

## Is Knowledge of Type 2 Diabetic Patients about Stroke Acceptable- a Cross Sectional Study

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### Abstract

**Objective:** The relative stroke risk is increased in patients with diabetes. Awareness and knowledge of the risk factors and symptoms of stroke are essential for prevention and immediate effective treatment of stroke. The aim of the study was to determine baseline knowledge about the warning symptoms and risk factors of stroke in patients with type 2 diabetes (T2DM).

**Materials and Methods:** This analytical cross-sectional study was conducted in Yazd-Iran 2015-2016. The pilot section included 10 T2DM patients. The main data was collected from 281 patients. The self-conducted checklist about knowledge of stroke risk factors, warning signs as defined by national institute of neurological disorder and stroke was prepared in three following parts. 1) Socio-demographic information. 2) Open-ended question about stroke risk factors, warning sign & symptoms and first action information. 3) Multiple choice questions related to the stroke risk factors, warning sign & symptoms and first action information.

**Results:** 408 T2DM patients were invited and 281 patients fulfilled in study. Most of them (70.4%) were women. The mean age of patients was 54.09±12.54 years. The most common general risk factors of stroke listed were "high blood pressure (92.9%), unhealthy diet" (86.8%), and "stress" (82.2%). The most common sources of stroke information were friends and family members (73.7%).

**Conclusion:** Education program to increase T2DM knowledge of stroke may contribute to reducing the risk of stroke and increasing the speed of hospital presentation after the onset of stroke.

**Keywords:** Type 2 diabetes, Stroke, Knowledge, Risk factors

## Introduction

Stroke is one of the leading causes of morbidity and mortality throughout the world (1-8). In two past decades the

annual stroke incidence in Iran ranged from 23 to 103 per 100,000 people (4).

In the global Burden of diseases, injuries and risk factors study (GBD 2010), the stroke was

second cause of death and third cause of disability adjusted life years (DALY's) worldwide in 2010 and 2015. The age-standardized stroke incidence per/100000 person years for 2010 was estimated 251.9-336.3. Also the age standardized stroke mortality was estimated 85.2-103/100000 people for 2010.

Although the risk of stroke increases with age, it is not a disease of old age alone. One quarter of all strokes occurring in persons younger than 65 years (8). The relative stroke risk is increased by 1.8 to 6 fold in patients with diabetes (9). The risk of stroke in people with type 2 diabetes (T2DM) within five years of beginning treatment is doubled in comparison with general population (5). Awareness and knowledge of the risk factors and warning symptoms of stroke in the general population are essential for prevention and immediate effective treatment of stroke.

Previous studies showed 18-94% respondents were able to name one risk factor of stroke. Between 25-75% were able to name at least one stroke symptom. About first action people would take if they thought they were having stroke, between 53% and 98% replied "call the EMS". People generally obtained information about stroke from family and friends (6).

Studies have reported that Different sources of information, such as mass media, friends and family, or medical professionals are used by people. Mass media was most frequently named as a source of information about stroke risk factors (7). Diabetes is the strongest risk factor for death from stroke among both men and women (3). Knowledge about the complications of diabetes such as heart attack, stroke, eye and foot complications was less than 50%, an about Stroke was 30% (10). About 24% identified diabetes, and 26% recalled, doctor told that diabetes was a risk factor for stroke (2).

The main aim of the study was to determine baseline knowledge about the warning symptoms, risk factors and treatment options available for stroke in patients with diabetes.

## Materials and Methods

This is an analytical cross-sectional study to assess awareness of stroke in T2DM patients in Yazd- Iran 2015-2016. The study was carried out in two parts (pilot and main).

The self- conducted checklist about knowledge of stroke risk factors, warning signs as defined by national institute of neurological disorder and stroke was prepared in three following parts. 1) Socio-demographic information (age, sex, marital status, education, medication type, Past medical history and socioeconomic). 2) Open-ended question about stroke risk factors, warning sign & symptoms and first action information. 3) Multiple choice questions related to the stroke risk factors, warning sign & symptoms and first action information.

### 2.1. Stroke risk factors:

These part included; hypertension, smoking, diabetes, prior stroke, heavy alcohol consumption, hyperlipidemia, past history of cardiovascular disease, physical inactivity, diet (poor eating), stress and obesity.

### 2.2. Stroke warning signs:

Knowledge of warning signs stroke included : sudden numbness(any, one side), weakness or heaviness of the face, arms and legs(any, one side), slurred speech or difficulty in speaking or understanding, vision problem (double vision), dizziness or loss of balance and coordination, difficulty swallowing and headache.

This study was registered as a research proposal in Shahid Sadoughi University of medical sciences by (sr.ssu.ac.ir:3138) code.

### 2.3. Sources of information:

The sources of information about the risk factors and warning symptoms of stroke were determined by individual responses to leading questions related to potential sources, which included the following: television, radio, newspapers/magazines, physician, family member or friends, and books, educational CD, training classes on Diabetes Center.

### 2.4. First action:

Action by individuals after stroke symptoms occurrence determined by individual responses to leading questions related to potential

sources, which included the following: drugs, call with family members, certified physician or emergency, unthinking.

