PREVALENCE OF STROKE IN HAWLER, KURDISTAN REGION- IRAQ

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ABSTRACT

Background

Stroke is one of the significant health problems in Iraqi Kurdistan. No study addressing the prevalence of stroke has been conducted in this region.

Objectives

We aimed to find the prevalence of stroke in general in Hawler, the capital of Iraqi Kurdistan.

Patients and Methods

This cross-sectional study comprised a household survey of a clustered and randomly selected sample of the city's population, and it was conducted from October 1st, 2018, to December 31st, 2019.

Results

Out of 4203 persons (905 families) we interviewed, only 33 patients (17 males and 16 females) had developed stroke, with a lifetime prevalence of 7.8/1000. Persons aged 60-74 years were the most typical target for stroke. The ratio of cerebral infarction (72.7%) to haemorrhage (27.3%) was 2.6:1. The subtypes of stroke were as follows: thrombotic 42.4%), embolic (12.1%), lacunar (18.2%), intracerebral haemorrhage (15.2%), and subarachnoid haemorrhage (12.1%). Hypertension was the most critical risk factor (54.5%), while smoking, diabetes mellitus, and hyperlipidemia were found to be other major risk factors.

Conclusion

Despite the lack of epidemiological data, the burden of stroke seems to be high in Hawler. Although ischemic strokes were more common than hemorrhagic ones, the relative proportion of haemorrhage was higher when compared to the Western population. There was no significant difference between genders in the disease pattern. Modifiable risk factors were common among patients with stroke.

Keywords: *Stroke, cerebral infarction, Intracerebral haemorrhage, Subarachnoid haemorrhage, The prevalence.*

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INTRODUCTION

Stroke is defined as a sudden, permanent neurological dysfunction caused by abnormal perfusion of the brain, retina, or spinal cord, due to vascular cause, based upon neuroimaging or pathological evidence with or without the presence of symptoms [1]. It can be classified into two major categories: ischemic and hemorrhagic. Ischemia is due to interruption of the blood supply, while haemorrhage (intracerebral and subarachnoid haemorrhage) is due to rupture of a blood vessel or an abnormal vascular structure [2]. The symptoms depend on the area of the brain affected; the most common symptom of a stroke is sudden weakness or numbness of the face, arm or leg, most often on one side of the body. The more extensive the brain area affected, the more functions likely to be lost. Some forms of stroke can cause additional symptoms: in intracranial haemorrhage, the affected area may compress other structures [3].

Stroke is the first leading cause of disability in developed and developing countries four and the third most common cause of death in most western populations, after coronary heart disease and cancer. Information on incidence, prevalence, and mortality of stroke is essential in assessing priorities for dealing with this disease, recognizing its occurrence, and designing programs for prevention and control; such information is limited in the developing world [4,5]. Studies on stroke epidemiology about prevalence have mainly been conducted among developed nations.

However, the future burden of stroke is likely to increase in developing countries because of the increasing prevalence of hypertension, fast-changing lifestyles, and population restructuring [6]. The best measure of the total burden of stroke in any population is the prevalence, which provides information about the number of people at any one time in that population who have survived a stroke; however, reliable estimates of stroke prevalence are difficult to obtain [6]. In Iraq, for example, stroke is one of the significant health problems, yet no prevalence studies on stroke have been reported from this region. The most important modifiable risk factors for stroke are high blood pressure (HTN) and atrial fibrillation (AF). Other modifiable risk factors include high blood cholesterol levels, diabetes mellitus (DM), cigarette smoking [7, 8], heavy alcohol consumption [9], drug use[10], lack of activity, obesity and unhealthy diet (low fruit and vegetables) [11]. Disability affects 75% of stroke survivors enough to decrease their employability [12], and it can affect patients physically, mentally, emotionally, or a combination of the three. The stroke results vary widely depending on the size and location of the lesion [13].

PATIENTS AND METHODS

This cross-sectional and observational study with a household survey was conducted at Hawler city (also named Erbil; the capital of Iraqi Kurdistan, with a general population, estimated to be 879 000 persons in 2018) from October 1st, 2018 to December 31st, 2019. The estimated sample size was 4203 persons, calculated by the Epi Info program (a public domain statistical software for epidemiology developed by Centers for Disease Control and Prevention, USA and WHO) Version 7.2.2.6, February 2018 (last stable version). The expected frequency was 1.00%, and the worst acceptable result was 1.3%. The expected prevalence of stroke is 1%; this is the estimated prevalence of stroke in a comprehensive review study [6]. The questionnaire form was designed by the researchers to collect data information by face-to-face interview. Hawler city is divided into six large Districts (sectors or municipalities), excluding the surrounding areas (Kurdistan Region Government/ Ministry of Municipality /Hawler, 2017) (Figure 1).

