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Awareness of Wake-Up Stroke in Middle-Aged Adults

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ABSTRACT

Wake-up stroke is the phenomenon of waking up with neurological symptoms similar to an ischemic stroke with a time of last known well when you went to bed. Wake-up stroke patients are currently excluded from intravenous thrombosis intervention (IV-rtPA) as time of onset is unknown leading to worse functional outcome. Thus, it is necessary to increase awareness about Wake-up stroke, its risk-factors, symptoms and warning signs in order to receive early medical intervention.

Aims and Objectives: This study was done to assess awareness of Wake-up stroke and its risk-factors in middle-aged adults.

Methods and Materials: This was a cross-sectional study in which purposive sampling method was used. 216 participants were included. A structured questionnaire was created that included the questions regarding awareness of Wake-up stroke and its risk-factors.

Statistical analysis: The data was analyzed using the descriptive analysis.

Results: 47.73% of middle-aged adults were aware about symptoms, warning signs, physical disability, functional outcomes of Wake-up stroke and its early physiotherapy intervention. 61.8% of middle-aged adults were aware regarding the risk-factors of Wake-up stroke.

Conclusion: Awareness about Wake-up stroke, its clinical features, preventive measures and emergency management was poor and must be given to the community through books, newspapers, community health camps and educational programs.

Keywords: Ischemic stroke, Obstructive sleep apnoea, Atrial fibrillation, Arterial hypertension, Circadian rhythm, IV recombinant tissue plasminogen activator (IV-rtPA).

INTRODUCTION

Stroke is one of the primary causes of neurological disability in the world. According to WHO, about 15 million people suffer from stroke each year, out of which 5 million are left permanently disabled.[1] About one out of six people older than 45 years suffer from stroke.[2] Stroke is defined as a neurological deficit, characteristic of an acute focal injury of the Central Nervous System (CNS) by vascular causes such as cerebral infarction, Intra-cerebral haemorrhage (ICH) and sub-arachnoid haemorrhage (SAH).[3] The symptoms of stroke vary, thus they are not easy to recognise. Presenting information regarding stroke, its risk-factors and its warning signs by hospitals and community health centres should be promoted in order to prevent the delay in recognition of symptoms and ensure early medical intervention. Many factors contribute to delays in seeking medical treatment for acute stroke, but one that is modifiable is

public lack of knowledge about symptoms. [4] In most countries, the reason for low rates of thrombolytic use for ischemic stroke is lack of medical attention after appearance of stroke symptom onset. This is often associated with lack of awareness of stroke symptoms, time-sensitive stroke treatments and its effects on functional outcome of the patients. The only FDA-approved medication available for acute treatment is IV recombinant tissue plasminogen activator (IV-rtPA). It is therefore important to create public awareness on the warning signs and risk factors of stroke along with the available urgent treatments.[5]

The chronobiological pattern of ischemic stroke onset, with higher frequency in the first morning hours, is associated with factors like circadian fluctuations in blood pressure, heart rate, haemostatic processes, and the occurrence of atrial fibrillation episodes. The modulation of stroke onset time also involves the sleep-wake cycle as there is an increased risk related to rapid-eye-movement sleep. [6]

Wake-up stroke (WUS) is the phenomenon of waking up with neurological symptoms resembling that of an ischemic stroke, in which one awakens with symptoms that were not present prior to falling asleep. It is an important issue as it comprises of approximately 14% of all acute ischemic strokes. [7] About 25% of strokes are WUS. A WUS differs from stroke by the unknown knowledge of exact time of symptom onset and the symptoms are noted on awakening.[1] In patients with unknown time of onset of stroke, the neurological impairment was severe and prognosis was worse at discharge than that of a stroke with a known time of symptom onset. Furthermore, the functional outcome measured with the Stroke Impact Scale (SIS-16) was worse. [2] The incidence pattern of Wake-up is associated with the interaction between physiological (circadian and sleep-state) and pathological (Obstructive sleep apnoea and Atrial fibrillation) factors.[6] A large number of patients are excluded from intravenous thrombolysis and thrombectomy intervention due to several reasons like the unknown time of onset and the potential cerebral bleeding risk associated with thrombolytic treatment, limitation of use of the therapy as many patients arrive late at the hospital. The IV-rtPA use is limited to four and half hours after known symptom onset after the original National Institute of Neurological Disorders and Stroke study had restricted tPA use to three hours following known symptom onset was extended to four and half hours by the recent European Co-operative Acute Stroke Study. [6-8] The risk-factors of Wake-up stroke are namely, Obstructive Sleep Apnea, a history of heart disease such as Atrial Fibrillation, Coronary Artery Syndrome, Arterial hypertension, smoking, diabetes, Hyperlipidemia, alcohol consumption. Other risk-factors include obesity, stress and sedentary lifestyle. Information regarding Wake-up Stroke, its clinical features, preventive measures and emergency management must be given to the community in order to identify and rectify the problem within time. Additionally, imparting knowledge about the risk-factors is also important for taking preventive measures such as lifestyle modification. [9] There is less awareness amongst the health-care professionals about Wake-up stroke and its risks factors. This study has been done to assess awareness of Wake-up stroke and its risk-factors in middle-aged adults.

