Original Research

Prevalence and pattern of stroke among patients attending a teaching hospital in Dhamar governorate, Yemen

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Abstract

Background: Stroke is still one of the most life-threatening disorders in the middle and low-income countries including Yemen.

Aim: The present study was aimed to explore the prevalence and pattern of stroke among patients attending Thamar University Al-Wahdah Teaching Hospital (TUWTH), located in Ma'bar city, Dhamar governorate, Yemen.

Methods: This was a hospital-based descriptive study conducted on 1482 patients admitted to the Internal Medicine Department, including Intensive Care Unit (ICU), between January and December 2016. Suspected stroke cases were diagnosed based on their history and clinical examination, and then confirmed by computed tomography scan (CT) or magnetic resonance image (MRI) techniques. Proposed risk factors and outcome of stroke were reported for the confirmed cases.

Results: The overall prevalence of stroke was found to be 6.1% (91/1482) among the study population in Dhamar governorate. Of all stroke cases, 76.9 % were ischemic stroke and 23.1% were hemorrhagic stroke. The majority (82.4%) of the stroke patients were improved and discharged with medication. As well, hemorrhagic stroke was significantly associated with higher mortality rate compared to ischemic stroke (52.4% vs. 7.1%, P = 0.001, respectively). The mean age of stroke patients was 66.1 years. Stroke was higher among males than females (63.7% vs. 36.3%, respectively). Other proposed risk factors such as hypertension, smoking, past history of stroke, diabetes mellitus, and family history of stroke were reported in   57.1%, 47.3%, 15.8 %, 11% and 5.5% of the stroke cases, respectively. Khat chewing habit was reported in 74.73 % of the stroke patients.

Conclusion: This study gives a clear description about stroke in Dhamar governorate. However, more inferential studies should be carried out in order to give reasonable accounts regarding this significant public health problem.

Keywords: Stroke, Ischemic Stroke, Hemorrhagic Stroke, Prevalence, Pattern, Dhamar, Yemen

1. Introduction

Stroke is continuing as a major health problem worldwide with higher incidence in the middle and low-income countries including Yemen. In USA, almost 800, 000 new or recurrent cases reported annually [1]. In the Arab world, the prevalence of stroke ranges from 42 and 68 per 100,000 populations [2]. Stroke is classified into two types: ischemic or hemorrhagic. Ischemic stroke is more prevalent than hemorrhagic (intracerebral and subarachnoid) [1].

Many modifiable and non-modifiable risk factors have been reported to associate with stroke. These risk factors include hypertension (HTN) [1, 3], cardiac diseases [4] diabetes mellitus (DM) [5], and hyperlipidemia [6], as well as habits and lifestyle related risks such as smoking [7], alcohol [8], diet, obesity and physical inactivity [1, 9-10]. In addition, age after 55 old [11], gender [12], family history of stroke [13], history of

stroke [14], race [15] and ethnicity [16] are potential predictors. Khat (Catha edulis) leaves, commonly chewed by a large proportion of the population in Yemen and East Africa [17], has been reported as a risk factor for developing stroke [18].

In middle and low-income countries, disability and mortality after stroke remain high (63% and 80%, respectively). These outcomes are higher among those with hemorrhagic stroke (84%) than ischemic stroke (57%). In the last 20 years, incidence of ischemic and hemorrhagic strokes was significantly reduced by 13% and 19 % in high-income countries. However, no important change was seen in middle or low-income countries [1].

In Yemen, little information is available on stroke. Therefore, this study was aimed to give a description about the prevalence and pattern of stroke among Yemeni people living in Dhamar Governorate, Yemen.

2. Methods

A descriptive hospital-based study was carried out in the Internal Medicine Department of Thamar University Al-Wahdah Teaching Hospital (TUWTH), Ma'bar city of Dhamar governorate, Yemen. Maabar city is located about 70 km to the south of Sana'a, the capital city of Yemen. TUWTH serves about half a million people in Dhamar governorate lies 1600 - 3200 m above the sea level. A total of 1482 patients admitted/readmitted to the Internal Medicine Department including Intensive Care Unit were enrolled in this study that was conducted over one year from January to December 2016.

