

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Migraine and Neck Circumference: Is there a link?.

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ABSTRACT

Migraine is characterized by headache and a wide variety of other symptoms. The aim of our study is to find if an association exists between migraine and neck circumference among males and females. After approval from institutional ethics committee, a case control study was conducted. Cases with confirmed diagnosis of migraine were taken from KMC Mangalore affiliated hospitals. Controls were taken from the general population residing in Mangalore. Data was collected from the consenting participants after taking detailed history and examination based on which targeted information was sought out in a systemic manner. Statistical analysis was done using SPSS version 11.5. No significant differences were observed for the neck circumference between cases and controls ($t=1.169$; $p=0.245$), weight of cases and controls ($t=1.206$; $p=0.232$) or for the BMI between cases and controls ($t=0.096$; $p=0.924$). Though neck circumference was significantly correlated with weight and BMI of the participants, no association could be established between neck circumference and migraine. Migraine is observed to be more prevalent among females than males in the study. It is more common in the productive age groups i.e. 20-50 years. The study concludes that neck circumference was not significantly associated with migraine contrary to the proposed hypothesis of such association.

Keywords: Migraine; Obesity; Neck Circumference; Association

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INTRODUCTION

Migraine is characterized by a typical throbbing headache on one or both sides and is often associated with a wide variety of symptoms such as nausea, vomiting and light sensitivity. These symptoms may cause exhaustion and weakness, and reduce functional ability that often results in inability to work. There is impairment of occupational and social aspect of quality of life, resulting in increased medical leave. The global prevalence of migraine is 14.7% [1]. In Karnataka the prevalence of migraine is reported to be 22.8% [2]. Neck circumference can be used to estimate upper body subcutaneous that may be a unique, pathogenic fat depot [3], and an indicator of risks besides the visceral abdominal fat [4]. Neck circumference can be used as a simple screening method for identifying overweight and obesity [5]. A relation between neck circumference, body mass index, waist circumference and metabolic syndrome has been established [6,7]. Obesity is associated with chronification of migraine. Since BMI and obesity are proportionally related to neck circumference, an association between migraine and neck circumference can be hypothesized.

There is no previous study conducted to relate migraine and neck circumference. The purpose of our study thus, was to find if any association exists between neck circumference and migraine.

MATERIALS AND METHODS

The research was taken up following approval from the Institutional Ethics Committee (IEC) as a case-control study. The study sample thus constituted of cases and controls. A case was defined as one that satisfied ICHD-3 criteria for diagnosis of migraine and controls were the ones who did not satisfy the ICHD-3 criteria. All the cases were taken from KMC Mangalore affiliated hospitals while the controls were taken from the general population of Mangalore.

The participant were enrolled in the study after obtaining written informed consent from the participants. Cases that satisfied the diagnostic criteria of migraine with aura and migraine without aura, within the age group of 16-65years were included in the study. Similarly, controls were included from the general population of Mangalore within the age group of 16-65years. Participants with thyroid disorders, any previous neck surgeries, pregnant women and participants on flunarizine medication were not included in the study. Migraine with aura and migraine without aura was diagnosed based on International Classification of Headache Disorders, 3rd edition [8].

The neck circumference (NC) was measured using a non-stretchable measuring tape that was placed perpendicular to the long axis of the neck just below the laryngeal prominence [9]. The normal values of NC for males are reported as <37 cm and for females as < 34cm [5]. The height and weight of the participants was measured using standard instruments (stadiometer and weighing scale) to calculate BMI. The Body mass index (BMI) was calculated using the formula; $BMI = \text{mass} / \text{height}^2$. BMI in healthy adult individuals ranges between 18.0-24.9 kg/ m².

The relevant data was collected by taking history and on examination of the patients, based on which targeted information was sought out in a systemic manner. Statistical analysis was done using SPSS version 11.5. Descriptive statistics were obtained and results were shown in proportions. Karl Pearson's correlation coefficient and Students t-test were performed to study the differences between cases and controls and respective correlations. P value less than 0.05 was considered as statistically significant.

RESULTS

A total of 50 controls and 46 cases participated in the present study. The majority of the cases with migraine in the present study were females (n=38, 82.61%) and the remaining 17.39% males (n=8). Equal number of males (n=25, 50%) and females (n=25, 50%) constituted of the control population. The majority of the people with migraine belonged to the age group of 20-29 years (34.78%), following it was the age group 40-49 years (28.26%) and 30-39 years (26.09%). Most of the migraine patients belonged to the middle age groups (20-49 years) that is considered as the productive age group. Among the controls, 76% of the participants belonged to age group of 20-29 years (n=38). Age distribution of the cases, and the controls is shown in Table 1.

Table 1: Age distribution of the cases and the controls.

Age	Cases		Controls	
	N	%	N	%
<20	01	02.17	02	04
20-29	16	34.78	38	76
30-39	12	26.09	04	08
40-49	13	28.26	04	08
50-59	02	04.35	02	04
>60	02	04.35	--	--
Total	46	100	50	100

The age of the cases ranged between 15-73 and the mean age being 35 years. The height of the cases ranged between 142.5-175.0 cm and the mean height was 159.062 cm. The weight of the cases ranged between 37-90 kg and the mean weight was 57.88 kg. The neck circumference of the cases ranged between 26.2-40 cm, the mean NC being 33.1 cm. The BMI ranged between 18.22- 32.08 kg/ m², and the mean BMI was 22.65 kg/m² (Table 2). The age of the controls ranged between 19-55 years, the mean age being 25 years. The height of the controls ranged between 144-185 cm and the mean height was 166.21 cm. The weight of the controls ranged between 40-92 kg, the mean weight being 62.32 kg. The neck circumference of the controls ranged between 27.5-43.2 cm, the mean NC being 34.42 cm. The BMI ranged between 15.17-32.60 kg/m² and the mean BMI being 22.536 kg/m² (Table 3). The neck circumference among the majority of the migraine patients ranged between 30-39 cm (n=35, 76.09%), followed by cases that had a neck circumference less than 30cms (n=10, 21.74%). Among controls; 78% of the participants (n=39) had neck circumference ranging between 30-39 cm. The neck circumference among the cases and controls is shown in Table 4.

