

## Association between migraine and Body Mass Index in patients reporting at a military hospital, Rawalpindi

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### Abstract

The objective of this study was to determine the association between Body Mass Index (BMI) and migraine.

This prospective study took place from 5th February, 2017 to 5th August, 2017 at a Military Hospital in Rawalpindi. Migraine in subjects was diagnosed according to the ICHD-III criteria by clinicians after taking an informed, written consent from 78 patients and the data was analysed using SPSS 22.

Of the 78 patients, 35(44.9%) were males and 43(55.1%) were females. Out of the 78 subjects, 9(11.5%) were underweight, 33(41.0%) were of normal weight, 9(14.10%) were overweight, 19(24.4%) were obese and 7(9.0%) were morbidly obese. The p-value calculated was 0.892 which indicates no significant evidence of any association between BMI and migraine in the survey population reporting at the Rawalpindi Military Hospital.

A follow-up study at a national level with much larger sample size will be able to better predict the changing results in our country, because as of now the association between BMI and migraine is debatable.

**Keywords:** Headache, Migraine, Body Mass Index.

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### Introduction

Despite progress in medicine, headache disorders remain neglected and under-treated.<sup>1</sup> Among all of the Headache Disorders, Tension-Type Headache and Migraine are the most common.<sup>2</sup> The main symptoms of migraine include; headache, often unilateral but can be bilateral, throbbing and severe, accompanied by nausea, vomiting, photophobia and phonophobia.<sup>3</sup> The prevalence of migraine in general population is 11%. In Asia, the prevalence of migraine is 3% and 10% among males and females respectively.<sup>4,5</sup> According to a recent study in Karachi, Pakistan, almost 81% of the patients

reporting at a headache clinic were diagnosed with migraine.<sup>6</sup> Recent studies showed evidence that obesity causes severe headache in migraine patients.<sup>7,8</sup> On the other hand, some researches do not support any association between the two variables.<sup>9,10</sup> Interestingly, one research found a decline in the risk of migraine in those who were pre-obese.<sup>10,11</sup> Thus, we can say that relation between BMI and migraine is debatable.

**Objectives:** To find association between BMI and migraine in Pakistani population reporting at a Military Hospital in Rawalpindi.

### Methodology

The study was initiated after taking ethical approval from the Institutional Review Board (IRB) of the Army Medical College. Patients' data was kept confidential. It was a prospective study that took place from 5th February, 2017 to 5th August, 2017, in the Neurology Out-Patient Department (OPD) of the Military Hospital, Rawalpindi. All patients of more than 13 years of age reporting to the OPD with complaints of headache were enrolled for the study, after taking a written and informed consent from each patient. Data from only 78 patients could be obtained because of the limited time frame and the strict inclusion criteria.

On follow-up visits, patients were re-diagnosed along with new subjects by trained specialists in Neurology, as per parameters given in "The International Classification of Headache Disorders, 3rd Edition (beta version)" (ICHD-III). The diagnosis was made in a sequential order; first definite migraine, then definite Tension Type Headache, then probable migraine and finally probable Tension Type Headache. Patients not falling into these categories were excluded. Patients were asked about the unilateral or bilateral location; pulsating quality; nausea, vomiting; sensitivity to light and sound; duration of attack; aggravating and relieving factors and other parameters given in ICHD-III. During subsequent analysis, probable and definite migraine were combined. After diagnosing migraine, written and informed consent was taken from each patient. The written form had two parts, one part was the Consent Form, while the other part pertained to demographics which included name, age, gender, family

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Table: Showing the type of migraine in each category of BMI as a function of gender.

BMI	Migraine with Aura			Migraine Without Aura		
	Male	Female	Total	Male	Female	Total
Underweight	3	3	6	1	2	3
Normal	7	11	18	6	8	14
Overweight	4	3	7	3	1	4
Obese	3	8	11	6	2	8
Morbidly Obese	1	2	3	1	3	4
Total	18	27	45	17	16	33

