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# Assessment of hypertensive patients' knowledge about lifestyle risk factors and warning signs of stroke

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**Background** Stroke is one of the leading causes of death globally. Awareness of stroke modifiable risk factors and warning signs are important for stroke prevention.
**Objectives** To assess hypertensive patients' knowledge regarding lifestyle risk factors and warning signs of stroke.
**Method** A descriptive study was conducted on 114 hypertension patients who attended chronic disease center in Sulaimani city. The study was carried out for the period of February to April 2015. A questionnaire has been used to collect relative data about patients' characteristics and knowledge regarding lifestyle risk factors and warning signs of stroke. Data were analysed through SPSS 20, and descriptive statistics (frequency, percentage and mean) and inferential statistics (*F*-test and *t*-test), the figure of $p > 0.05$ was considered as the statistical significant.
**Result** Patients' knowledge regarding stroke lifestyle risk factors and stroke warning signs were low of 55.3 and 76.3% respectively. Physical inactivity has lower (17.5) percentage among lifestyle risk factors. The patients' knowledge was influenced by patients' age, gender, education levels and duration of hypertension ($p > 0.05$).
**Conclusions** Hypertensive patients complained from lack of knowledge regarding stroke lifestyle risk factors and warning signs. Physical inactivity was less identified risk factors. Young, female, high level of education and longer duration of disease tended to have higher knowledge.
**Recommendations** Our study results recommended that there was a need to bring high risk group awareness about stroke risk factors and warning signs, particularly to the population with hypertension.
**Keywords** hypertensive, knowledge, lifestyle, warning signs, stroke

## Introduction

Stroke is one of the leading causes of death globally and is a major cause of disability worldwide.[1] Stroke is a preventable and treatable disease through the control of modifiable risk factors and the early recognition of stroke warning symptoms respectively.[2] According to the third national mortality retrospective sampling survey in Iraq, stroke disease has become the 2nd leading cause of death in Iraq and is responsible for 11.3% of all deaths.[3] The percentage of stroke among individuals in the Kurdish population is around 19%, especially among hypertensive and older aged patients.[4] In Kurdistan region, more than half (58.8%) of the hypertensive patients were uncontrolled. The factors associated with uncontrolled hypertension were smoking, lack of exercise and irregularity of treatment.[5]

A known modifiable risk factors of stroke include physiological and lifestyle risks.[6] Importantly, modifiable risk factors linked to lifestyle, such as smoking, physical inactivity, obesity, unhealthy diet and high alcohol consumption, were among the most prevalent unfavourable behavioural patterns may promotes the development of well-documented physiological risk factors such as arterial hypertension, diabetes mellitus, or hyperlipidemia, and ultimately lead to atherosclerosis and ischemic stroke.[7]

People with hypertension are at increased risk for experiencing a stroke; effective stroke prevention programme should be focused to improve the high risk group awareness about the early warning symptoms of stroke and modifiable risk factors.[8] Hence, there was a need to study the knowledge and level of awareness among the high risk group such as hypertensive regarding warning signs, and modifiable risk factors to prevent occurrence or at least detect it early.[9] Another important component of successful stroke prevention is improvement of public knowledge about stroke.[10] In addition lack of knowledge may lead to unhealthy lifestyle behaviours, which are a major problem because healthy lifestyle behaviours are associated with a lower risk of stroke. Therefore, it is important to learn more about stroke knowledge and health behaviours among hypertensive patients.[11]

## Objectives of the Study

The aims of this study were:

- To assess the level of hypertensive patients' knowledge regarding the influence of life style risk (low physical activity, unhealthy diet, obesity, smoking and alcohol intake) and stroke warning signs.
- To find out association between knowledge and patients characteristics such as age, gender, level of education, financial status, BMI and duration of hypertension.