MATERIALS AND METHODOLOGY

This cross-sectional study was based on a structured questionnaire which consisted of various questions regarding Wake-up stroke awareness, its recovery period, onset of symptoms, functional outcomes and its risk-factors. The targeted population was middle-aged adults i.e., 44-60 years. The targeted population was selected on the basis of previous research data which concluded the age of the Wake-up stroke patients was in middle-aged group. The sample size was calculated by a

statistical method by assuming 50% prevalence of awareness, with acceptable difference of 7% within 95% confidence interval. The minimum sample size calculated was 196. The sample size was calculated using the WinPepi Ver 11.65. The sampling method used was purposive sampling due to its simplicity and time limitation. After obtaining the permission from the ethical institutional committee and university, participants were selected on the basis of inclusion and exclusion criteria. The study was conducted by distributing the questionnaires to individuals who can understand Marathi or English language. The participants who had previous history of stroke and individuals who were illiterate were excluded. Consent was taken from the participants through a consent form. Additionally, a subject explanation form was given along with name, age, gender and socioeconomic status of the participant. The data was collected offline.

The questionnaire was divided into two parts, the first part consisted of fifteen questions regarding awareness of Wake-up stroke, its recovery period, onset of symptoms, administration of IV-rtPA, functional outcomes and importance of physiotherapy intervention. The second part of the questionnaire included ten questions regarding awareness of risk-factors of Wake-up stroke including Obstructive Sleep Apnoea, Atrial Fibrillation, hypertension, diabetes, history of stroke in the family, smoking, alcohol consumption, high cholesterol level, stress and sedentary lifestyle. The questions were scored as 'Yes' and 'No' on the basis of presence of awareness of symptoms, warning signs, physical disability, functional outcomes and early physiotherapy intervention of Wake-up stroke, its distinction from an ischemic stroke and awareness about its risk-factors. The participants that scored the questions as 'No' or 'I don't know' were considered unaware regarding Wake-up stroke and its risk-factors.

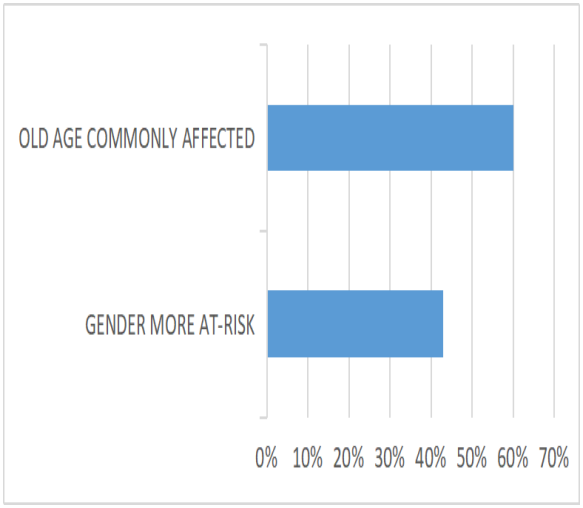
Statistical Analysis

The responses of the participants were collected and statistical analysis was done by descriptive method. Awareness about symptoms, functional outcomes and risk-factors was calculated in the form of percentage and was further represented into graphical data.