Table 2: Descriptive statistics- Age, height, weight, BMI and neck circumferences for the Cases.

	Minimum	Maximum	Mean
Age (years)	015.00	073.00	035.00
Height (cm)	142.50	175.00	159.06
Weight (kg)	037.00	090.00	057.88
Neck circumference (cm)	026.20	040.00	033.10
BMI (kg/m²)	018.22	032.08	022.65

Table 3: Descriptive statistics- Age, height, weight, BMI and neck circumferences for the Controls.

	Minimum	Maximum	Mean
Age (years)	019.00	055.00	024.98
Height (cm)	144.00	185.00	166.21
Weight (kg)	040.00	092.00	062.32
Neck circumference (cm)	027.50	043.20	034.42
BMI (kg/m²)	015.17	032.60	022.54

Table 4: Neck circumference among the cases and controls.

Variable	Cases		Controls	
	N	%	N	%
<30	10	21.74	06	12
30-39	35	76.09	39	78
40-49	01	02.17	05	10
Total	46	100	50	100

Most of the cases already had a history of migraine (82.61%) and were treated for the same, while the others (17.39%) were newly diagnosed. The majority of the patients had a history of migraine for less than 5 years (28.94%), followed by 5-9 years (26.31%). The other cases had a history of migraine for 10-19 years (21.05%), and >19 years (23.68%). The majority of the participants complained of migraine of 1 day duration.

In 55.26% of the participants the migraine lasted for 1day while only 2.63% of the migraine patients complained of migraine lasting more than 4 days. In our study, 62.5% of the migraine participants complained of unilateral migraine and the remaining 37.5% complained of migraine of bilateral nature. In 20% of the cases aura was associated with migraine attacks while the other 80% had no aura along with the episodes of migraine. In our study, 51.72% of the cases had < 4attacks/ week. 27.59% cases had migraine attacks 4-7 times/ week. 13.79% had < 4attacks/ month. And the remaining 6.9% had > 4attacks/ month. The majority of the participants with migraine reported a frequency of < 4 times per week. Very few participants in our study (n=2) had a frequency of attacks > 4times per month.

Correlation between weight, BMI and neck circumference was obtained and comparisons between cases and controls was done. Weight and BMI of all the participants (both cases and controls) were significantly correlated with neck circumference. Pearson correlation (r) between weight and Neck circumference for cases was 0.612 (p=0.012), and for controls was 0.817 (p<0.001). Pearson correlation (r) between BMI and Neck circumference for cases was 0.663 (p=0.005), and for controls was 0.619 (p<0.001). No significant differences were observed for the neck circumference between cases and controls (t=1.169; p=0.245), weight of cases and controls (t=1.206; p=0.232) or for the BMI between cases and controls (t=0.096; p=0.924).

DISCUSSION

There is a worldwide neglect of headache disorders, like migraine as a major cause of public ill health, and inadequate responses to them in countries throughout the world [10]. In the present study the majority of the patients were females. A similar study on Migraine by Macqreoqor et al. [11] reported migraine to be more prevalent in women than in men, and attributed it to the effect of female sex hormones. The present study also observed that the majority of the patients belonged to 20-50 years age group, considered as the productive period of life, the maximum patients being in the age group of 20-30 years. Previous studies have shown that migraine is mostly reported in people during their teens and later between 50-60 years of age [10,12]. Headache prevalence is known to decrease in patients older than 65 years. The symptoms of migraine are also known to decrease with age [13]. The present study shows 20% prevalence of aura in migraine patients. According to the national headache foundation, approximately one-fifth of migraine sufferers experience aura [14].

The present research confirms a correlation weight and neck circumference and also between BMI and neck circumference. Thus, with increase in BMI, neck circumference also increases, or in other words obese people have larger neck circumference. Previous studies have indicated an association of neck circumference with age, weight, waist and hip circumferences and BMI among males and females. BMI is employed as an index of obesity. Preis et al. compared overweight and obesity related variables with BMI values and concluded that correlation is present between obesity (measured by BMI) and neck circumference [3].

Obesity may be one of the aggravating factors for migraine. Since BMI and obesity are proportionally related to neck circumference, an association between migraine and neck circumference was hypothesized in the present investigation. In the present research on association between neck circumference and neck circumference, no significant differences were observed for the neck circumference between cases and controls. Besides, in the present investigation, no significant differences were observed for the weight and BMI between cases and controls. Thus, obesity is not a variable, which may have influenced the association of migraine and neck circumference. The present investigation thus, concludes that no association/ correlation exists between the neck circumference and migraine. There are no previous studies related to the association of migraine and neck circumference for comparisons with observations of the present investigation. The observations of this preliminary research however, need to be confirmed on a larger sample. Gender differences may have influenced the association if any. Hence, separate studies among males and females are recommended.

ACKNOWLEDGEMENTS

The present research was taken up in Kasturba Medical College (KMC), Mangalore and was supported by Manipal University Student Research Grant. We wish to acknowledge the faculty of Medical Research Department of KMC, Mangalore for all the guidance in carrying out this work. We wish to acknowledge the



participants for voluntarily participating in the study.

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