## Materials and Methods

With the use of a descriptive design, 114 hypertensive patients were recruited from chronic diseases center in Sulaimani city (is the only center in Sulaimani city which provide medications for patients with chronic disease free). The study was carried out for the period of February to April 2015. The exclusion criteria were patients with history of stroke; health care professional and unwilling to participate in the study. The patients were informed that participation is voluntary. They were also informed of the confidentiality of their participation. Before administering the questionnaire, researcher

stressed to patients that participation or lack of participation in the study would not influence care (medications) received.

The study used purposive (non-probability) sampling technique to select sample. The data were collected during the patients' visit to the center in order to receive medications. The study was approved by ethics committee in college of nursing, university of Sulaimani.

The stroke knowledge instrument used in our study was a questionnaire, which was prepared after a comprehensive research of relevant literatures and references,[1,6–8,10–18] pre-tested and modified in terms of questions clarity and cultural adaptation by experts. The questionnaire was administered to ten hypertensive patients for evaluating test retest reliability. Questionnaire consisted of three sections. The first section included eight items to provide information about the demographic and clinical characteristics of the respondents (age, gender, level of education, financial status, BMI, duration of hypertension, smoking, and alcohol intake). Second section included five items to determine the knowledge regarding lifestyle risk factors (physical inactivity, obesity, unhealthy diet, smoking, and unhealthy use of alcohol). The third section included five items to determine the knowledge with regard stroke warning signs. The questionnaire was used close-ended questions to assess patient knowledge in 2nd and 3rd sections, with a 'yes' response indicating that the patient is knowledgeable and 'no' is not knowledgeable. One point was given for each 'yes' answer and zero for each 'no' answer.

Knowledge scores were categorised for each section as follows: low knowledge identify (≤2) risk factors or warning symptoms, moderate knowledge (3) and high knowledge (≥4).[14]

## Data Analysis

The data were analysed with SPSS 20. Socio-demographic, clinical characteristics and level of knowledge were analysed using frequencies and percentage. Patients' stroke prevention knowledge (which includes stroke lifestyle risk factors and warning signs) were analysed using percentage of means. *F*-test and *t*-test were used to explore the relationship between stroke prevention knowledge and patients' characteristics and the figure of $p > 0.05$ was considered as the statistical significant.

## Results

A total of 130 hypertensive patients were proposed to be included in the study, 114 patients were eligible and agreed to participate, giving a response rate of 87.7%.

Table 1 shows the demographic and some clinical characteristics of the study participants. Participants' mean age was (58.4 ± 14.2) years, the age more than 77% was between 45 and 65 years. Of the respondents, 58.8% were male, 45.7% had low education (illiterate or primary school), and 43% with self-reported insufficient financial status. Most of the patients were insufficient or barely sufficient financially and had received a low or moderate level of education.

The mean BMI of the study population was 28.6 ± 5.1 kg/m$^2$. The percentage of normal body weight was 20.2; while 36.8% were found to be obese and remaining were overweight according to their calculated BMI. Approximately more than half 50.9% of participant indicated that they smoked and 8.8% reported that they drink alcohol. Regarding duration of their hypertension, 43% of them had it for less than 1 year, 31.6% was between 1 and 3 years and other one-fourth were more than 3 years.

The main finding of present study presented in Figs. 1, 2 show respondents' knowledge about lifestyle risk factors and stroke warning signs. The patients' knowledge about lifestyle stroke risk factors was low knowledge for 53.5%, moderate knowledge for 36% and only 10.5% of participant had high knowledge. Knowledge regarding stroke warning signs was lower, it was low knowledge for 75.4%, moderate knowledge for 20.2% and high knowledge for 4.4%.