Types of stroke were detected according to brain computed tomography scan (CT) or magnetic resonance image (MRI) results. Patients with head trauma or meningitis were excluded.

In this study, data collected from archive of patients include available demographic, lifestyle, habit and medical history related risk factors. These factors included age, gender, smoking, drug abuse and khat chewing as well as summary of chief complaint, previous history of stroke and family history of stroke, hypertension (blood pressure > 140/90 mm Hg or under antihypertensive drugs) [19] and diabetes mellitus (fasting blood glucose 126 mg/dl, HbA1C > 6.5 and/or under treatment)[20] .

Data was analyzed using statistic package to social sciences (SPSS, version 21). Prevalence of stroke was calculated by dividing number of stroke cases by total of the admitted patients. Distribution of proposed risk factors for stroke cases was descriptively presented as percentages. Continuous variable i.e., age of stroke cases was presented as mean and standard deviation. Association between categorical variables of stroke outcomes was compared using the Chi-square test. P value < 0.05 was considered statistically significant.

3. Results

As shown in Figure 1, prevalence of stroke was found to be 6.1% (91/1482) among patients admitted to the Internal Medicine Department at TUWTH, Ma'bar city, Dhamar governorate.

As shown in Table 1, of all stroke cases, 76.9% (70/91) were ischemic stroke, including transient ischemic attack (TIA), and 23.1% (21/91) were hemorrhagic stroke. Majority (82.4%) of the stroke cases had good outcome. However, 17.6% of the cases had died during hospitalization. Accordingly, the mortality among hemorrhagic stroke cases was significantly (χ2 = 22.81; P < 0.001) higher than ischemic stroke cases (52.2 % vs. 7.1%).
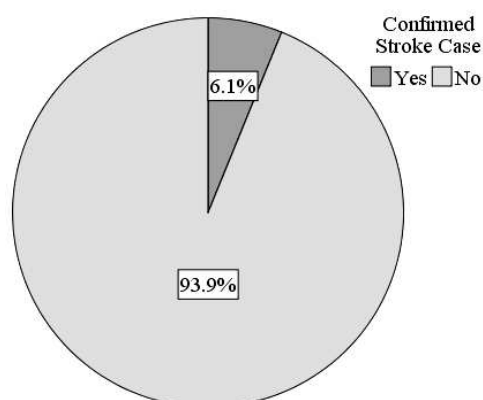

Figure 1: Prevalence of stroke among patients attending TUWTH during 2016 (n = 1482)

Table 1: Outcomes of ischemic and hemorrhagic strokes among the study population (n = 91)

Stroke type	Outcome			P
	Cases n (%)	Improved n (%)	Dead n (%)	
Ischemic	70 (76.9)	65 (92.9)	5 (7.1)	< 0.001
Haemorrhagic	21 (23.1)	10 (47.6)	11(52.4)	
Total	91 (100)	75 (82.4)	16 (17.6)	

Distribution of the proposed risk factors among the stroke cases is descriptively presented in Table 2. It is revealed that the mean ±SD age of the 91 stroke cases was 66.1±14.0 years. Most (63.7%) of the stroke cases were males compared to 36.3% females.

Table 2: Distribution of the proposed risk factors among the stroke cases in Dhamar governorate

Variable	Distribution
Age, mean (± SD)	66.1 (±14.0)
Gender, n (%)	
Male	58 (63.7)
Female	33 (36.3)
Hypertension, n (%)	52 (57.1)
Smoking, n (%)	43 (47.3)
Previous stroke, n (%)	14 (15.4)
Diabetes mellitus, n (%)	10 (11.0)
Family stroke history, n (%)	5 (5.5)
Khat chewing, n (%)	68 (74.8)

Similarly, hypertension was reported in 57.1% of the cases followed by smoking (47.3%) history of previous stroke (15.4%), diabetes mellitus (11.0%) and family stroke history (5.5%). Khat chewing is reported in 74.8% of the stroke patients.

