Epidemiological Study of Stroke in Ardabil, Iran: a Hospital Based-Study

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Abstract

**Introduction:** Stroke is one of the neurologic diseases and the third common causes of death in USA after cancer and heart disease. Two-thirds of strokes occur in developing countries and people up 65 years old. Based on WHO report, the country Iran with 97.4 deaths per 100000 is in the 90th ranking between world countries. The aim of this study was epidemiological study on stroke in Ardabil city at 2015.

**Methods:** A cross sectional study was conducted on 207 hospitalized stroke patients in Ardabil city hospital. The necessary data collected from patient’s hospital records and analyzed by statistical methods in SPSS.16.

**Results:** 52% of patients were male and rest of them was female. 98% of patients were married and 67% were from urban. The mean age of patients was 70 ± 13 years. 71% of patients have hypertension and 47% history of stroke. Of all patients, 25.6% had the diabetes and Hypertension at the same time that the rate of mortality in these patients was 22.6%.

**Conclusion:** This study showed that the epidemiology of stroke in the Ardabil city is similar to other places and doing more studies in future is essential.

INTRODUCTION

The pattern of mortality in Iran and world had been changed from infection diseases such as AIDS and Malaria to chronic diseases such as heart diseases and cancers. According to the WHO report, the four main reasons for mortality in 2030 will be heart failure, stroke, chronic obstructive pulmonary disease and lower respiratory tract infections [1].

Stroke is a non-communicable disease among the elderly population that is the third leading cause of death in developed countries after coronary artery diseases and cancers. According WHO report, 56.4 million deaths occurred worldwide in 2015 that 54% of them were among the top ten causes of death [2,3]. There was wide geographic variation in the rate of mortality, especially among elderly people and meanwhile, the mortality rate of stroke in some countries such as Japan, North America and West Europe has declined [4-6].

Several factors including age, sex, alcohol, smoking and HTN have main role in the incidence of stroke among people [7-10]. Stroke is the main cause of physical disability among society’s people which takes more than 24 hours. The onset and duration of symptoms determined by getting history and neurological examination of patients and finally confirmed by CT-scan and MRI [7,11,12].

Stroke is classified in four types included: ischemic stroke (IS), subarachnoid hemorrhage (SH), primary intracerebral hemorrhage and unknown stroke that from them ischemic stroke had prevalence about 87% in society [2]. Early diagnosis and proper management of strokes is very important in good prognosis patients and many efforts in processing at societies to reduce disability and mortality in stroke patients. The aim of this study was epidemiological study of stroke in Ardabil city at 2015.

MATERIALS AND METHODS

A cross sectional study was conducted on 207 stroke patients from Apr 2014 to May 2015. The necessary data included age, gender, residence place, marital status, history of hypertension, diabetes, myocardial infarction and previous stroke, vital symptoms such as pulse rate, heart rate, fever, and length of stay in hospital and treatment outcome collected from patient's hospital records by researchers and entered in the checklist and finally collected data analyzed by statistical methods in SPSS.16.

RESULTS

Of all patients, 108(52%) were male and rest of them were female. The mean age of all stroke patients was 70 ± 13. 25.6% of patients have diabetes and HTN together that the rate of mortality was 22.6% among them. The mean length of stay in hospital was 9 days. Of all patients, 82% discharged from hospital with partial recovery and 12% with personal satisfaction and 6% were died. The rate of disability and mortality in women were 18% and 78%, respectively which upper than men (Table 1).

The mean of systolic blood pressure in women and men were 141.8 ± 27.6 and 141.3 ± 29 mmHg, respectively and the mean of diastolic blood pressure were 81.4 ± 1.6 and 80.2 ± 1.8 mmHg,
respectively which was similar between two sexes. 4 percent of patients have cerebral hemorrhage and 0.5% thrombosis of peripheral veins. 98% of patients were married and 67% urbanization. 33% of patients referred to hospital during 20 o’clock in night to 6 o’clock in morning and 29% in winter season. There were no significant differences between two sexes in the fever, pulse rate and heart rate. 71% of patients have history of HTN and 47% history of stroke that history of HTN is the most risk factors in all age groups (Figures 1, 2).

52% of patients were male and among all age groups, most of patients in age group 50-65 were men and in other age groups were women that were statistically significant (p=0.008) (Table 2).

Patients upper than 80 years old and in age group 65-80 years old have the highest rate of mortality and disability among all age groups (Figure 3).

**DISCUSSION**

There were many evidence about role of HTN in epidemiology of stroke and prospective studies showed that SBP and DBP are the predictable variables for stroke incidence and the risk of stroke increased with increment of BP as the SBP more than 160 mmHg and DBP more than 90 mmHg showed the higher risk of stroke [7,13,14]. Researchers showed that the 10 mmHg increment of DBP accompany with twice increasing risk of stroke and the decreasing 5-6 mmHg in DBP decrease the risk of stroke about twice [10,13]. In this study, the history of HTN is the most risk factor which in line with other studies. In O’Donnell and et al study, HTN is the most risk factor for all strokes. In Lawes and et al study, the decrease of BP is known as a predictable factor in incidence of stroke and in Warlow study pointed to the role of HTN in stroke incidence [7,10,14]. In this study apart from age group <50 in other age groups, the history of BP is the important factor. There are several studies about role of gender and age in the incidence of stroke which showed that an increased risk of stroke is increased in every decade of life. For example, in people <45 years, the rate of stroke annually was 0.1-0.3 per 1000 and in people 75-84 years reach to 12-20 per 1000 that revealed the direct relationship between prevalence of stroke and increment of age [2]. In this study, the mean age of women was 70.6 and a man was 69.5 and apart from age group 50-65, in other age groups the most of cases were women. In a cohort study done on 3378 people, the mean age of women and men was 61.1 and 59 years respectively, that lower than our study [15]. Appelros and et al in a study showed that the rate of stroke in men was 33% more than