Lifestyle risk factors and stroke warning signs are shown in Table 2. The mean of knowledge for the total stroke life risk

Table 1. **Socio-demographic and clinical characteristics of study**

| Characteristics | Frequency | % |
|---|---|---|
| **Age groups** | | |
| <45 years | 6 | 5.3 |
| 45–65 years | 88 | 77.2 |
| >65 years | 20 | 17.5 |
| Mean ± STD | 58.4 ± 14.2 | |
| **Gender** | | |
| Female | 47 | 41.2 |
| Male | 67 | 58.8 |
| **Levels of education** | | |
| High | 20 | 17.5 |
| Medium | 42 | 36.8 |
| Low | 52 | 45.7 |
| **Smoking** | | |
| No | 56 | 49.1 |
| Yes | 58 | 50.9 |
| Total | 114 | 100 |
| **Body mass index** | | |
| Normal | 23 | 20.2 |
| Over-weight | 49 | 43.0 |
| Obese | 42 | 36.8 |
| Mean ± STD | 28.6 ± 5.1 | |
| **Financial status** | | |
| Sufficient | 28 | 24.6 |
| Barely sufficient | 37 | 32.5 |
| Insufficient | 49 | 43.0 |
| **Duration of disease/year** | | |
| <1 | 49 | 43.0 |
| 1–3 | 36 | 31.6 |
| >3 | 29 | 25.4 |
| **Alcohol intake** | | |
| No | 104 | 91.2 |
| Yes | 10 | 8.8 |
| Total | 114 | 100 |

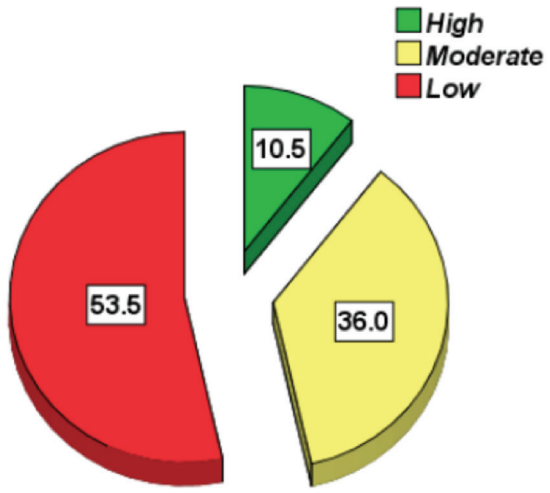


Fig. 1 **Percentage of knowledge levels regarding stroke lifestyle risk factors.**

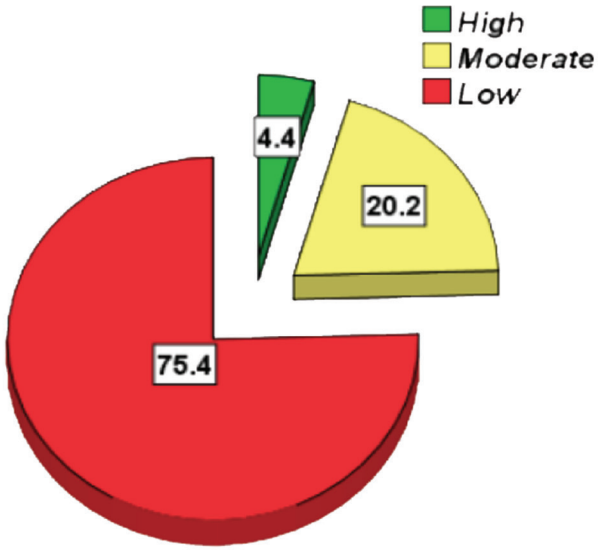


Fig. 2 **Percentage of knowledge levels regarding stroke warning signs.**

factors was 36.3 ± 22.7 (low knowledge). Of patients, 17.5% only identified physical inactivity as stroke risk factors, followed by obesity and smoking and tobacco use was 39.5%, excessive alcohol intake came third was 42.1%, and unhealthy diet had greatest percentage among lifestyle stroke risk factor was 43%.

The mean knowledge for total stroke warning signs was 27.3 ± 26.3 it was low knowledge. The most common stroke warning signs indicated by participants were 'sudden numbness or weakness of the face, arm, or leg' 29.8%, followed by 'sudden confusion, trouble speaking or understanding others' 28.9%, then 'severe headache with no known cause' 23.7%, 'sudden trouble seeing in one or both eyes' 22.8% and 'sudden dizziness, trouble walking, loss of balance or coordination' 20.2%.

