAL-BASED STUDY OF ASSOCIATION BETWEEN OBESITY AND MIGRAINE BASED ON THE PATIENTS ATTENDING A TERTIARY CARE HOSPITAL OF SOUTH INDIA

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ABSTRACT

INTRODUCTION: Migraine is the second commonest headache disorder, and the etiology of which still unclear.(Bigal & Lipton, 2009) Obesity is also common malady. Recent literature throws light on the link between obesity and migraine. This study was aimed to find out their association.

AIM: To study the influence of obesity on the clinical presentation of migraine.

METHODOLOGY: This study was done cross-sectionally in a single-canter, clinic-based, on 100 outpatients of more than 18 years of age during the period of 1-01-2021 to 01-06-2021. Migraine was diagnosed by using the International Classification of Headache Disorders and its severity was assessed by the Migraine disability assessment questionnaire (MIDAS). Body Mass Index was calculated by measuring height and weight of each participant.

RESULTS: The mean BMI was 32.3 kg/m2. In 100 participants, 52% were overweight, 16% obese, 10% underweight and 22% were in within the normal BMI category. Patients with higher body weight had significantly more longer and intense episodes and numerically more episodes. (P=0.001). A positive correlation was identified between bodyweight and migraine episodes, severity, and frequency.

CONCLUSION: Obesity and overweight were associated with more intense migraine which supports findings of previous literature.(Tietjen et al., 2007) Regular exercise and weight loss could be a viable and cost-effective approach for alleviating migraine episodes. The effect of weight loss in preventing migraine needs to be assessed by further studies.

KEYWORDS : Migraine, bodyweight, obesity

INTRODUCTION:

Migraine is the second commonest primary headache followed by tension-type headache. In India, the 1-year prevalence of any sort of cephalalgia is 63.9 %, with more prediction in females, so female: male ratio is 4:3. When the subjects are matched for age, prevalence of migraine is 25.2 %; and it was higher in females than males (OR: 2.1 [1.7-2.6]). Literature reports rural population being affected more than the urban. (OR = 1.5 [1.3-1.8])(Kulkarni et al., 2015).In South India, the prevalence of migraine is extremely high as compared to the mean global prevalence which was around 14.7%. The reasons behind it probably lies in environmental, cultural, and/or, lifestyle factors, although the relationship with rural population and female gender is the same as global scenario(Kulkarni et al., 2015). Despite being such a common chronic debilitating primary headache disorder it's pathophysiology and aetiology have not been clear to date. Many studies have shown a link between the frequency of migraine not only with total body obesity but also with the evolution of migraine from episodic to chronic migraine(Bigal et al., 2007; Gelaye et al., 2017; Ornello et al., 2015). There are many documented papers stating the association between body weight and migraine attack frequency, and severity(Kristoffersen et al., 2020). First, obesity defined from the ratio of bodyweight in kilograms to hight square in meters i.e. Body Mass Index cannot differentiate between adipose tissue and muscle mass or among central and peripheral fat allocation (Ross et al., 2020; *Waist Circumference and Waist-Hip Ratio: Report of a WHO Expert Consultation*, n.d.). Central body fat has metabolically different properties than other body fat and appears to be a self-sufficient predisposing factor for medical complications (Janssen et al., 2004; Ross et al., 2020).Central obesity may be particularly involved in the etiopathogenesis of migraine, as this adipose tissue secretes various factors that are potentially involved in migraine pathophysiology, which consist of systemic inflammatory biomarkers. Second, both fat distribution and migraine prevalence differs significantly with gender and age, and it is very much likely that there is association between these two factors and with migraine severity(Peterlin et al., 2013)

So, we decided to study the relationship of bodyweight, specifically obesity and migraine association in tertiary care hospitals in South India.

METHODOLOGY

This study was done cross-sectionally in a single-centre, clinic-based, on 100 subjects. The study included patients attending Neurology Department from 01 January, 2021 to 01 June,2021. Patients more than 18 years are included in this study.

After approval of the Institutional Ethical Committee, patients more than 18years of age, diagnosed with migraine, according to the International Classification of Headache Disorder, were recruited. Clinical interview regarding migraine features were taken which include the age of onset of headache, frequency of headache per month, history of the presence of aura, duration of headache in hours, severity or disability due to disease. The severity of migraine was assessed with the Migraine disability assessment questionnaire (MIDAS) which is 7 item questionnaires, where the higher the score the more severe. Anthropometric measurements including height and weight were taken and Body mass index was calculated. Patients were divided into four categories underweight, normal bodyweight, overweight and obese, according to revised guidelines for BMI cut-offs for the Asian population. Patients who refused to participate in the study, other types of headaches and patients aged <18 years were excluded from the study.

Sample Size:

Sample size has been calculated with help of Epi Info (TM) 7.2.2.2. EPI INFO which is a trademark of the Centres for Disease Control and Prevention (CDC).

The formula used for sample size calculation is as follows,
n = 4pq / (L2) Where,
n= Required sample size
p= 0.813 (p=prevalence =8=81.8) the study by Bigal et al.
q = 1 - p
L = Loss % (Loss of information) = 12%
Power 88%
Calculated sample size= 98.89 ~ 100

Statistical Analysis:

Statistical analysis was performed with the help of SPSS software version 24.0. Description of sample characteristics was done with descriptive statistics: percentage, mean and standard deviation. Group difference for sample characteristics was examined with independent t-test, chi-square test, and Fischer exact test wherever applicable. Paired T-test was used to compare the means of MIDAS score between each group. P≤0.05 considered being statistically significant. All the related parameters were collected by measurements and through direct interviews with the patients with help of a well-designed proforma.