4. Discussion

To the best of our knowledge, this study is the first to present information about prevalence and pattern of stroke among Yemeni people in Dhamar governorate. The findings of the present study agree and conflict with some studies conducted in middle and low-income countries including Yemen. In this hospital-based study, stroke prevalence of 6.1% was reported. This finding is somewhat higher than those reported in Saudi Arabia (4.4%), Korea (4.5%) and Thailand (2.7%) among older adults aged 65 years and above [21-23]. However, it was slightly lower than those reported in USA (8.3%) and Singapore (7.6%) [24-25].

In this study, ischemic stroke (including TIA) was revealed as the most common type of strokes compared to hemorrhagic stroke (76.9% vs. 23.1%). This result was in consistent with several studies conducted in other Yemeni areas and regional countries [26-29]. However, this proportion of ischemic strokes was considered higher compared to that reported in Ethiopia and Al-Bahrain [30-31], where the ischemic stroke against the hemorrhagic stroke rate has been reported to be 50.3% vs. 49.7% and 53% vs.30%, respectively.

Regarding the outcome of the stroke, this study showed that 82.4% of cases had good outcome. On the other hand, 17.6% of the cases had died during hospitalization. Although, the mortality rate of stroke in the present study was lower compared to that reported in Sana'a (24.2 %) [26], it was nearly comparable with that reported in Ethiopia (14.7 %) [30]. In addition, the study showed that the proportion of mortality among hemorrhagic stroke cases was significantly higher than an ischemic stroke (52.4 % vs. 7.1%, $P < 0.001$). This finding was higher compared to that reported in Sana'a (28.8%) [26], and in Ethiopia (23.5%) [30]. On the other hand, although the proportion of mortality among the ischemic stroke cases reported by this study was lower compared to that reported in Sana'a (19.7%) [26], it was nearly comparable with that reported in Ethiopia (6.1%) [30].

The mean age of stroke cases reported in this present study (66.1±14 years) has a number of similarities and variations with the results of studies reported in Iran (69.6 years) [32], Jordan (61.2 years) [33], Bahrain (60.0 years) [31], the capital city of Yemen (59.6 years) [26] as well as Pakistan (56.0 years) [34] and Ethiopia (53.1 years) [30].

Regarding gender related risk, this study showed that the males had higher proportion of stroke compared to females (63.7% vs. 36.3). This result was comparable with those reported in other areas of the country, Sana'a (62.6% vs. 37.4%) and Hadhramout (56.5% vs. 43.5%)

[26, 35], as well as with those reported in Jordan [33] (62.0% vs. 38.0) and Ethiopia (66.3% vs. 33.7%) [30]. Other proposed risk factors such as hypertension, smoking, past history of stroke, diabetes mellitus, and family history of stroke were reported in 57.1%, 47.3%, 15.8 %, 11% and 5.5% of the stroke cases, respectively. These results agreed and conflicted with previous studies conducted in Yemen and other regional Asian and African countries [26-31, 36-38]. Regarding khat chewing, a popular habit in Yemen, 74.7% of the stroke cases was reported with this habit. This result could reflect an increase in the khat chewing among the population in Dhamar governorate.

In general, the design of the present study on the proposed risk factors was descriptive. Such design is unable to give reasonable conclusions about the association of these factors with stroke. However, the proportions of these factors, presented by this study, could give preliminary ideas about their burden among the stroke cases.

5. Conclusion

Stroke is still one of the major medical problems in Yemen. The prevalence of stroke is estimated to be 6.1% in Dhamar governorate with high incidence among old age people. Ischemic stroke is more prevalent than hemorrhagic stroke. Significant high mortality is reported among hemorrhagic stroke cases. Proposed risk factors of stroke such as age, gender, hypertension, and smoking, history of stroke, diabetes mellitus, and family history of stroke as well as khat chewing are descriptively presented by this study. Further well-designed studies are recommended in order to give rational inferences about the association of potential risk factors with stroke.

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