More than 25% of participants did not identified any stroke lifestyle risk factor, 17.5% recognise one risk factors, (18.4%) identified two risk factors followed by (28.07%) identified three risks, 9.7% identified four risks and all risks were identified by <1%, as showed in Fig. 3.

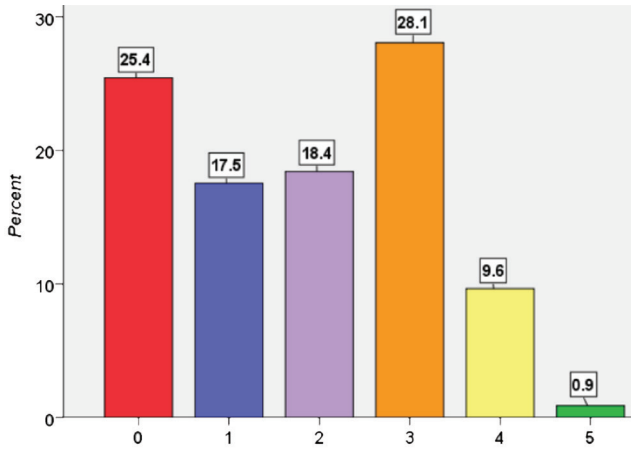


Fig. 3 **Number and percentage of identified stroke lifestyle risk factors.**

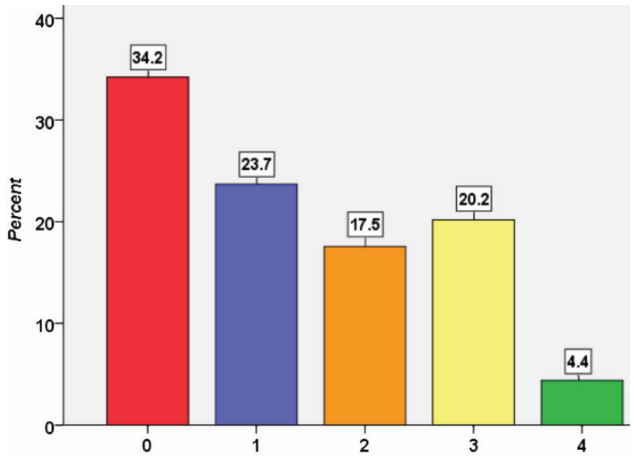


Fig. 4 **Number and percentage of identified stroke warning signs.**

The identified stroke warning signs by the participant in present study were lower than identified lifestyle risk factors, 34.2% did not recognised any warning sign, 22.7% identified one warning sign, two signs were identified by 17.5%, followed three signs by 20.2%, four warning signs were recognised by 4.4% only, and no participants had knowledge to recognise all warning signs as illustrated by in Fig. 4.

Table 3 shows the results of the association of participants' characteristics with stroke risk factors and stroke warning signs. There were significant association between age, gender and education with knowledge regarding stroke risk factors and warning signs, younger patients, female and more educated had more correct answer, while the duration of disease was associated to risk factors, but not to warning signs knowledge ($p < 0.05$). Association was not found between financial status and BMI with any kind of knowledge ($p > 0.05$).

## Discussion

Identification of the major lifestyle risk factors of stroke and its warning signs have a direct implication for the prevention of stroke with the possible therapeutic measures in high risk group such as hypertensive patients. This descriptive study found that hypertensive patients lacked stroke prevention knowledge which includes stroke lifestyle risk factors and

