A Comparison of Some Risk Factors between Male and Female in Patients with Ischemic CVA

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ABSTRACT
Background: Stroke is a major cause of morbidity and mortality in the general population. The most effective way to reduce the burden of stroke is through prevention. This article provides findings on gender differences for risk factors of ischemic stroke. Aims: The purpose of this retrospective study was to compare males and females on some risk factors for ischemic stroke. Methods and material: In this retrospective study, a total of 400 patients with the diagnosis of ischemic stroke, based on CT scan findings, who were admitted to 17th hospital from 2006 to 2010, were assessed. The frequency of some risk factors such as diabetes mellitus, hypertension, smoking, hypercholesterolemia and heart disease, were examined. The hospital data were reviewed and recorded in special standardized questionnaire. Finally data analyzed by SPSS (version 16), CHI squer, and Fisher’s exact test with significant level of 5%. Results: 50% of patients were men and 50% were women, and the mean age was 70.51±11.457 years. Stroke risk factors that differed significantly by gender include the history of smoking (26% men vs. 14.5% women, P=0.016), hypercholesterolemia (48.5% females vs. 35.5% males, P=0.008), duration of hypercholesterolemia (11.95±7.816 years in women and 9.10±5.141 years in men, P=0.004), incidence of low levels of HDL (10.5% in female and 3.5% in male, P=0.005), high levels of TG (39.5% in women vs. 25% in men, P=0.002), history of hypertension (77.5% in female and 64.5% in male, P=0.003), duration of hypertension (13.829±7.6476 years in women and 10.291±6.1048 years in men, P=0.0001). Conclusion: Women are more likely to have hypertension, hypercholesterolemia, low levels of HDL cholesterol and high levels of TG. Although duration of hypertension and hypercholesterolemia are longer in women than in men. History of smoking in men was more than in women. High LDL levels, history of DM, and duration of DM, VHD, IHD, arrhythmia and age were equally frequent in males and females.

Keywords: Risk Factors; Male; Female; Ischemic CVA.
INTRODUCTION
A stroke is a medical emergency and can cause permanent neurological damage, complications, and even death. Worldwide, stroke is a leading cause of death, with stroke mortality being particularly high in Eastern Europe and Asia. Despite gradual declines in overall stroke death rates in many industrialized countries, stroke remains a leading cause of death and disability, particularly in united states. The Middle East and North Africa are lacking in data on the epidemiology of stroke. There is only one study showing an incidence of 43.12/100,000 population/year of first-ever ischemic stroke in all age range in Iran (1-4). Strokes are classified into one of two major categories: ischemic and hemorrhagic. Ischemic strokes are the most common type of stroke—contributing to 88 percent of stroke cases (5). Risk factors for ischemic stroke are: increasing age, male gender, black ethnicity, family history of CVA, diabetes mellitus, arterial hypertension, hypercholesterolemia, heart disease, and smoking. Patients with ischemic stroke that had the history of estrogen therapy, or taking oral contraceptives, and patients with hemorrhagic stroke, were excluded from the study. Finally, data analyzed by SPSS (version 16), CHI square, and Fisher’s exact test with significant level of 5%. Results from a study by Hochner et al confirm our findings. They found out there is a significant gender gap in HTN (29.1% of women vs. 14.3% of men). In Requer’s et al study, women with P.value = 0.0027 had history of HTN, either (9-11). But in the Hinkle’s study, a significantly higher (P<0.05) rate (48%) of HTN is reported for men in comparison to women (32%). (12) Also, we assessed the duration of HTN in our study. The mean duration of HTN was 12.222±7.1970 years. This mean time was 13.829±7.6476 years in women, and 10.291±6.1048 years in men. Hyperglycemia is frequent in patients with cerebrovascular disease. In recent years, diabetes, prediabetic states and insulin resistance and their association with cerebrovascular disease have drawn attention of many researchers (13). Among our samples, 35% (n = 140) of people suffered from DM.

METHODS AND MATERIALS:
This study was a retrospective study. In this study, we choose 400 patients from patients with ischemic stroke, who were admitted in 17th shahriar hospital of mashhad in 2006-2010. The patient’s disease were confirmed with CT scan findings. We divided patients into two groups (men and women). According to the information from patient’s records, we compared fre-quency of some risk factors of ischemic stroke. Risk factors which we assessed in this study were: age, dia-betes mellitus, arterial hypertension, hypercholesterolemia, heart disease, and smoking. Patients with ischemic stroke that had the history of estrogen therapy, or taking oral contraceptives, and patients with hemorrhagic stroke, were excluded from the study. Finally, data analyzed by SPSS (version 16), CHI square, and Fisher’s exact test with significant level of 5%.

