

# FREQUENCY RATE OF OBESITY AND LOW MOBILITY IN NORTH AMERICAN AND IRANIAN STROKE PATIENTS

Kavian Ghandehari<sup>(1)</sup>, Ashfaq Shuaib<sup>(2)</sup>

## Abstract

**INTRODUCTION:** Obesity and low mobility are among the risk factors of stroke and cardiovascular diseases. A pilot double-center study evaluated frequency rate of obesity and low mobility in patients with ischemic stroke.

**METHODS:** This prospective clinical study was conducted on 100 consecutive stroke patients in Mackenzie hospital, Canada and 100 consecutive stroke patients in Ghaem hospital, Iran in 2007. The patients were age- and sex- matched. Diagnosis of ischemic stroke was made by stroke neurologists. Obesity and low mobility was detected based on the standard method in the two studied groups. Chi-Square and Fisher tests served for statistical analysis and  $P < 0.05$  was declared as significant.

**RESULTS:** 92 males and 108 females with ischemic stroke were investigated. Obesity was present in 26% of the Canadians and 21% of Iranian stroke patients,  $df = 1$ ,  $P = 0.403$ . Low mobility was reported in 29% of Canadian and 5% of Iranian stroke patients,  $df = 1$ ,  $P < 0.0001$ . The frequency rate of obesity was not significantly different in the two groups and in each gender separately ( $P > 0.05$ ), while the difference was significant for low mobility,  $P < 0.05$ .

**CONCLUSIONS:** There is no significant difference in frequency rate of obesity between Canadian and Iranian stroke patients. However, low mobility is significantly more frequent in the old Canadian individuals with stroke.

**Keywords:** Obesity, Stroke, Race.

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## Introduction

A number of large epidemiological studies in North America and Europe have identified numerous risk factors for the development and progression of atherosclerosis and stroke.<sup>1</sup> It has been shown that modification of several major risk factors for stroke can reduce stroke incidence.<sup>1</sup> Obese persons have higher blood pressure, blood glucose and atherogenic serum lipids, and on the account alone could be expected to have an increased stroke incidence.<sup>2</sup> Vigorous exercise may exert a beneficial influence on risk factors for atherosclerosis. It could reduce elevated blood pressure as a result of weight loss and by lowering the pulse rate.<sup>2</sup> High physical activity raises the HDL, lowers the LDL cholesterol and improves glucose tol-

erance by increasing insulin sensitivity.<sup>2</sup> Regular sport program and high physical activity promotes a lifestyle conducive to favorably changing detrimental health habits such as cigarette smoking and change of the harmful diet.<sup>2</sup> Managing obesity and moderate levels of physical activity provides substantial benefit and is recommended as a sensible lifestyle modification to reduce risk of stroke. This pilot double-center study was designed for evaluation of overweight and low mobility in patients with ischemic stroke.

## Materials and Methods

A hundred consecutive ischemic stroke patients admitted in Walter Mackenzie hospital, Canada and 100 consecutive ischemic stroke patients admitted in Ghaem hospital, Iran in 2007 enrolled in

1) MD FLSP, Associate Professor of Neurology, Mashhad University of Medical Sciences, Mashhad, Iran. E-mail: kavianghandehari@yahoo.com

2) MD FRCPC FAHA, Professor of Neurology, University of Alberta, Edmonton, Canada.

a prospective study. The Canadian patients consisted of white North American race and the Iranian patients were white Persian race. Ischemic stroke patients were age and sex matched in the two groups. Diagnosis of ischemic stroke was made by stroke neurologists. Stroke was defined as an ischemic focal neurological deficit that persisted at least 24 hours.<sup>3</sup> All of the ischemic stroke patients had one or more brain computerized tomography 48-hour post stroke.<sup>4</sup> Low mobility was defined as walking less than 5 kilometers or half an hour per day.<sup>3,4</sup> The measurements of body height and weight were carried out in the morning. Body weight (in kilograms) was measured to the nearest 0.1 kg with an electronic scale (Seca, Germany). Body height was measured to the nearest 0.5 cm as the patients stood erect against a vertical wall-mounted scale with heels, buttocks and occiput in the Frankfort plane with anthropometric square.<sup>3,5</sup> The patients were dressed in light underclothing and no shoes throughout the measurements. Obesity was calculated based on the Body Mass Index (BMI).<sup>5,6</sup> BMI was calculated as ratio of body weight in kilograms to the square of body height in meters ( $\text{Kg}/\text{m}^2$ ). Obesity, expressed as a metropolitan relative weight that is more than 30% above average.<sup>5,6</sup> The effects of race and gender on frequency rate of these risk factors were analyzed by Chi-Square and Fisher tests and  $pP < 0.05$  was declared as significant. Data were processed and analyzed with SPSS software version 11.5. The protocol was approved by our institutional ethics committees and the informed consent was obtained from the subjects and/or their guardians.

## Results

Two hundred ischemic stroke patients (92 males, 108 females) were evaluated. Mean age of the Canadian and Iranian stroke patients was 71.88, SD: 10.99 and 68.7, SD: 5.3 respectively. In the Iranian group, Obesity and low mobility was found in 21% and 5% of the cases respectively. In Canadian group, obesity and low mobility was detected in 26% and 29% of the cases respectively. The effect of race on the frequency rate of obesity was insignificant in the stroke patients,  $df = 1$ ,  $P = 0.403$ .

Low mobility was significantly more frequent in Canadian stroke patients,  $df = 1$ ,  $P < 0.0001$ .