Table 2. **Frequencies and percentage of participants' positive responses to stroke risk factors and warning signs**

| Categories | Frequency | % |
|---|---|---|
| **Lifestyle stork risk factors** | | |
| Physical inactivity | 20 | 17.5 |
| Obesity | 45 | 39.5 |
| Unhealthy diet | 49 | 43 |
| Smoking and tobacco use | 45 | 39.5 |
| Excessive intake of alcohol | 48 | 42.1 |
| Total (mean ± STD) | 36.3 ± 22.7 | |
| **Stroke warning signs** | | |
| Sudden confusion, trouble speaking or understanding others | 33 | 28.9 |
| Sudden numbness or weakness of the face, arm, or leg | 34 | 29.8 |
| Sudden dizziness, trouble walking, loss of balance or coordination | 23 | 20.2 |
| Severe headache with no known cause | 27 | 23.7 |
| Sudden trouble seeing in one or both eyes | 26 | 22.8 |
| Total (mean ± STD) | 27.3 ± 26.3 | |

Table 3. **Association between stroke risk factors, warning signs knowledge with respondents' characteristics**

| Characteristics | Risk factors knowledge | | Warning signs knowledge | |
|---|---|---|---|---|
| | Mean | STD | Mean | STD |
| **Age groups/year** | | | | |
| <45 | 73.3 | 20.7 | 56.7 | 19.7 |
| 45–65 | 33.6 | 26.2 | 25 | 23.3 |
| >65 | 37 | 29.2 | 29 | 28.7 |
| *F* (*p*-value) | 4.3 (0.007) | | 3.2 (0.026) | |
| **Gender** | | | | |
| Female | 40.6 | 27.6 | 30.8 | 27.3 |
| Male | 30.2 | 26.9 | 22.6 | 21.5 |
| *t*-test (*p*-value) | 2.08 (0.045) | | 1.97 (0.049) | |
| **Level of education** | | | | |
| High | 54 | 22.6 | 48 | 26.3 |
| Medium | 44.8 | 26.1 | 41 | 19.2 |
| Low | 22.7 | 24.4 | 8.5 | 13.3 |
| *F* (*p*-value) | 10.4 (0.0001) | | 34.8 (0.0001) | |
| **Financial status** | | | | |
| Sufficient | 40.7 | 25.2 | 30 | 23.4 |
| Barely sufficient | 34.6 | 25.7 | 23.8 | 27.4 |
| Insufficient | 35.1 | 30.7 | 28.6 | 24.8 |
| *F* (*p*-value) | 0.33 (0.8) | | 0.39 (0.76) | |
| **Body mass index** | | | | |
| Normal | 41.7 | 23.3 | 27.8 | 28.1 |
| Overweight | 35.1 | 28.7 | 29 | 24.9 |
| Obese | 34.8 | 29 | 25.2 | 24.6 |
| *F* (*p*-value) | 0.39 (0.76) | | 0.17 (0.92) | |
| **Duration of hypertension/year** | | | | |
| <1 year | 28.6 | 25.8 | 22.9 | 24.2 |
| 1–3 years | 37.2 | 27.5 | 28.3 | 25.9 |
| >3 years | 48.3 | 27.5 | 33.8 | 25.7 |
| *F* (*p*-value) | 3.35 (0.022) | | 1.19 (0.32) | |

warning signs. More than half of the respondents had low knowledge; more than one-fourth were not aware of any established lifestyle stroke risk factors. About one-ten (10.5%) of subjects had high knowledge and were aware of four risk factors and more; the percentage of participants who identified all lifestyle risk factors was less than one. The respondents' knowledge regarding established stroke risk factors was better than that for the warning signs of stroke, more than three-quarter of participants' knowledge were low in identifying stroke warning signs, and more than one-third were unable to identify any warning signs. Few (4.4%) of them had high knowledge or were able to list four warning signs.