The pilot section included 10 T2DM patients. Then the data was collected from 281 patients with diabetes referred to Yazd Diabetes Research Center (Yazd, Iran).

### Data analysis

Descriptive and comparative statistical analyses were performed with the use of the statistical program SPSS version 20. Categorical variables are reported as frequency and percent. Bivariate analyses were performed using T-test. Multivariate analyses were performed using ANOVA. Interval variables are reported as means  $\pm$  SD.

### Results

A total of 408 diabetic patients were invited and 281 patients with diabetes fulfilled in our study. Table 1 shows the patients demographic characteristics and medical history. Most of the participants (70.4%) were women. The mean age of patients was  $54.09 \pm 12.54$  years (24-78 years).

The most common general risk factors of stroke listed by respondents were “unhealthy diet” identified by 244 respondents (86.8%); and “stress” characterized by 231 respondents (82.2%) (Table 2).

The most common sources of stroke information reported by respondents were friends and family members 207 (73.7%) rather than mass media 118 (42%), physicians 70 (24.9%), personal experience 6 (2.1%) and internet 3 (1.1%).

There were no statistical significances between participant's total knowledge score in genders ( $P$ -value: 0.88), marital status ( $P$ -value: 0.47), job ( $p$ -value: 0.4), income ( $P$ -value: 0.55), education ( $P$ -value: 0.09) and history of HTN (0.87), stroke (0.51), CAD (0.86), HLP (0.65). Tables 3-5 show Respondents Knowledge of stroke warning signs, first reaction and treatment. The multilevel logistics regression model result was in table 6.

**Table 1. Demographic, socio-economic and past medical history of the respondents**

| Variable                     | Frequency (%)     |
|------------------------------|-------------------|
| Age (Mean $\pm$ SD)          | 54.09 $\pm$ 12.54 |
| Sex                          |                   |
| Male                         | 83 (29.6)         |
| Female                       | 197 (70.4)        |
| Marital status               |                   |
| Single                       | 4 (1.4)           |
| Married                      | 277 (98.6)        |
| Education                    |                   |
| Illiterate                   | 64 (22.9)         |
| Primary                      | 98 (35)           |
| Secondary                    | 97 (34.7)         |
| Under graduated              | 21 (7.5)          |
| Job                          |                   |
| Yes                          | 39 (14.7)         |
| No                           | 225 (84.6)        |
| Income                       |                   |
| No income                    | 39 (14.7)         |
| <6000000 Rial                | 93 (35)           |
| 6000000-12000000 Rial        | 134 (50.4)        |
| Type of medication           |                   |
| Life style modification      | 32 (11.4)         |
| Oral medication              | 123 (43.8)        |
| Insulin                      | 101 (35.9)        |
| Oral medication plus insulin | 25 (8.9)          |
| Hypertension history         |                   |
| Yes                          | 147 (55.3)        |
| No                           | 119 (44.7)        |
| Stroke history               |                   |
| Yes                          | 10 (3.6)          |
| No                           | 256 (91.1)        |
| Hyperlipidemia history       |                   |
| Yes                          | 102 (38.4)        |
| No                           | 164 (61.7)        |
| Cardiac disease history      |                   |
| Yes                          | 71 (26.7)         |
| No                           | 195 (73.3)        |
| Smoking                      |                   |
| Never                        | 255 (90.7)        |
| Smoker                       | 16 (5.7)          |
| Ex- smoker                   | 10 (3.6)          |

### Discussion

Identification of the major risk factors of stroke and its clinical presentation has a direct implication on the prevention and rapid intervention for a stroke patient with the possible therapeutic measures. The present study showed that the T2DM patients have very poor knowledge or awareness about the risk factors and warning symptoms of stroke. Also, this poor knowledge varied among the subjects according to their level of education, gender, age and income. Some people in the general population and patients could easily identify hypertension and sedentary lifestyle as

**Table 2. Respondents Knowledge of Stroke risk factors**

| Questions                | Frequency (%) |
|--------------------------|---------------|
| Family history(genetics) | 111 (39.5)    |
| Obesity                  | 223 (79.4)    |
| Cold whether             | 238 (84.7)    |
| Smoking                  | 221 (78.6)    |
| Old age                  | 175 (62.3)    |
| Contraceptive pill       | 34 (12.8)     |
| unhealthy diet           | 244 (86.8)    |
| Lack of exercise         | 62 (22.1)     |
| Alcohol                  | 180 (64.1)    |
| Stress                   | 231 (82.2)    |
| High blood pressure      | 261 (92.9)    |
| High cholesterol         | 239 (85.1)    |
| Diabetes                 | 201 (71.5)    |
| CAD                      | 196 (69.8)    |
| Valvular cardiac disease | 133 (47.3)    |
| Past history of stroke   | 247 (87.9)    |

