Frequency of primary headache disorders and association with body mass index; an ambispective study

Sarwat Iqbal,[1] Mujeeb-ur-Rehaman Abid Butt,[2] Uzma Sarwar,[3] Arshad Ullah Afridi[4]

Abstract

Objective: To determine the association of body mass index with various primary headache disorders.

Method: The ambispective study was conducted at the Department of Medicine, Shalamar Institute of Health Sciences, Lahore, Pakistan, from January 2020 to March 2021, and comprised data of patients who presented to outpatient departments of Neurology and Medicine with complaint of recurrent or persistent headaches. Body mass index of each subject at the time of latest headache visit was recorded. A control group of 200 individuals was also raised and the body mass index of its subjects was measured. Headache disorders were classified as per International Classification of Headache Disorders-3 beta criteria. Correlation of frequency of different types of primary headaches with body mass index was explored. Data was analysed using SPSS 20.

Results: Of the 400 subjects, 200(50%) each were cases and controls. There were 132(33%) males and 268(67%) females. The overall mean age was 37.4 ±14.7 years and mean body mass index was 27.3 ±5.87kg/m^2. Migraine was found in 183(46%) subjects compared to tension-type headache 96(24%). Migraine was more common in subjects with high body mass index (p<0.05).

Conclusion: Primary headaches constitute a significant health problem. Among various risk factors weight-gain is one that can predispose an individual to increased frequency of migraine.

Keywords: Primary headache disorders, Migraine, Tension type headache, Body mass index. (JPMA 72: 1968; 2022)

Introduction

Primary headaches comprise a variety of clinical disorders with certain diagnostic and classification criteria. These have been long recognised as non-fatal disabling disorders with significant impact on psychosocial health of individuals. About 96% of individuals have at least one episode of headache in lifetime, while 46-47% of adults have recurrent headaches that meet the criteria of primary headache disorders (PHDs).[1] Currently, the international classification of headache disorders (ICHD)-3 beta version introduced by the International Headache Society (IHS) is used.[1,2] Migraine and tension type headache (TTH) are the most common among the primary headaches with a prevalence of about 10-11% and 30-78% respectively.[1-3]

The pathogenesis of primary headaches has been studied extensively and is well linked to various endogenous and exogenous factors. Obesity is a risk factor for several chronic medical disorders. Its prevalence is increasing globally over the last couple of decades. Currently, body mass index (BMI) is used as an indirect indicator of obesity. The World Health Organisation (WHO) cut-off for normal BMI range is 18.5-24.9kg/m^2 in Asian population[4]

....

[1,2]Department of Medicine, [3]Department of Dermatology, [4]Department of ENT, Shalamar Hospital, Lahore, Pakistan.

Correspondence: Sarwat Iqbal. Email: saiqef@gmail.com

however for south Asian population BMI of >23 is considered bench mark for obesity.[5] Its association with idiopathic intracranial hypertension has led researchers to talk about possible connection with other headache syndromes as well.[6] Obesity and headache are two conditions that affect mental health and social issues related to an individual, ultimately leading to decreased efficiency, multiple psychiatric illnesses and metabolic disorders.[7] Several population-based studies have consistently documented the association of obesity with headache, specifically migraine.[7,8] In addition, there is evidence that higher the BMI values, the more chronicity happens to be the pain. Episodic migraine may convert to chronic migraine and TTH may become chronic TTH (CTTH).[4,8]

The current study was planned to determine the association of BMI with various (PHDs).

Materials and Methods

The ambispective study was conducted at the Department of Medicine, Shalamar Institute of Health Sciences, Lahore, Pakistan, from January 2020 to March 2021. After approval from the institutional ethics review board, The Epi info software[9] was used for sample size calculation, considering headache prevalence of 46%[1] with 5% margin of error and 95% confidence interval (CI). The sample was raised using simple convenience

sampling technique from the digital record of Medicine and Neurology out-patient departments (OPDs). The data related to patients of either gender aged 18-65 years who sought medical advice for recurrent or persistent headache. Patients with pregnancy during study period were excluded due to BMI variability. Data of each patient was recorded using a predesigned proforma. Primary headache was defined as any headache that did not reveal any secondary cause in history, examination or imaging studies. Headache disorders were classified according to ICHD-3 beta version criteria.[1,2] Since height and weight is routinely recorded for all patients visiting the OPD, BMI was calculated using the standard formula BMI = weight(kg)/height (m^2). According to guidelines for south Asian population5, BMI categories were further divided for analysis purpose into two broad classes Under-to-normal ($\leq$23kg/m^2) and over-to-obese (>23kg/m^2). Similarly, headache patients were grouped into those with migraine, TTH and other headaches. A control group was raised from among individuals visiting the Neurology OPD for other conditions, and their BMI was recorded after taking informed consent.