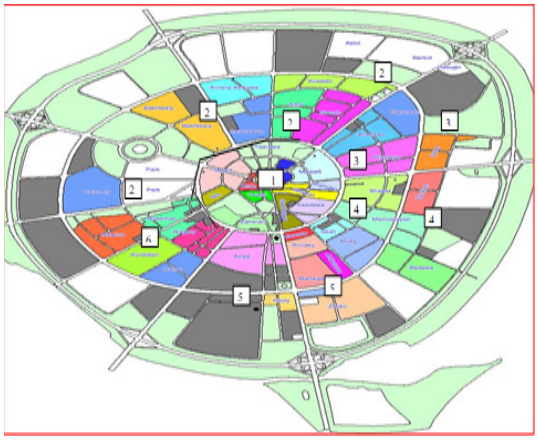

Figure 1. Distribution of Hawler city's districts.

The sample size was divided according to the proportion of the population of each sector from the total population of Hawler city. The sample of each sector was distributed according to the population of each area and randomly from each street's number chosen. Then, in each street, several families were selected randomly (by a sort of lottery) to complete the sample size needed for each sector.

All families had agreed to provide us with the information we needed (with regional security permission). After explaining the nature of our study, an interview was made with the family, asking about any case of stroke, any attack of sudden unilateral weakness or paralysis and facial asymmetry, speech difficulties, sudden unsteadiness and difficulty of walking, or sudden attack of loss of consciousness. Patients with definite stroke (all ages, both genders, and those recovering from the disease were included) were evaluated clinically at home and then referred (if it was necessary) to the neurology department of the Rizgary Teaching Hospital, Hawler, to be examined by neurologists and neurology trainees.

The diagnosis of stroke was carried out by computerized cranial tomography (CT) scan or MRI (magnetic resonance imaging). Patients with TIA (transient ischemic attack; (an acute neurological deficit of vascular origin, lasting <24 h), cerebral venous sinus thrombosis, subdural hematoma, brain tumour and space-occupying lesion that mimic stroke were excluded from the study. The estimated risk factors in this study were: hypertension (HTN), diabetes mellitus (DM), hyperlipidemia, atrial fibrillation (AF), TIA, ischemic heart disease (IHD), obesity, smoking, and other less common factors, such as oral contraceptive pills usage. Data was then processed to a computer using (Microsoft Office Excel 2019 computer program), and the Statistical Package for Social Sciences (SPSS) program for Windows version 26.0, 2019 (SPSS Inc., Chicago, IL) was used to find out the association between different variables by calculating the Chi-square test. A P-value ≤ 0.05 was regarded as statistically significant.

RESULTS

A total of 4203 subjects living in 905 households were interviewed and examined. However, 2.9% of the households were not cooperative and were excluded. Overall, the lifetime prevalence rate of stroke for Hawler city was 7.8/1000 persons. Individuals selected and examined from the six sectors of Hawler city were as follows: sector 1 (578 persons), sector 2 (620 persons), sector 3 (524 persons), sector 4 (912 persons), sector 5 (512 persons), and sector 6 (1057 persons). A total of 33 persons were found to have had a stroke (5, 5, 5, 7, 4, and 7 patients consequently for each abovementioned sector). Of the 33 stroke patients we found, 17 were males (51.5%), and 16 were females (48.5%). The Mean age (± Standard deviation) for stroke was 59.88 ±15.09 years (ranging from 25 to 80 years). Brain CT scan was done in 26 persons and MRI for seven only. Based on the CT scan and MRI, cerebral ischemia (infarction) was present in 24 (72.7%), and hemorrhagic stroke was present in 9 (27.3%) stroke patients. The ratio of infarction to haemorrhage was 2.6:1.

Table 1 shows that the stroke patients were divided into four age groups; the peak age of stroke was between 60-74 years (36.3%). The ischemic type was the commonest one in all age groups, except younger patients (they had the exact prevalence of both hemorrhagic and ischemic strokes).

The ischemic stroke was present in 72.7% of cases; the thrombotic subtype accounted for 42.4% of all strokes and 58.3% of ischemic ones. The Embolic stroke accounted for 12.1% of all stroke subtypes and 16.7% of ischemic ones. Lacunar infarction was present in 18.2% of all stroke subtypes and 25% of ischemic ones. Hemorrhagic stroke was found in 27.3% of the patients; ICH accounted for 15.2% of all stroke subtypes and 55.6% of hemorrhagic strokes. SAH accounted for 12.1% of all stroke subtypes and 44.4% of hemorrhagic strokes (Table 2). The risk factors for stroke found in the study were as follows: HTN was the most typical risk factor (n=18), followed by smoking (12 patients and two ex-smokers), and then DM (n=8) (Table 3).

Table 1. Prevalence of stroke subtypes and their age groups.

Age group (year)	Types		Total	Chi-square	P-value
	Ischemic	Hemorrhagic			
<45	2 (50%)	2 (50%)	4 (12.1%)		
45-59	5 (50%)	5 (50%)	10(30.3%)		
60-74	10 (83.3%)	2 (16.7%)	12(36.3%)	6.951	**0.073**
>75	7 (100%)	0 (0%)	7 (21.2%)		
Total	24 (72.7%)	9 (27.3%)	33 (100%)		

Table 2. Prevalence of stroke subtypes (n=33).

Ischemic subtype:	Frequency	Percentage
Thrombotic	14	58.3
Embolic	4	16.7
Lacunar	6	25
Total	24	100%
Hemorrhagic subtypes:		
ICH	5	55.6
SAH	4	44.4
Total	**9**	**100%**

Table 3. Prevalence of risk factors in stroke.