30.4% of the Canadian and 17.4% of Iranian males with ischemic stroke were obese;  $df = 1$ ,  $P = 0.143$ . In female patients, 22.2% of the Canadians and 24.1% of Iranians were obese,  $df = 1$ ,  $P = 0.823$ . 26.1% of Canadian and 5.5% of Iranian males with stroke had low mobility,  $df = 1$ ,  $P = 0.011$ . In female patients, 31.5% of the Canadian and 3.7% of Iranians had low mobility,  $df = 1$ ,  $P = 0.0002$ .

## Discussion

Obesity is a significant independent contributor to stroke incidence in younger men and elderly women.<sup>2</sup> Recent studies have suggested that abdominal obesity, rather than elevated BMI, is more strongly related to stroke incidence.<sup>7</sup> Obesity has been a common stroke risk factor in both of our Canadian and Iranian patients with insignificant differences based on the race and gender. Obesity, even at an advanced age, is a significant risk factor for atherosclerosis.<sup>2,7</sup> Overweight correlates with several other risk factors for atherosclerosis, i.e hypertension and hypercholesterolemia.<sup>2,7</sup> Low mobility was significantly more frequent in our Canadian stroke patients, especially in the Canadian females, although Canadian and other western nations have a better physical lifestyle than Iranian and other Middle East nations. However, old people in western countries are usually left alone or live in the institutions. Fortunately, Iranian and other Middle East nations have especial respect to the old people based on their cultural believes. Thus, old people in Iran have usually acceptable physical activity by help of their children and relatives. In Framingham study, physical activity in subjects with mean age of 65 years was associated with a reduced stroke incidence.<sup>8</sup> This relative reduced risk of stroke in men was 0.41 in the study.<sup>8</sup> Surprisingly, there was no evidence of protective effect of physical activity on risk of stroke in women of the Framingham cohort.<sup>8</sup> As in coronary heart disease, moderate physical activity conferred no less benefit than heavy activity levels.<sup>8</sup> In a number of other population studies and in a series of case-control studies, low levels of physical activity were associated with increased incidence of stroke.<sup>2</sup> Recently, a beneficial effect was found in women.<sup>9</sup> A graded response to exercise was seen in 7735 British men

aged 45 to 59 years, with a greatest benefit in reduced stroke incidence derived from the most intense level of exercise and an intermediate protective effect from medium levels.<sup>10</sup> In the Honolulu Heart Study of Hawaiian Japanese men, higher levels of physical activity, after adjustment for other risk factors was associated with lower rates of both ischemic and hemorrhagic stroke.<sup>11</sup> Recent data from NHANES I Epidemiologic followup study disclosed a consistent association of low levels of physical activity and an increased risk of stroke in women as well as men and in both blacks and whites.<sup>12</sup> Moderate levels of activity tended to provide an intermediate level of protection.<sup>12</sup>

### References

1. Wolf PA, Kannel WB, D'Agostino RB. Epidemiology of stroke. In: Ginsberg MD, Bogousslavsky J, Editors. *Cerebrovascular Disease: Pathophysiology, Diagnosis and Management*. Vol 2. Massachusetts: Blackwell Science; 2006. p. 837-43.
2. Wolf PA, D'Agostino RB. Epidemiology of stroke. In: Barnett HJM, Mohr JP, Stein BM, Yatsu FM, Editors. *Stroke: Pathophysiology, Diagnosis and Management*. 3<sup>rd</sup> ed. New York: Churchill Livingstone; 2006. p. 8-19.
3. Ghandehari K, Izadi Z. The Khorasan Stroke Registry: Results of a five-year hospital-based study. *Cerebrovasc Dis* 2007; 23(2-3): 132-9.
4. Ghandehari K, Izadi Mood Z. Khorasan Stroke registry: Analysis of 1392 stroke patients. *Arch Iranian Med* 2007; 10(3): 327-34.
5. Taheri F, Kazemi T. Prevalence of overweight and obesity in adolescents in Birjand. *ARYA* 2006; 2(1): 27-30.
6. Jood K, Jern C, Wilhelmsen L, Rosengren A. Body mass index in mid-life is associated with a first stroke in men: a prospective population study over 28 years. *Stroke* 2004; 35(12): 2764-9.
7. Walker SP, Rimm EB, Ascherio A, Kawachi I, Stampfer MJ, Willett WC. Body size and fat distribution as predictors of stroke among US men. *Am J Epidemiol*, 2006; 144(12): 1143-50.
8. Kiely DK, Wolf PA, Cupples LA, Cupples LA, Beiser AS, Kannel WB. Physical activity and stroke risk: The Framingham Study. *Am J Epidemiol* 1994; 140(7): 608-20.
9. Manson JE, Stampfer MJ, Willett WC, Colditz GA, Speizer FE, Hennekens CH. Physical activity and incidence of coronary heart disease and stroke in women. *Circulation* 2005; 91(Suppl): 5-11.
10. Wannamethee G, Shaper AG. Physical activity and stroke in British middle aged men. *BMJ* 1992; 304(6827): 597-601.
11. Abbott RD, Rodriguez BL, Burchfield CM, Curb JD. Physical activity in older middle aged men and reduced risk of stroke: The Honolulu Heart Program. *Am J Epidemiol* 1994; 139(9): 881-93.
12. Gillum RF, Mussolino ME, Ingram DD. Physical activity and stroke incidence in women and men: The NHANES I Epidemiologic Followup Study. *Am J Epidemiol* 1996; 143(9): 860-9.