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Original research article

Body mass index and its impact on migraine prevalence and severity in female patients: Preliminary results

Kamil Chorążka, Marlena Janoska, Izabela Domitrz *

Department of Neurology, Medical University, Warsaw, Poland

ARTICLE INFO

Article history:
Received 29 March 2014
Accepted 31 March 2014
Available online 8 April 2014

Keywords:
Migraine
Body mass index
Obesity
Cardiovascular diseases

ABSTRACT

Background and purpose: A strikingly increasing number of obese patients causes a great interest in potential medical problems resulting from abnormal body weight. Many conditions are associated with obesity. The severity and risk of migraine may be connected with a body weight. We would like to assess a correlation between body mass index (BMI) and frequency and duration of migraine.

Materials and methods: We collected data of 53 female patients with migraine and 36 healthy persons (25 women) as a control group. Mean duration of migraine attacks and their mean frequency were based on patients' diaries. The patients reported their height. Weight was measured by the authors. We consequently calculated BMI and performed statistics on SAS 9.2.

Results: The mean BMI of the migraine group was 24.27 ± 4.47. Forty-nine percent of patients had normal BMI (18.5–25), 30% patients were overweight (>25) and 13% were obese (>30). The mean BMI among controls was 22.69 ± 2.96. Eighty-four percent of the control group had normal BMI, 12% was overweight and 5% was obese. An association of BMI in women with frequency of migraine episodes per month occurred remarkable when adjusted for age. Difference of a mean BMI value between the migraine and the control group was nearly statistically significant. Body mass index and duration of the episodes revealed similarly strong correlation.

Conclusions: Increased BMI correlates with frequency of migraine. Its influence on a risk of the headaches and their duration remains to be specified.

1. Introduction

Abnormally increased body mass index (BMI) (overweight and obesity) becomes currently more and more common in a human population. This so-called plague of the 21st century is already described as a disease of affluence [1–3]. Obesity seems to be a risk factor of several conditions, especially cardiovascular diseases, diabetes, dyslipidaemia and joint problems. As

* *Corresponding author at*: Department of Neurology, Medical University, Banacha 1a, 02-097 Warsaw, Poland. Tel.: +48 22 599 28 57; fax: +48 22 599 18 57.
E-mail addresses: izabela.domitrz@wum.edu.pl, idomitrz@wum.edu.pl (I. Domitrz).

http://dx.doi.org/10.1016/j.pjnns.2014.03.003

a matter of fact, some recent studies prove that migraine may be associated with BMI as well.

Migraine is a frequent and disabling neurological illness and the common type of headaches encountered especially in women. Recently, migraine is thought to be a risk factor of cardiovascular conditions, like myocardial infarction, stroke, and coronary disease [4–8]. Thus, its correlation with abnormal BMI attracts even more attention of scientists.

Indeed, the review of the literature indicates that there is a relation between a BMI value and a more severe course of migraine [9,10]. Besides, some papers show a higher risk of migraine in the overweight or the obese subjects [11–15]. The other research suggests that frequency of such migraine features, as well as sensitivity to sound and light is significantly associated with a higher BMI value [9,16]. On the contrary, some authors conclude that migraine patients with low BMI are also more likely to have an increased risk for migraine [13,17]. Interestingly, other authors indicate that there is no correlation between BMI and frequency of migraine attacks [18,19]. According to the mentioned information we would like to discuss abnormal BMI and obesity as potential factors aggravating a course of migraine and confront our results with the newest views on the topic.

2. Materials and methods

We collected randomly data of 53 adults female with migraine with no long-term drug management (only acute medications 3 days before consultation or earlier) and 36 patients with no medical history or drug management (25 women and 11 men) as a control group (with a mean age of 41.88 ± 12.37 years). Patients were interviewed and examined in the Outpatient Headache Clinic of the Medical University of Warsaw from November 2010 to February 2012. All of our patients were diagnosed with migraine according to the International Headache Society (IHS) criteria, second edition [20]. Selection of individuals to the groups and statistics were performed by different members of the research team.