Risk factors	No. of stroke patients.	%
Hypertension	18	54.5
Smoking	12	36.4
Diabetes	8	24.2
Hyperlipidemia	6	18.2
Transient ischemic attack	5	15.1
Obesity	5	15.1
Ischemic heart disease	3	9.1
Atrial fibrillation	3	9.1
Alcohol consumption	2	6.1
Family history	2	6.1
Previous stroke	2	6.1
Valvular heart disease	1	3
Undetermined	1	3

***Out of the 33 stroke patients, one risk factor was found in 10 patients, while two and more risk factors were present in 22 patients. However, in one patient, no risk factor could be found.**

DISCUSSION

There are no large-scale epidemiological studies in Iraqi Kurdistan to compare our results. Studies on stroke epidemiology addressing the incidence, prevalence, and case-fatality rates have mainly been conducted in developed nations [6]. Nevertheless, the results in the present study seem to be higher, but nearly comparable, with the prevalence found in studies done in some developing countries, like China (6.2/1000), Thailand (6.9/1000) [6], Peru (6.2/ 1000) [14], and Colombia (6.51/1000) [15]. On the other hand, our results were not comparable with other developing countries, which showed a lower prevalence rate, like Saudi Arabia (1.86/1000) [16], Tunisia (0.6/1000) [17], Egypt (5.08/1000) [18], India (5.45/1000) [19], and Bolivia (1.74/1000) [20].

The possibility is that our population probably has been exposed to lifestyle risk factors for longer than the others, like recurrent stressful events and absence of quality control on the available antihypertensive and other medications, is further along with unknown protective ethnic factors or differences in dietary habit. Many Arabic studies date back to 20-30 years; up-to-date figures of stroke epidemiology in the Arab world are therefore sparse. The considerable recent and ongoing socio-economic changes in Arab countries, including increased life expectancy and greater adoption of a westernized lifestyle, especially in the Gulf States, raise the likelihood of an increased stroke rate [21]. As a result of the prevalence rate in the present study was lower than that of developed countries.

In the United States [22], for example, reported 17/1000 prevalence rate of stroke in 1991; in the United Kingdom [23] it was 14.7/1000 and was 14.45/1000 in France6. The resulting lower number of stroke survivors in our population might be responsible for the lower stroke prevalence rate in comparison to developed countries, especially in the more advanced ages. Regarding the distribution of stroke according to age, the result shows peak age prevalence among age groups of 60 to 74 years and lesser prevalence in older age. This may also be explained by increased mortality of stroke with age in developing countries (i.e., lower number of survivors from stroke among the elderly population in developing countries). Based on the cranial CT scan, in our study, the ratio of cerebral infarction to intracerebral haemorrhage was 2.6:1, which is nearly consistent with the studies of other developing countries, like Egypt (2.37:1) [18], India (2.21:1) [24], Argentina (2.7:1) [25], and Ecuador (1.67:1) [26]. These ratios indicate a relatively higher rate of hemorrhagic stroke than ischemic ones. In contrast, in Western countries [27,28], the ratio is nearly equal to 5.6:1, itis may partly explain the differences in stroke outcome and prognosis between developed countries and developing countries that likely determined by the higher proportion of hemorrhagic strokes and the poorer health care in developing countries, according to Feigin and colleagues [6]. In addition, the high prevalence of haemorrhages might be related to the higher prevalence of uncontrolled HTN in our population.

The slightly higher proportion of lacunar strokes in our population (18.2%) in comparison to that in the Western countries (17%) [27, 28], was probably attributed to the high burden of inadequately treated HTN and DM and the small sample size in this study. For the identification of the most common risk factors in stroke patients, the results in the present study showed that HTN is the single most common risk factor (54.5%), followed by smoking (36.4%), DM (24.2%), and hyperlipidemia (18.2%). These results were approximately the same as a study done in Saudi Arabia [29] ,and Iran [30]. Smoking was present in a high percentage of stroke patients (36.4% of cases) in the present study. This might be attributable to the fact that smoking habit is prevalent in a high number of our population like most of the other developing countries.

In conclusions, despite the lack of epidemiological data, the burden of stroke seems to be high in Hawler. Stroke is a common neurological disorder in Hawler city, and despite the lack of epidemiological data, the burden of stroke seems to be high in Iraqi Kurdistan. Although ischemic strokes are more common than hemorrhagic ones, the relative proportion of haemorrhage is higher when compared to the Western population. There was no significant difference between genders in the disease pattern. Most of the patients in our study had risk factors commonly present in stroke patients. In addition, modifiable risk factors were common among patients with stroke. Hypertension is the most common risk factor for stroke in Hawler, followed by smoking habit.

Recommendations

Better control of these risks and raising the educational level of our population toward stroke risk factors is recommended. High-quality stroke services are not widely available; we recommend that a stroke care unit be established in the city. Improving the city's infrastructure will help us conduct well-designed

epidemiological studies, create awareness in the general population with respect to stroke, and improve capacity building in order to meet future challenges.

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