Data was analysed using SPSS 20. Frequencies and percentages were calculated for various types of primary headaches. Mean ± standard deviation values were determined for age and BMI. Chi-square test was applied to calculate significance of BMI's association with headache subtypes. P$\leq$ 0.05 was considered statistically significant.

Results

Of the 400 subjects, 200(50%) each were cases and controls. The overall mean age was 37.4±14.7 years and mean BMI was 27.3±5.87kg/m^2 (Table-1). There were

Table-1: Distribution of age and body mass index (BMI).

	N=Total No.	Minimum	Maximum	Mean	Std. Deviation
Age	400	18	65	37.4	14.7
BMI	400	14.7	45	27.3	5.87

Table-2: Gender distribution and frequency of primary headaches.

Variables	Sub categories	Frequency/percentage
Gender	Males	132(33%)
	Females	268(67%)
Primary headaches	Migraine	183(46%)
	TTH	96(24%)
	CDH	48(12%)
	Cluster headache	1(0.3%)
	Nonspecific headaches	72(18%)

TTH: Tension type headache, CDH: Chronic daily headache.

Table-3: BMI/ICHD class distribution.

		ICHD classes			
		Migraine	TTH	Others	Total
BMI classes	>23	126(31%)	51(12.7%)	89(22%)	266
	$\leq$23	57(14%)	45(11%)	32(8%)	134
Total		183	96	121	400

BMI: Body mass index, ICHD: International classification of headache disorders, TTH: Tension type headache.

Table-4: Odds ratio (OR) for various headache groups with respect to body mass index (BMI).

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for BMI (obese / non-obese)	1.950	1.173	3.243
For migraine	1.274	1.047	1.550
For tension type headache	.653	.475	.898
Number of Cases	279		
Odds Ratio for BMI(obese / non obese)	2.426	1.373	4.289
For other headaches	1.523	1.136	2.043
For tension type headache	.628	.471	.838
Number of Cases	216		

132(33%) males and 268(67%) females. Migraine was found in 183(46%) subjects compared to TTH in 96(24%). There was no case of headache owing to medication overuse (Table-2). There were 266(66.5%) subjects with BMI >23kg/m^2 and 134(33.5%) had BMI $\leq$23kg/m^2 (Table-3).

After adjusting for confounders, like age and gender, using linear regression analysis, primary headaches had a significant association with BMI (p<0.05), particularly migraine which was reported more frequently by individuals having BMI >23kg/m^2 compared to TTH (p=0.005), while TTH was least affected by BMI (Table-4).

Discussion

Obesity and headache are two disorders that in one way or the other affect overall mental health of individuals. Several psychiatric illnesses, like depression, anxiety and eating disorders, may share the cause-effect relationship with obesity and headache. The current study investigated whether weight-gain can be a harbinger of primary headache, like TTH or migraine. Pathophysiology of idiopathic intracranial hypertension is well understood in obese women of child-bearing age, which may be one-end of the spectrum, while the other end may comprise other primary headaches with no underlying structural abnormality.

The WHO has classified obesity as total body fat percentage (TBF%) exceeding 25% in males and >35% in females. However, anthropometric indices, like BMI or

waist circumference (WC), have been utilised by many epidemiological studies because of ease of use and cost to determine the threshold abdominal obesity and total body obesity (TBO), respectively. Based on BMI, general obesity and TBO is estimated as a BMI ≥30. In contrast, abdominal obesity (abd-O), based on the WC, is calculated as >102cm in men or WC >88cm in women[6]. Obesity has been more common around the world in the past few decades. It was observed in the US that general obesity had risen to 32% in men and 35% in women in 2007-08) from 27% in men and 33% in women in 1999-2000. Similarly, the same rise has been seen in abd-O in US with 43% of males and 62% of females meeting criteria in 2007-08 compared to 38% and 56% respectively in 1999-2000.[6] Racial differences in adipose tissue distribution have also been observed in obesity in contrast to gender-specific variations. Prevalence of obesity, depending on BMI, has so far been the highest in African Americans, followed by Caucasians, and least the in Asian Americans in the US. Nevertheless, with the same BMI, white women have a higher total body fat percentage than black women, with the Caucasians having a lower total body fat percentage than their Asian counterparts.[6]