The mean age of the migraine group was 43.4 ± 10.9 years (range: 22–63 years). The mean frequency of migraine attacks per month was 4.0 ± 5.6, mean duration of migraine attacks was 51.2 ± 45.2 h. The control group participants reported their height and weight filling out a survey. The interview contained such information as type of migraine, frequency of migraine attacks, duration of the disease, medications, cigarette smoking. Mean duration of migraine attacks and their mean frequency were obtained from the mean number of migraine episodes within three months before consultation. These data were systematically noted in the patients' diaries. During the first consultation patients reported their height, weight was measured by the authors of the project and consequently BMI was calculated by dividing weight in kilograms by the square of height in meters.

The statistical analysis was carried out using SAS 9.2. The comparison of BMI in the migraine group and the control group was done. p-Values of <0.05 were considered statistically significant. We also assessed the association between BMI and frequency of migraine attacks and their duration. We took advantage of the age-adjusted logistic regression models.

3. Results

The mean BMI of the migraine group was 24.27 ± 4.47 (range: 17.24–34.82). Twenty-six patients (49%) had normal BMI (18.5–25), 16 patients (30%) were overweight (BMI >25) and 7 (13%) were obese (BMI >30). 4 patients (7%) were underweight (BMI < 18.5). The mean BMI of the controls was 22.69 ± 2.96 (range: 18.06–40.61). Twenty-one persons had a normal BMI value (84%), 3 (12%) were overweight and one was obese (5%). In the control group only women were considered as well.

An association of BMI in women with frequency of migraine episodes per month occurred remarkable when adjusted for age ($p = 0.0421$, $r = 0.29$). Comparing BMI in women with mean frequency of migraine attacks in the same age groups brought a noteworthy relation between the studied parameters indicating an impact of BMI on frequency on the attacks

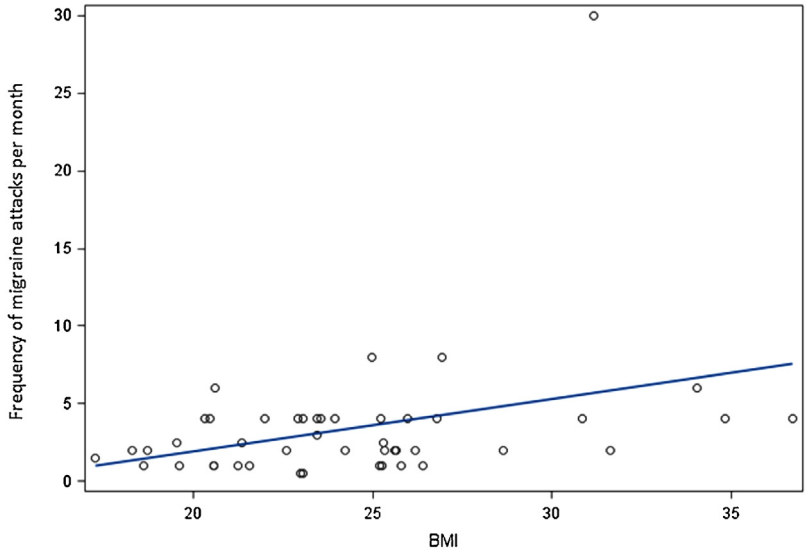

Fig. 1 – A linear correlation between a body mass index (BMI) value and frequency of migraine attacks per month.

(Fig. 1). Mean BMI values did not differ between the migraineurs and controls ($p = 0.0695$). However, it was close to the statistical significance and it is even more convincing when we compare percentage of normal (49% vs. 84%), overweight (30% vs. 12%) and obese (13% vs. 5%) participants between the migraine and control groups. No significant correlation was found between BMI and duration of the episodes ($p = 0.0609$, $r = -0.27$).

4. Discussion

There are three findings that should be taken into consideration: the impact of BMI on frequency of migraine attacks, potentially abnormal BMI in migraineurs and a lack of evidence proving any relation between BMI and duration of migraine episodes.

The finding that BMI is proportional to frequency of migraine attacks is supported with the results of several other studies. Similar results are presented by Bigal et al. [9]. A telephone interview of 30.125 participants showed no risk of migraine with elevated BMI, but more often attacks occurred in the overweight and obese patients [9]. The latter finding is supported by another work done by Bigal et al. [10] based on data of 18,968 migraineurs (the data were collected from questionnaires mailed to target households) [10]. Verrotti et al. [21] proposed interesting research trying to assess whether a reduction of BMI may alleviate a course of migraine. One hundred and thirty-five adolescents underwent a mass reduction program containing a diet, systematic exercises and a behavioral therapy. After 12 months of the project, the authors obtained a statistical decrease of weight, BMI, waist circumference, frequency, intensity of migraine episodes, disability, need of acute medication intake. This approach to the problem also shed a light on a positive relation between BMI and frequency of the headaches [21]. Winter et al. [16] analyzed data of 63,467 women. The relation between frequency of migraine attacks and BMI was observed, but differently expressed. The most frequent attacks were observed in patients with BMI >35 as well as <23 (J-shaped association) [16].

