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RESEARCH ARTICLE

Effect of abdominal obesity on migraine features in Indian population

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ABSTRACT

Background: Migraine is a common headache disorder affecting large population globally. Some studies found an association between abdominal obesity (AO) and characteristics of migraine headache, whereas others found no such association. **Aims and Objectives:** Therefore, this study aims to find out the effect of AO on various clinical characteristics of migraine in Indian population. **Materials and Methods:** Male and female migraineurs, between 20 and 50 years, were recruited for the study after obtaining informed consent. Details of migraine history (age of onset of headache in years, frequency of headache per month, and duration of pain in hours) and severity according to migraine disability assessment score were noted. Waist circumference (WC) and waist–hip ratio (WHR) were measured for each patient. AO was determined from WC cutoff for the Asian population. Comparison of clinical features of migraine in groups with and without AO was done using independent sample *t*-test. $P < 0.05$ was considered statistically significant. **Results**: A total of 50 patients, 21 males and 29 females (age mean [standard deviation] 28.7 [6.8] and mean 30.4 [6.4], respectively) were selected. Differences in WC and WHR were statistically significant between males and females. There was statistically significant difference in severity of migraine in male patients and, severity and frequency of migraine among female patients with and without AO. **Conclusion**: Individuals with abdominal obesity have increased frequency and severity of Migraine, compared to those without abdominal obesity. Weight loss may have a potential role in controlling migraine frequency and severity.

KEY WORDS: Migraine; Abdominal Obesity; Migraine Disability Assessment; Waist–Hip Ratio; Waist Circumference

INTRODUCTION

One of the common headache disorders affecting one-fifth of population globally is migraine.[1] Reported prevalence of migraine in our country is about 25.2% in one of the south Indian study.[2] Migraine headache is characterized by recurrent pain, occurring unilaterally, pulsatile quality, and moderate to severe in intensity, lasting about 4–72 h. It is aggravated by routine physical activity, has various associated symptoms such as nausea, vomiting, photophobia, and phonophobia.[3] Autonomic dysfunction, alteration in sensory activity, and focal neurological deficits may be present in some patients.[4] Migraine etiology is not clear but recently obesity has been associated with migraine.[5,6] Obesity is another growing public health problem. It is a chronic, multifactorial disorder of excessive adipose tissue deposition.[7] Some recent reports have found that there is association between obesity and migraine. There is increased frequency, severity of migraine and aura, which is marked by transient focal neurological symptoms usually preceding or often accompanying the headache, is found to occur more in obese migraine patients.[8,9] Others report no such association.[10] Although most of the

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studies have assessed the relationship between general obesity or total body obesity through the estimation of body mass index (BMI) on migraine features, BMI is not an accurate tool, as neither it can distinguish between the weight contributions by muscle, fat, or bone nor does it provides any clue about the distribution of fat across the body. Recently increasing attention is being paid toward the assessment of abdominal adiposity through the measurement of waist circumference (WC), in research studies.[11] Furthermore, abdominal obesity (AO), as assessed by WC, has shown to be the risk factor for chronic daily headache in women.[12] Another study has shown that there is increased frequency of migraine with AO.[13]

Therefore, it is the need of the hour to observe the various characteristics of migraine in relation to AO in migraineurs.

MATERIALS AND METHODS

Patient Recruitment

This study included male and female migraine patients, diagnosed according to the international classification of headache disorders, third edition,[3] in the age group of 20–50 years, from neurology outpatient department of the hospital. Patients with diagnosis of tension-type headache, any neurological disorder, diabetes, and hypertension, were excluded from the study. Prior approval from the institutional ethics committee was obtained. All participants filled informed consent form before the interview.

Assessment of Migraine Features

Age and gender of the patient were noted, followed by a clinical structured interview. Clinical features of migraine such as age of onset of headache (years), frequency of headache per month, duration of pain in hours, and disability due to migraine. Disability was assessed with migraine disability assessment (MIDAS) questionnaire, which depicts disease impact on patients life in previous 3 months.[14] Following this clinical neurological examination was done and all required measurements were taken.

Anthropometric Measurement

All measurements were taken at 8:00 am in the department research laboratory. WC was measured in cm, using a non-stretchable flexible tape in horizontal position, just above the iliac crest, at the end of expiration. Subject was standing straight and observer was sitting in front of subject. Hip circumference was measured in cm at the maximum posterior protuberance of the buttocks. Waist–hip ratio (WHR) was calculated as WC (cm) divided by hip circumference (cm). AO was determined from WC, based on cutoff values for WC in men and women, according to the current guidelines for Asian Indians.[15]

Statistical Analysis

Data were analyzed using SPSS Software (Version 16.0). Quantitative data were presented as mean ± standard deviation. Differences in age, anthropometric measurements, and characteristics of migraine between males and females were calculated using independent sample *t*-test. Comparison of clinical features of migraine in groups with and without AO was done using independent sample *t*-test. $P < 0.05$ was considered statistically significant.