Figure 1: Frequency distribution of hypertension in two sexes

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RESULTS:

According to our inclusion criteria 400 patients, with the diagnosis of ischemic stroke based on CT scan findings, who were admitted to hospital, were included in the current study. The samples divided into two groups: 200 (50%) male and 200 (50%) female. The subsequent results were found: Mean age of the patients was 70.51 ± 11.457 years and this finding was 70.47 ± 11.41 years in women, and 70.55 ± 11.532 in men. According to statistical analysis there was no significant difference in age of symptom onset between two sexes (P = 0.944). A population-based study in Sweden found stroke incidence to be 60% lower for women than men at ages 55–64 years, but by the age of 75 years women had a 50% higher incidence than men. The Oxford Vascular Study also showed lower ischemic stroke incidence for women than men aged 55–74 years, but higher incidence for women aged 85 years and older.(7,8) Hypertension identified as the most common preventable stroke risk factor in the general population. The results showed that hypertension was presented in 71% (n= 284) of patients. Actually, 77.5% (n = 155) of females and 64.5% (n= 129) of males had the history of HTN. After eliminating the effect of age, a significant difference with P. value = 0.003, was seen in HTN between men and women (figure 1).

Type II, and none of them had DM type I. It was reported that 36.5% (n = 73) of female and 33.5% (n= 67) of males had had DM in their past medical history. Based on logistic regression after eliminating the effect of age, our study revealed no significant difference in DM frequency between men and women (P= 0.528), whereas Hochner’s et al study, showed that there is a significant gender gap in DM (29.1% of women and 14.3% of men) (10). The duration of DM was not significantly different in our study either. (P=0.084) The mean duration of DM was 12.782 ± 7.5004 years, which was 13.664 ± 8.0631 in women and 11.821 ± 6.7643 years in men. The third factor which is evaluated its frequency in two sexes was hypercholesterolemia. 42% (n= 168) of all patients, 48.5% (n = 97) of females and 33.5% (n= 71) of males had the history of hypercholesterolemia. By logistic regression analysis, with eliminating the effect of age, we found significant difference (P = 0.008) in two genders (figure 2).

Figure 2 : Frequency distribution of hypercholesterolemia in two sexes

Similar to our results, Hochner’s et al results showed a significant gender gap in hypercholesterolemia (29.1% of females and 14.3% of males) We estimated the mean duration of hypercholesterolemia, 10.74± 6.942 years among our patients. This mean time was 11.95 ±7.816 years in women and 9.10± 5.141 years in men. There is also a significant difference among men and women in duration of hypercholesterolemia (P=0.004). We assessed LDL , TG , and HDL disturbances as follow: 29.8% (n=119) of people included in our study had high level of LDL, which 33.5% (n=67) of them were woman , and 26% (n=52) were men. Statistical analysis demonstrated no significant difference (P=0.101) in high levels of LDL between males and females. High levels of TG were seen in 32.3% (n=129) of all patients, 39.5% in women and 25% in men. 7% (n=28) of all patients, 10.5% (n=21) of females and 3.5% (n=7) of males had low levels of HDL in their laboratory findings. TG and HDL disturbances were not equally frequent in women and men. Through calculating using logistic regression, our statistical analysis showed significant differences in high TG levels with P = 0.002, and in low HDL levels, with P=0.005, between male and female. Similar to our study, Karttunen’s et al concluded significant difference in low HDL cholesterol with P value=0.035, among different genders. (14) Sex difference in heart disease was the fourth risk factor, we assessed. The results were as follow: 39.8% (n=159) of patients mentioned positive history of IHD.
Frequency of IHD was 86 (43%) in women and 73 (36.5%) in men. There was no significant difference in frequency of IHD between males and females (figure 3, table1).

Table 1: Logistic regression analysis of frequency of ischemic heart disease

<table>
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<th>Effect</th>
<th>Model Fitting Criteria</th>
<th>Likelihood Ratio Tests</th>
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<td>-2 Log Likelihood of Reduced Model</td>
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<td>.002</td>
</tr>
<tr>
<td>gender</td>
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But in 3 studies performed by Hochner (35.5% of men vs. 29.1% of women), Holroyed et al (18.1% of men vs. 15.3% of women with P<0.001) and Hinkle (13% of men vs. 1% women), men with stroke were more likely to have history of IHD. In our study, it is reported that 19% (n=76) of all patients, 20% (n=40) of females and 18% (n=36) of males, had the history of arterial fibrillation, confirmed by ECG. According to statistical analysis calculated by logistic regression, no significant difference in AF were found between males and females (P=0.599) (table 2).