The next finding was BMI as a potential risk of migraine. Although we did not achieve a statistical significance in this connection, other studies encourage us to state that our outcome might be of some clinical importance. Horev et al. [11] examined a group of 27 women with a mean BMI of 41.07 that were qualified to bariatric surgery. Within the group, 17 patients had a history of episodic headaches. Thirteen of them were diagnosed with migraine. Such a big number of migraine individuals in the group of morbidly obese patients indicated that BMI may play a role in migraine development. Vo et al. [12] interviewed 3733 women during their early pregnancy–data obtained included height, weight (at age of 18 and 3 months before pregnancy), past history of migraine as diagnosed by physicians. The higher the BMI was the greater the odds of migraine observed in women. Ford et al. [13] evaluated 7601 men and women showing that the highest risk of severe headaches or migraine in the age-adjusted calculation was in patients with BMI <18.5 and >30. On the other hand, Peterlin et al. [14] stated that obesity contributed to migraine only in patients at age of 20–55 years – not older, and Yu et al. [15] showed that odds of migraine increased only in patients with BMI >30. Another thing is that Bigal et al. [9] denied any increased prevalence of migraine in patients with abnormal BMI [9]. Tellez-Zenteno et al. [18] found no association either (group of blood donors both men and women). Mattsson et al. [19] described no risk or increased frequency of migraine among mammography screening program attendees. However, the examined group was at age of 40–74 what makes it a slight different to our younger population. In the paper of Yu et al. [15] migraine severity, frequency or disability was also not related to obesity. Additionally, Winter et al. [16] also showed no remarkable risk of migraine connected with increasing BMI after age- and multivariable-adjusted statistics. Le et al. [17] evaluated 31,165 twins for the purpose of finding environmental factors contributing to migraine events. Surprisingly, the risk of migraine was higher among the underweight than among the ones with higher BMI.

To our knowledge, there is no paper suggesting an association between duration of migraine attacks and BMI, so this is in favor of our result.

Finally, we acknowledge some limitations of our study. The most important is a small number of the analyzed cases both among the migraine and control group. A larger population would definitely make our results more reliable and convincing. That could also avoid potential bias. We cannot forget too that all of the findings can be applied only to white women, so they cannot be generalized and describe only a specific population. The patients' diaries might be another limitation as well. Observations noted by patients are less objective and has to be treated with caution, because the participants might not write down all of the migraine attacks neglecting mild ones or changing the time of duration due to lack of systematic self-controls. A study designed in a full clinical set would certainly minimize this kind of imprecision. Besides, the only cofounder that we used in our statistics was age. In fact, there are more factors affecting the course of migraine, like smoking, alcohol, diet, sleep habits and so on. The more detailed database should be introduced in the future projects. Finally, a self-reported survey in the control increases a chance of bias as well.

Weight and height taken during consultation may be treated as an advantage of the project. This way of obtaining data is surely more accurate than an interview by phone or mail and allows us to provide more reliable results. What is more, the diagnosis of migraine was made directly by a neurologist who had followed the particular patients involved in the study. In other words, we were convinced that we dealt with migraineurs in comparison to research where diagnosis of migraine was reported by personal survey according to the past history. Last but not the least, strength of our work is the control group without any chronic diseases.

5. Conclusion

There is a probable relationship between BMI and frequency of migraine attacks. There was no association of BMI with duration of migraine episodes similar to the outcomes of the other scientists.

In accordance to our results we can also assume that it would be prudent to control weight in migraineurs systematically.

Increased BMI value may be a potential target for prevention [21,22]. Nevertheless, a sensible approach to eating habits is a remarkable prophylaxis against other conditions, like cardiovascular diseases. Additionally, a question that emerges too is whether the same situation is observed in men population with migraine.

Conflict of interest

None declared.

Acknowledgement and financial support

None declared.

Ethics

The work described in this article has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans; Uniform Requirements for manuscripts submitted to Biomedical journals.

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