RESULTS

A total of 50 patients, 21 males and 29 females, were included in the study. Demographic details, clinical features, and anthropometric measurements are shown in Table 1. Age of patients, age of onset of headache, frequency of headache per month, duration of headache in hours, severity of migraine as assessed with MIDAS score, and hip circumference did not show any statistically significant difference between males and females. Differences in WC and WHR were statistically significant between males and females.

Correlation between clinical features and AO indicators in males and females is shown in Table 2. Among males, there was statistically significant difference in severity of migraine between patients with and without AO. This was seen with both the indicators of AO, WC, and WHR. Among females, there was statistically significant difference in frequency of headache per month and severity of migraine between patients with and without AO. This was seen only with WC cutoff.

DISCUSSION

This study was done to investigate the effect of AO on various characteristics of migraine in males and females. We included the AO indicating parameters such as WC and WHR. We found significant difference in WC and WHR between males and females, with males having greater WC and WHR than females. Almost 33% of males and 55% of females were found to have AO according to WC cutoff. We found greater severity of migraine in men with AO, in relation with WC as well as WHR. This was statistically significant. There was significant rise in frequency and severity of migraine in women with AO. However, this was seen with only WC. No significant difference was observed in duration of headache in patients with and without AO, in both sexes.

Other studies have also reported a higher WC and WHR in males as compared to females.[16,17] Furthermore, high

Table 1: Demographic details and clinical features of migraine in men and women

Characteristics	mean±SD		*P* value
	Males (*n*=21)	Females (*n*=29)	
Age (years)	28.7±6.8	30.4±6.4	0.364
Age of onset of headache (years)	23.3±5.6	27.4±10.3	0.106
Frequency (per month)	6.8±2.7	6.03±4.4	0.458
Duration of headache (h)	6.7±2.6	6.9±6.3	0.902
MIDAS Score	18.2±6.6	18.2±10.0	0.975
WC (cm)	85.6±5.9	79.7±11.7	0.041*
Hip circumference (cm)	100.6±2.5	100.3±9.2	0.890
WHR	0.85±0.04	0.79±0.07	0.002*

SD: Standard deviation, MIDAS: Migraine disability assessment score. *Significant at 0.05 level. WHR: Waist–hip ratio, WC: Waist circumference

Table 2: Comparison between clinical features and AO indicators in males and females

Parameters	WC (cm) mean±SD			WHR mean±SD		
Males (*n*=21)	WC<90 (*n*=14)	WC>90 (*n*=7)	*P* value	WHR<0.88 (*n*=14)	WHR>0.88 (*n*=7)	*P* value
Frequency (per month)	6.4±1.9	7.7±4.0	0.298	6.4±1.9	7.7±4.0	0.298
Duration of headache (h)	6.3±2.5	7.4±2.7	0.389	6.3±2.5	7.4±2.7	0.389
MIDAS score	16.2±±5.6	22.4±6.8	0.039*	16.2±5.6	22.4±6.8	0.039*
Females (*n*=29)	WC<80 (*n*=13)	WC>80 (*n*=16)	*P* value	WHR<0.80 (*n*=16)	WHR>0.80 (*n*=13)	*P* value
Frequency (per month)	4.2±2.2	7.5±5.3	0.048*	5.1±4.5	7.1±4.2	0.230
Duration of headache (h)	5.9±4.9	7.6±7.3	0.466	6.0±4.8	8.0±7.8	0.408
MIDAS score	14.0±7.7	21.5±10.7	0.044*	17.5±9.4	19.0±11.1	0.710

h: Hour, SD: Standard deviation, MIDAS: Migraine disability assessment score. *Significant at 0.05 level. WHR: Waist–hip ratio, AO: Abdominal obesity, WC: Waist circumference

prevalence of obesity in women has been reported in some researches.[18,19] Previous studies have also reported that migraineurs with high WC have increased frequency and severity of migraine compared to patients with normal WC.[13,17] In one of the clinical trials, it was reported that weight loss decreases abdominal fat, and thus decreases severity and frequency of migraine.[20] On the other hand, few studies report no such association between obesity and migraine.[10] Hence, much variation in findings can possibly be attributed to the changes in factors affecting characteristics of migraine such as physical activity, health status, diet, and genetic polymorphisms.[21,22] The association between migraine and obesity has been linked to some common inflammatory markers. These are secreted from visceral adipose tissue and may affect migraine symptoms.[23] Alteration in hypothalamic functions due to hormones secreted from adipose tissue has been proposed as another explanation for this association, as hypothalamus is the center for food intake and migraine attack.[24] Therefore, it appears that weight loss and weight control have potential role in reducing the frequency and severity of migraine and its outcome.

The strength of this study is that we have assessed the effect of AO on clinical features of migraine, using WC as well as WHR. Limitation of our study is small sample size. Furthermore, in a cross-sectional study design, we could not determine the cause-effect relationship between AO and migraine features. To further explore this relationship between AO and migraine, future studies need to be done with greater sample size.

CONCLUSION

Individuals with abdominal obesity have increased frequency and severity of migraine, compared to those without abdominal obesity. Weight loss may have a potential role in controlling migraine frequency and severity.

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