<table>
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<th>Risk factors</th>
<th>male</th>
<th>N</th>
<th>%</th>
<th>female</th>
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<td>73</td>
<td>3/35</td>
<td>147</td>
<td>71</td>
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<td>27</td>
<td>41</td>
<td>20</td>
<td>97</td>
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<td>15</td>
<td>33</td>
<td>16</td>
<td>64</td>
<td>31</td>
<td></td>
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<td>8/0</td>
</tr>
<tr>
<td>Smoking</td>
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<td>5/13</td>
<td>5</td>
<td>5/2</td>
<td>33</td>
<td>16</td>
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<tr>
<td>Dead</td>
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<td>7</td>
<td>18</td>
<td>9</td>
<td>33</td>
<td>16</td>
<td></td>
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<tr>
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<td>29</td>
<td>78</td>
<td>38</td>
<td>138</td>
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Table 1: Compare the risk factors and outcomes by gender.

Of all risk factors, only smoking was the significant factor between two sexes. (p=0.001)

![Figure 1 Risk factors for stroke in patients.](image-url)
women who can be related to the genetic factors, the inhibitory effect of estrogen and blood pressure level differences between men and women [9]. Many studies showed that the level of BP in men was more than women in similar age groups but in our study there wasn’t significant difference in term of history of BP, rate of SBP and DBP between two sexes [9,13,16,17]. In line with our study, other studies showed that the rate of stroke in men was more than women. Patients with transient ischemic attack have more shares in the risk of stroke and in more studies, the occurrence of stroke predicted after Transient ischemic attack. About 4-20% of patients with transient ischemic attack lead to stroke in the first 90 days and half of them in two first days after this attack suffered to stroke. The history of previous stroke is the second important factor in this study which was seen in 47% of patients and in age group <50 years, the frequency of women was more than men [18-20]. History of diabetes is the third risk factor and 31% of patients with stroke have history of diabetes and this rate in some studies was 14-38.3%. In epidemiologic studies done in Shiraz and Qom diabetes is the second risk factor. The result of a cohort study in Iranian population showed that most of accidence related to stroke due to HTN, Chronic Kidney Disease and diabetes. 25.6% of patients have diabetes and HTN at the same time and the rate of mortality in these patients was 22.6% of all death. However, control of blood pressure in patients with type 2 diabetes as part of a plan to reduce the risk of cardiovascular disease and stroke are recommended in adults.
with diabetes [15,21,22]. A meta-analysis from 32 research showed that the risk of ischemic stroke in smokers was 1.9 times more than non-smokers. In this study, 16% of patients were smokers that most of them were men. In line with our study, the rate of smoking in Daneshfar and et al study was 15.4% and in other studies smoking is the main risk factor for stroke in 73% of patients and after cutting smoking the risk of stroke is declined and leave smoking use is an essential for each stroke prevention program [7,15,22]. About one third of patients with ischemic stroke have history of coronary heart disease such as angina and MI. In a study done about the risk factor of stroke in 22 countries, results showed that heart etiology known as factor for increasing ischemic stroke risk and in our study history of MI known as the last risk factor [7,14,23]. 31% of patients with stroke have disability that most of them care in their home by family members which are the important resources for patients care. Stroke, is one of the main disability causes in world that associated with long stay in hospital and increment treatment costs while the direct and indirect costs due to stroke in year 2008 in USA was 65.5 billion and 67% of patients have disability in a half-body that most of them were in women and age groups 65-80 years old [24]. Most of patients in our study discharged with partial recovery but 16% died and patients with up 80 years age and women have the more death than men and the rate of dead have direct relation with age increment. In similar studies in Shiraz and Esfahan, the rate of mortality was 12.1% and 26.1%, respectively. At Khaw study there was direct relation between mortality rate from stroke and increased age. In our study the rate of mortality in women was 2% more than men which was in line with other studies [13,22,25].

In addition to the role of sex, age and other risk factors in the incidence of stroke it seems that environmental and other factors can be effective in the stroke incidence rate. Most of patients are from Urban that referred in winter and the last time of night and in a similar study in Hamadan, the rate of Urban people among patients was 57.9% which lower than our study and in Delbari and et al, study, the most risk factors were BP and diabetes that have seen in 74.6% and 55.7% of patients respectively [21,26].

CONCLUSION

This study provides evidence that the epidemiology of stroke in the northwest part of Iran may be similar to other places. So doing more studies about prevalence of the stroke and identify its effective environmental in future is essential.

REFERENCES