Table 2: Logistic regression analysis of frequency of arrhythmia

<table>
<thead>
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<td>.000</td>
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<td>Age</td>
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<td>5.433</td>
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<tr>
<td>Gender</td>
<td>188.224</td>
<td>.276</td>
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Hinkle’s et al study, confirmed our results through finding a ratio of female to male patients With AF (3%) equal to what is obtained in our research. (12). Unlike our results, history of AF were significantly more frequent in female stroke patients, in 3 follow studies: Niewad’s study, Dicarlo’s with P<0.001, and Holroyd’s with P <0.001 (15-17). Valvular heart disease did not have a significant difference between male and female stroke patients. According to echocardiographic findings, VHD, were seen in 3.5% (n=14) of all patients containing 4.5% (n=9) of women, and 2.5% (n=5) of men. The last factor which we assessed was smoking. 79.8% (n=319) of all patients, 85.5% (n=171) of women and 74%
(n=148) of men were nonsmokers. 5% (n=20) of all patients, 3.5% (n=7) of women, and 6.5% (n=13) of men were light smoker. 15.3% (n=61) of all patients, 11% (n=22) of women, and 9.5% (n=39) of men were heavy smoker. Smoking was not equally frequent in males and females. Our results showed statistically significant difference in smoking between men and women. (P=0.016)(Figure 4, table 3)

Figure 4: Frequency distribution of smoking in two sexes

Table 3: Logistic regression analysis of frequency of smoking

<table>
<thead>
<tr>
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<th>Likelihood Ratio Tests</th>
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Compared to our findings, several studies recorded similar results as below: In Hochner’s study, 43.9% of men were smoker whereas this finding was 16.4% in women (10). Karttunen et al showed smoking is more in men than in women with P value= 0.012. (14). In Hinkle’s study, 30% of men and 4% of women were smoker. (3) Roquer et al with P value<0.001 demonstrated that smoking is more frequent in men than in women. (11) A study performed by Valsta et al confirm of results and other previous results for smoking either. (13).

DISCUSSION

Ischemic stroke is the third cause of death and a common cause of hospitalization in the world. Thrombotic and embolic ischemic stroke, is considered as one of the major causes of morbidity and mortality all over the world. Ischemic strokes accounts 80% of cerebral stroke. Cerebral stroke is included in the important and common issues of primary care in which about 3/1 of cases are due to intracranial or extracranial artery ath-erosclerosis (12, 13).Cerebral stroke is a medical emer-gency and occurs when blood flow to the brain stops for a few minutes and brain cells begin to die, strokes occur in two main categories, a series of stocks are as a result of the closure of brain blood vessel (ischemic) and a second series caused by bleeding in the brain or around it. Ischemic stroke is followed by the risk for numerous neurological complications such as cerebral edema, seizures, intracranial hemorrhage and progres-sion of neurologic deficits. It is noted that the between above mentioned complications, the neurological dis-orders and cerebral edema are of the most important cause of death in these patients. Tanaka and col-leagues carried out a study with 10 years following up, aimed the incidence of ischemic stroke among people 40 years and older in a rural community located on the island of Shikoku, Japan, in 1977. They studied on 772 men and 901 women with free initially strokes, from July 1967 to June 1977. Their results revealed that the ischemic stock incidence is 10.47 per 1,000 person-years for men and 6.41 per 1,000 person-years for women. Important risk factors that were identified in the study were: age, male gender, hypertension, ECG, Funduscopic disorders. They declared that high blood pressure is the most important risk factor and mean

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arterial pressure (MAP) is the best predictive scale in ischemic stroke. The results of this study confirm that high level of these two parameter is associated with the increasing the proportion of cerebral hemorrhage up to 26% which is higher than previous study in United State (12-15%). In this study an inverse proportion was observed between serum cholesterol level and incidence of cerebral hemorrhage (or stroke). The results of this study also showed that excessive alcohol consumption is one of the risk factors for bleeding in the brain (but not for cerebral infarction) (14). Alex and colleagues in 2009 investigated the differences between genders in AIS (acute ischemic stroke) in the fields of Baseline characteristics, etiology, CT/MRI stroke pattern etc in 237 AIS patients (111 women and 126 man with mean age of 70.7 years). Their results showed that in studied variables there are significant differences between men and women. For instance fibrillation and age were significantly higher in women. Whereas hyperlipidemia, smoking, coronary heart disease and internal carotid artery disease were high frequent in men. In conclusion they declared that there is a relationship between stroke lesion patterns and etiology and risk factor such as gender (15). The results of this study indicated that women with CVA more likely have hypertension, hypercholesterolemia, low levels of HDL and high levels of TG. The duration of hypertension and hypercholesterolemia were also longer in women whereas the history of smoking in men was more than women.

CONCLUSION
The sex differences in stroke can be summarized as follows:
Women are more likely to have hypertension; hypercholesterolemia, low levels of HDL cholesterol, and high levels of TG although duration of hypertension and hypercholesterolemia are longer in women than in men.
History of smoking in men was more than in women. High LDL levels, history of DM , and duration of DM, VHD, IHD, arrhythmia, and age were equally frequent in males and females.

REFERENCES

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