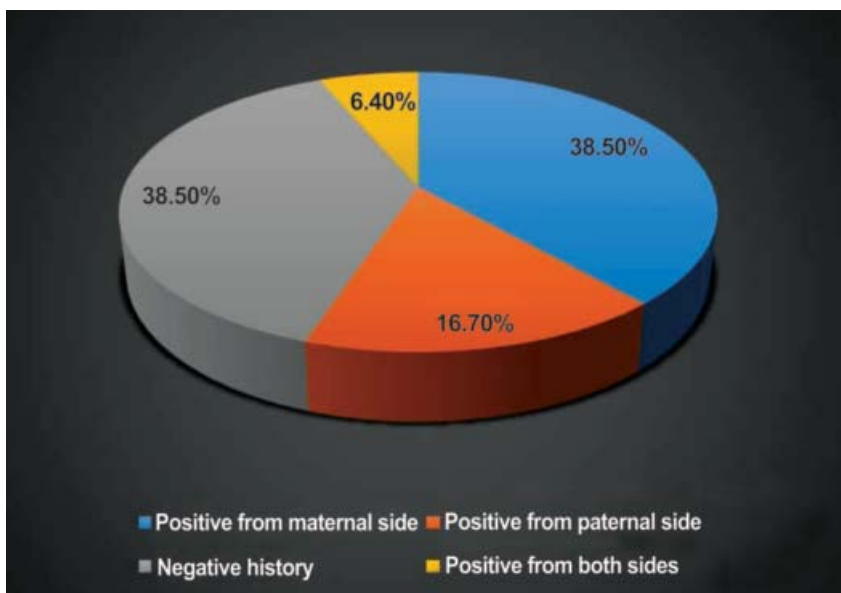


Figure: Chart showing overall distribution of migraine according to family history.

history, type of migraine (migraine with aura, migraine without aura), duration of the migraine from the onset, medications used and anthropometric parameters height(m) and weight(kg). BMI was then calculated by the formula; weight in kg/height in m<sup>2</sup>. Weight was measured using analogue standard weight machine without shoes and recorded in kilograms (kg) with an accuracy of 1.0 kg and height was measured using a fixed stadiometer without shoes. The criteria used for BMI interpretation was according to the World Health Organisation (WHO): underweight BMI:<18.5; normal BMI: 18.5 to <23.0, overweight BMI: 23.0 to <25.0; obese BMI: 25.0 to <30.0 and morbidly obese; BMI ≥ 30.0 kg/m<sup>2</sup>.<sup>12</sup>

Patients suffering from Cluster Headache, Tension-Type Headache, pregnant women, patients suffering from recent head trauma, altered consciousness, those who had past cranial or brain surgery, patients with a history of epilepsy or who presented with atypical history or one that did not fulfil the ICHD-III criteria, were excluded. All

the incomplete forms were discarded at the end of the study. Due to narrow inclusion criteria and limited time frame, only 78 patients could be enrolled.

Waist circumference could not be measured accurately in the OPD, because it came out different in standing and lying down positions. Moreover waist circumference is used more often to assess cardiometabolic risk, but our study focussed on association of migraine with BMI, not obesity. Waist circumference does not account for differences in height, therefore, potentially over- and under-evaluating risk for tall and short individuals respectively.<sup>13</sup>

Data was analysed using SPSS 22. Tables and charts were made between different variables. The p-value was calculated via Independent Chi-square chart (p<0.05 is significant).

## Results

Of the 78 patients, 35(44.9%) were male and 43(55.1%) were female. The mean age of patients was 28.87±12.10 years. From the total of 78 subjects, 45 (57.7%) had migraine with aura and 33(42.3%) had migraine without aura.

Out of the total, 35 males, 18(51.4%) had migraine with aura and 17(48.6%) had without aura, whereas out of the 43 females, 27(62.8%) had migraine with aura and 16(37.2%) had without aura.

Of the total 35 male, 20(57.1%) had a positive family history, while 15(42.9%) had a negative family history for migraines. Whereas, out of 43 female, 28(65.1%) had positive family history for migraines and 15(34.9%) had negative family history.

Out of the total 78 migraine patients, 9(11.5%) were underweight, 33(41.0%) had normal BMI, 9(14.10%) were

overweight, 19(24.4%) were obese and 7(9.0%) were morbidly obese. Migraine was most common among subjects with normal BMI, followed by those who had obese BMI, then overweight and underweight BMI patients - both having equal number of subjects - and the least number of migraine patients out of the total belonged to the morbidly obese category.

The p-value calculated via Chi-square test for migraine and BMI Interpretation was 0.892 which was statistically insignificant. Thus, in our study we found no evidence of any significant association between migraine and Body Mass Index (Chi-square=1.115, df=4, p=0.892). This is consistent with several previous international studies.<sup>8,14</sup> However, there are previous studies that also strongly suggest evidence of an association between migraine and obesity.<sup>15</sup>

### Limitations

The sample size was limited due to shortage of time, limited number of migraine patients, patients presenting with atypical history or those that did not adjust according to the "The International Classification of Headache Disorders, 3rd edition (beta version)" criteria, patients presenting with symptoms of more than one type of headaches or multiple headaches at a single time. The patients' histories of were self-reported and therefore misclassification of migraine was a possibility. No imaging modality was used in our study due to financial constraints.

### Conclusion

The findings from our research indicates that there is no evidence of any significant association between BMI and Migraine (p=0.956) in the survey population reporting at the Military Hospital in Rawalpindi. To the contrary, in our study, majority of the subjects belonged to the normal-weight category.

**Disclaimer:** None.

**Conflict of Interest:** None.

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