**Table 3. Respondents Knowledge of stroke warning signs**

| Questions                   | Frequency (%) |
|-----------------------------|---------------|
| Paralysis (one side)        | 245 (87.2)    |
| Paralysis (any part)        | 246 (87.5)    |
| Disorder in swallow         | 156 (55.5)    |
| Sudden death                | 207 (77.8)    |
| Disorder in speaking        | 219 (77.9)    |
| Syncope                     | 187 (66.5)    |
| Unbalance in walking        | 249 (88.6)    |
| Vertigo                     | 159 (56.6)    |
| Chest pain                  | 165 (58.7)    |
| Disorder in vision          | 153 (54.4)    |
| Difficulty in understanding | 239 (85.1)    |
| Headache                    | 151 (56.8)    |

**Table 4. Respondents first reaction to stroke**

| Questions                   | Frequency (%) |
|-----------------------------|---------------|
| Medicine consumption        | 278 (98.9)    |
| Call an emergency           | 281 (100)     |
| Call family or friends      | 281 (100)     |
| Herbal medicine consumption | 281 (100)     |
| Do not know                 | 280 (99.6)    |

**Table 5. Respondents Knowledge of stroke treatment**

| Questions                 | Frequency (%) |
|---------------------------|---------------|
| Aspirin                   | 172 (61.2)    |
| Anticoagulation drugs     | 135 (48)      |
| Surgery                   | 39 (13.9)     |
| Hyperlipidemia control    | 236 (84)      |
| Hypertension control      | 258 (91.8)    |
| Physiotherapy             | 183 (85.1)    |
| Diabetes mellitus control | 201 (71.5)    |
| Life style modification   | 259 (92.2)    |

risk factors for stroke, but had little idea about other risk factors.

In our study, three most common stroke risk factors which were selected by diabetic

patients were hypertension, past stroke history and unhealthy diet but aging as the first and most important risk factor was recognized as 12th risk factor in our study. About 22% of participants named the sedentary life style and lack of exercise as the stroke risk factor. But the cold weather which is not the stroke risk factor was named as 5th and the stress as other unknown risk factor was ranked as 6th important stroke risk factors. In pilot phase of study, the cold weather and stress were named as stroke risk factors which were added to questions. Most of the studies conducted on health literacy were population-based and less frequent among diabetic patients. Our findings showed that diabetic patients do not know diabetes as the important stroke risk factors. In this study, high blood pressure was the most frequently identified risk factor; in a study conducted in Shiraz, most of the participants referred to one of the clinics in this city, the most important risk factor for stroke was high blood pressure, as in the present study (11). Population-based studies in South Korea (12) and Hong Kong (13) also reported that high blood pressure was the most frequently identified risk factor of stroke. Amongst the close relatives of stroke victims in Bangladesh, stress was the most frequent risk factor for stroke (14).

Knowledge of and attitude towards stroke were significantly associated with age, level of education and gender. These were expected findings because with increasing age and level of education the level of knowledge increases. These findings are consistent with previous studies (13,15-19). In a study conducted in Shiraz, knowledge of and attitude towards stroke were significantly associated with income and level of education (11). In the present study, calling emergency services was the most common reaction reported by respondents to a suspected stroke, which suggests knowledge of a sense of urgency in seeking treatment; like the study done by Metias et al (20).

In our study, we found a gap between the lifestyle and knowledge about risk factors.

**Table 6. The significant predictors of knowing at least one risk factor or stroke sign in logistic regression**

| Factors             | Odd's ratio | Standard error of mean(SEM) | P-value |
|---------------------|-------------|-----------------------------|---------|
| <b>Risk factors</b> |             |                             |         |
| Age                 | 1.03        | 0.013                       | 0.045   |
| Gender (female)     | 2.23        | 0.358                       | 0.025   |
| Education           | 1.29        | 0.099                       | 0.009   |
| Income              | 2.45        | 0.24                        | 0.034   |
| <b>Stroke sign</b>  |             |                             |         |
| Age                 | 1.03        | 0.013                       | 0.019   |
| Education           | 1.33        | 0.094                       | 0.002   |

According to the cohort study conducted by Jeerakathil T et al. they found that patients newly treated for type 2 diabetes were at a substantially elevated short- term risk for stroke compared with individuals in the general population, with an almost 10% absolute risk within 5 years.(5). It is important in this regard that the subjects involved in the study are those with diabetes who are at one of the risk factors for stroke (21) and, to this extent, their level of knowledge about stroke is low. In an efficacy study by Stern et al. (22), it was shown that the information on stroke can be successfully increased by using media including television, magazines and newspapers as well as family and friends followed by health professionals and educational campaigns. Better knowledge of stroke symptoms was predicted by having received information on stroke at an earlier stage. Thus, educational efforts are needed to increase awareness of stroke symptoms, but information must be tailored to the audience. Mass media campaigns have shown to improve knowledge of warning signs of stroke, but may be less effective in those 65 years of age or older (23).

## Conclusions

The study found that information about diabetic patients about stroke is incomplete

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and is sometimes blended with folk illustrations. Interestingly, the level of education did not affect this information, as well as those who received the most information from their friends and relatives. It is estimated that our education system is improving the health literacy of children and adolescents. In the context of this disease, our media and health workers also play a smaller role than those around them. Surely, if our education system, our media and active health professionals are active in this field, they will eliminate misconceptions about insults and will be better off for the prevention and treatment of this disease.

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## Conflict of Interest

No conflict of interest was declared.



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