RESULTS:

The sociodemographic details of 100 subjects are described in table number 1.

Variable	Result
Number of patients(n)	100
Age (Years)	40.2 years
Female(%)	58.5%
Marital status (%)	
• Living with partner	95%
• Living without partner	5%
Religion, (%)	
• Hindu	76%
• Christian	18%
• Muslim	6%
Background,(%)	
• Urban	45%
• Rural	55%
Education,(Years)	11.20 years
Diabetes Mellitus	20%
Hypertension	32%
Smoking	29%

The mean BMI was 32.3 kg/m2. The participants were dived into four groups namely, normal bodyweight, overweight, obese, and underweight. The National Institute of Health (NIH) uses BMI to define an individual as underweight, normal weight, overweight, or obese rather than height vs. weight charts. These classifications for BMI are also used by World Health Organization (WHO) for black, white and Hispanic population. In this classification ,Underweight - BMI under 18.5 kg/^{m2,} normal weight - BMI greater than or equal to 18.5 to 24.9 kg/m^2, Overweight – BMI greater than or equal to 25 to 29.9 kg/m^2, Obesity –BMI greater than or equal to 30 kg/m^2(Weir & Jan, 2021)).In 100 participants, 52% were overweight, 16% obese, 10% underweight and 22% were in the normal BMI category.

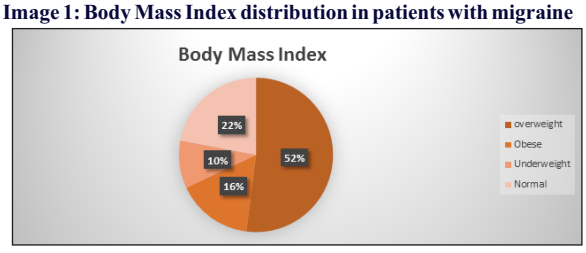
Patients with higher body weight had significantly more intense episodes, with a longer and increased number of episodes (P=0.001). Student t-test comparing Mean MIDAS scores of obese/overweight individuals versus Normal weight/underweight showed significantly higher Mean MIDAS scores among the obese/overweight group as shown in table no:2

BMI	Percentage	MIDAS Score	P value
Overweight & Obese	58%	19.22	**0.003**
Underweight & normal weight	32%	10.11	

We have also found that patients with hypertension have more severe and frequent episodes of migraines($p<0.03$) but we did not fount such association with diabetes mellitus and smoking.

So, there is a positive correlation between body weight and migraine episodes, severity, frequency. So, there is a positive correlation between body weight and migraine episodes, severity, frequency.

Image 1: Body Mass Index distribution in patients with migraine



DISCUSSION:

We conducted a comprehensive study of the association between obesity and migraine frequency, severity, and disability. We found that patients with BMI in the category of overweight and obese have frequent and severe episodes of migraine than patients with normal BMI. This finding is supportive of previous many studies(Peterlin et al., 2010, 2013; Robberstad et al., 2010; Ross et al., 2020; Vo et al., 2011; Yu et al., 2012). Ford, et al reported that subjects who are underweight(BML<18.5) and obese(BMI>30) were at more risk of headache and migraine than those with normal BMI(Ford et al., 2008). Robberstad et al, stated, link between recurrent headache and overweight (odds ratio [OR] = 1.4, 95 % CI 1.2–1.6, p\0.0001) (Robberstad et al., 2010). Queiroz et al did not find any association between migraine and body mass index(Queiroz et al., 2009). Te´llez-Zenteno et al reported that there was no association between migraine frequency, severity, disability, and body mass index(Téllez-Zenteno et al., 2010). Keith et al. reported that increased risk of headache in overweight and obese woman, but not specifically migraine(Keith et al., 2008). Couple of studies were done by Winter et al. (Winter et al., 2009) and Mattsson(Mattsson, 2007) assessing older population showed no link between migraine and obesity. Several general population studies found that there is a relationship among obesity and migraine in those with child bearing age group(Robberstad et al., 2010; Vo et al., 2011). In our study, at the end of evaluation we found that obese and overweight individuals have more frequent and severe migraine attacks which was statistically significant. We also found that there is a weak association with underweight and normal weight subjects and migraine.

There is enough literature that patients with migraine have a higher risk of developing hypertension(Rist et al., 2018) but patients with hypertension and the course of migraine are yet inconclusive. In our study, we found out that patients with hypertension have frequent, more severe, and disabling attacks. Hagen et al, reported weak link between high systolic blood pressure and migraine in women(Hagen et al., 2002). Fageraes et al, also found that increased systolic blood pressure associated with decreased prevalence of migraine on follow up(Fagernæs et al., 2015) Merikangas et al, found that hypertension associated with increased risk of migraine on follow up (OR = 1.2[1.04–1.5])(Merikangas et al., 1997). While some studies reported a positive correlation between migraine and diastolic blood pressure. Ikeda et al, found that migraine patients have higher systolic and diastolic blood pressure(Ikeda et al., 2012) and Courant et al reported Higher DBP associated with migraine (OR = 1.12 [1.04–1.20] per 10 mmHg)(Courand et al., 2016).

Limitations of our study: First, small sample size so the results cannot be generalized. Second, it's a cross-sectional study, hence the long-term course of migraine can not be illustrated. Third, the study was conducted in the tertiary care hospital patients, which may give an increased prevalence of migraine.

CONCLUSION:

Patients with BMI in the category of overweight and obese have frequent and intense migraine attacks which support the previous literature but warrants future research. Large scale weight-loss trials supported the benefits of weight reduction in migraine patients. These strategies may provide useful treatment options to reduces headache frequency and severity in overweight and obese migraine patients.

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Conflict of Interest: Nil

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