Our finding was lower than Pakistani study result which reported 86.9% of the participants correctly stated at least one of stroke risk factors, 70.2% knew at least two and 53% knew at least three. Furthermore it was lower than the reported by an Australia study, 76.2% respondents correctly listed ≤1 established stroke risk factor, but only 49.8% respondents correctly listed ≤1 warning sign.[16]

'Unhealthy diet' was the most common and physical inactivity was less common identified risk factors of stroke in this study. It is of interest that only few 17.5% of respondents identified 'physical inactivity' as a risk factor for stroke. A very worrisome finding in the current study was the respondents' low knowledge of some stroke risk factors like physical inactivity and stroke warning signs. This may reflect that the health care professional focused on diet, stopping alcohol intake, smoking cession and reduce weight, while they ignored role of physical activity in controlling hypertension, and preventing stroke. This result agreed with the finding of a China study which reported most of the participants knew that hypertensive patients should eat foods that are low in sodium, quit smoking, and reduce alcohol consumption.[11]

The commonest stroke warning sign recognised by the patients were 'confusion or trouble speaking or understanding others' 34%, followed by 'numbness or weakness of the face, arm, or leg' 33%, and 'severe headache with no known cause' 27%. These figures were similar to finding of Kuwaiti study, which reported the 'confusion, problem in speaking and understanding' 36.4% followed by 'weakness of arm and leg' 34.7% as a most warning sign identified. The most common warning sign identified by the people in Pakistani study was weakness of one or both sides of the face or body 71.4% followed by numbness of one or both sides of the face or body 60.6%.[15] While an Iranian study considered smoking as the most identified lifestyle risk factor, and most common warning sign as a pain.[17] Furthermore the most identified risk was smoking and 'blurred and double vision or loss of vision in an eye' was most established warning signs in an Australian study,[16] and 62% of participants in study conducted in India described paralysis of one side of the body as the most common warning signs of stroke.[19]

We found a positive relationship between stroke prevention knowledge and patients' characteristics indicating that the

young, female, higher educated and longer duration of hypertension had better knowledge regarding stroke lifestyle risk factors and warning signs, while the knowledge not influenced neither by financial status nor BMI. Low level of education and old age may lead to limited interaction with society and therefore to less interest in following medical developments, and thereby resulting in a low level of health care knowledge about stroke. Previously, better stroke knowledge was observed in women compared with men in the majority of the studies although there is a general lack of knowledge in both genders. Four out of 18 studies reported better risk factor knowledge and eight out of 15 studies reported better knowledge in stroke warning signs in women compared with men. Women tended to know more evidence-based stroke risk factors than men.[1]

These findings are consistent with previous studies; Pakistani study found strong association between intermediate-and-above level of education and younger age group with their correct identification of stroke risk factors. Same findings reported by other study conducted in India.[19] Furthermore Iranian study reported that knowledge and attitude towards stroke were significantly associated with age and level of education. Other study stated that one in five respondents were not aware of any stroke risk factors, and almost one in three was not aware of any stroke warning signs. Stroke knowledge was poorest among groups that have the highest risk of stroke.[17]

The results of our study have contributed to the understanding of strokes' lifestyle risk factor and stroke warning signs in at-risk individuals. The current findings and mentioned previous studies conducted in several countries may signify that the lack of awareness about stroke among the general public and high risk groups is a worldwide problem. One implication of our results was the importance of increasing public awareness about stroke and stroke prevention, particularly in the at-risk population. These findings have significant implications for clinical practice. It was important for nurses to pay more attention to patients' knowledge concerning physical activity and stroke warning signs, so that they can assist patients to gain knowledge and engage in behaviours that could help patients prevent stroke.

## Conclusions

Depending on our findings we concluded that knowledge regarding lifestyle risk factors and warning signs was low among hypertensive patient. Majority of participants were unable to identify more than a single risk factor and recognise more than one stroke warning sign. Physical inactivity was less identified risk factor and recognisation of warning signs was below one third. Been young, female, high educated and long duration of hypertension possess more knowledge, while financial status and BMI had no effect on patients' knowledge.

## Recommendations

The present findings emphasise the need for effective stroke education efforts in particular regarding physical inactivity and stroke warning signs. We believed that the use of public media and school education will probably change the level of the population's knowledge towards stroke. Male hypertensive patients and those with a lower education level need targeted stroke education. Considerable emphasis should therefore be placed on improving stroke risk perception among hypertensive patients. ■

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