The rising trend of obesity has been observed in Pakistani population. One study conducted on 10,063 subjects showed that 22.8% participants were obese and 5.1% were overweight.[10]

Studies have shown that a positive link exists between headache and obesity.[8,11] These studies show that people with obesity have a higher risk of headache, and, therefore, this risk rises with increase in obesity status, Besides, this relationship is greater among those with chronic headaches than in episodic headaches. Currently it is not possible to be sure which way the migraine/headache-obesity association is going, but research suggests that obesity increases the chance of chronic and episodic migraines, with this risk being the highest in reproductive age groups.[12] Research also supports that the chances of having migraine rises with rise in obesity status, but whether this migraine-obesity association is dose-dependent or not has not been proven yet.[12]

There is a substantial lack of data on the relationship between TTH and obesity. This relationship has been studied in three general populations, showing that individuals with chronic migraine and episodic TTH had a higher BMI than patients with episodic migraine (EM) and CTTH. It was concluded that overweight and obesity were associated with chronic migraine (CM), but not with CTTH

after adjusting for gender, age, marriage, level of education and other clinical factors.[8,12]

Targeting obesity as a mode of treatment can have effect on incidence and prevalence of primary headaches. Larger studies in Pakistani population with large database can further validate the results. The treatment of primary headaches, in particular migraine, can be redirected to a broader spectrum with target to achieve an optimum BMI.

Conclusion

Primary headaches constitute a significant health problem. Among various risk factors weight-gain is one that can predispose an individual to increased frequency of migraine.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

References

1. Daroff RB, Jankovic J, Mazziotta J, Pomeroy SL. Bradley neurology in clinical practice 7th ed. London: Elsevier, 2016; pp-1686-719.
2. Murtaza M, Kisat M, Daniel H, Sonawalla AB. Classification and Clinical Features of Headache Disorders in Pakistan: A Retrospective Review of Clinical Data. PLoS One. 2009; 4:e5827.
3. Stovner Lj, Hagen K, Jensen R, Katsarava Z, Lipton R, Scher A, et al. The global burden of headache: a documentation of headache prevalence and disability worldwide. Cephalalgia. 2007; 27:193-210.
4. Huang Q, Yu H, Zhang N, Guo B, Feng C, Wang S, et al. Body Mass Index and Primary Headache: A Hospital-Based Study in China. Bio Med Res Int. 2019; 4:1-9.
5. WHO, Regional office for the Western Pacific? The Asia – pacific perspective redefining obesity and its treatment. [Online] [Cited 2022 April 28]. Available from: URL: http://apps;who.int/iris/handle/10665/206936.
6. Chai NC, Scher AI, Moghekar A, Bond DS, Peterlin BL. Obesity and Headache: Part I – A Systematic Review of the Epidemiology of Obesity and Headache. Headache. 2014; 54:219-34.
7. Huang Q, Liang X, Wang S, Mu X. Association between Body Mass Index and Migraine: A Survey of Adult Population in China. Behav Neurol. 2018; 2018:e6585734.
8. Pavlovic JM, Vieira JR, Lipton RB, Bond DS. Association between Obesity and Migraine in Women. Curr Pain Headache Rep. 2017; 21:41.
9. Sullivan KM, Dean A, Soe MM. Open Epi: a web based epidemiologic and statistical calculator for public health. Public Health. Rep. 2009;124:471-4
10. Asif M, Aslam M, Altaf S, Atif S, Majid A. Prevalence and Sociodemographic Factors of Overweight and Obesity among Pakistani Adults. J Obes Metab Syndr. 2020; 29:58-66.
11. Laino D, Vitaliti G, Parisi P, Pavone P, Verrotti A, Lubrano R et al. Headache, migraine and obesity: an overview on plausible links. J Biol Regul Homeost Agents. 2016; 30:333-8.
12. Ornello R, Ripa P, Pistoia F, Degan D, Tiseo C, Carolei A, et al. Migraine and body mass index categories: a systematic review and meta-analysis of observational studies. J Headache Pain. 2015; 16:27.