RESULT

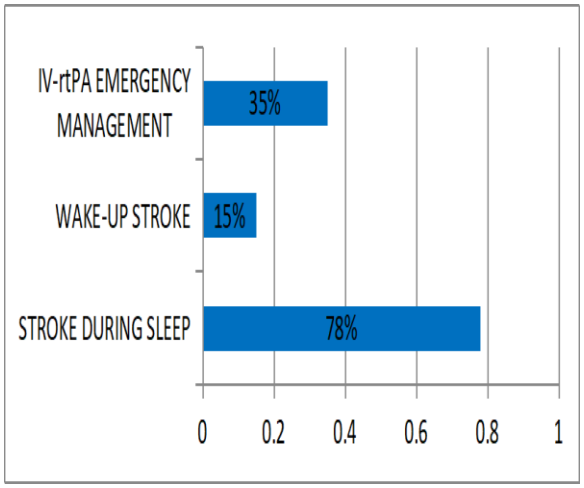
The study was conducted on 216 middle-aged adults. The data was collected offline through a questionnaire consisting of questions regarding awareness of Wake-up stroke, its symptoms, treatment options, recovery period and its risk-factors. The data was analysed by descriptive method.

AWARENESS OF WAKE-UP STROKE



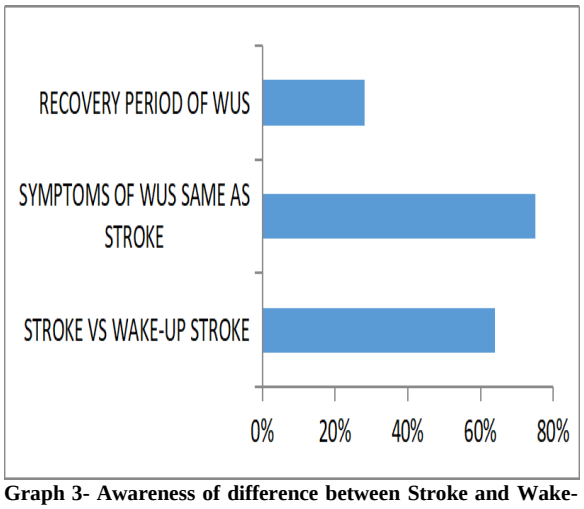
Graph 1- Awareness of gender more at-risk and age commonly affected

The graph 1 shows 60% of the participants know that Wake-up does not affect younger population more than the older population, while 40% believe that the former is more affected by Wake-up stroke than the latter. 43% of the participants are aware that Wake-up stroke does not affect males and females equally and 57% believe that both males and females are equally affected by Wake-up stroke.



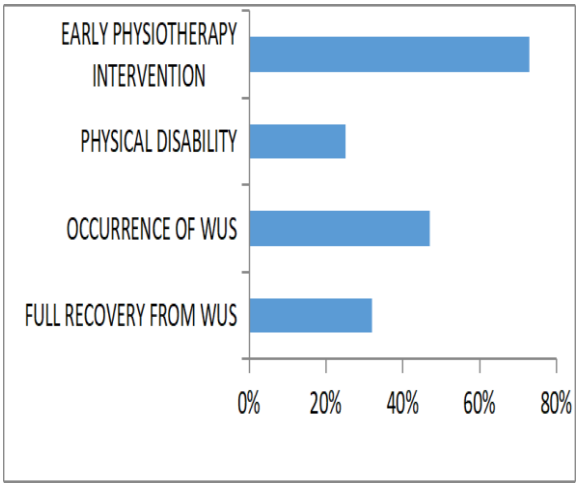
Graph 2-Awareness of Wake-up stroke and emergency management

The graph 2 shows us that 78% of the middle-aged adults know that stroke can occur during sleep, 22% of them are not aware about the same. 85% out of the 216 middle-aged participants are not aware about Wake-up stroke and only 15% know about it. 35% of participants are aware about IV-rtPA as a treatment for Wake-up stroke and 65% of them did not know about the use of IV-rtPA for treatment of Wake-up stroke.



Graph 3- Awareness of difference between Stroke and Wake-up stroke

The graph 3 shows that 64% of the middle-aged adults can differentiate Wake-up stroke from stroke whereas, 36% believe that both stroke and Wake-up stroke are the same. 75% of the participants know that the symptoms of stroke and Wake-up stroke are same and 25% of them believe that Wake-up stroke has different symptoms. 28% of the middle-aged adults are aware that the recovery period in Wake-up stroke patients is not the same as that in stroke patients. 72% believe that Wake-up stroke patients and stroke patients have same recovery period.



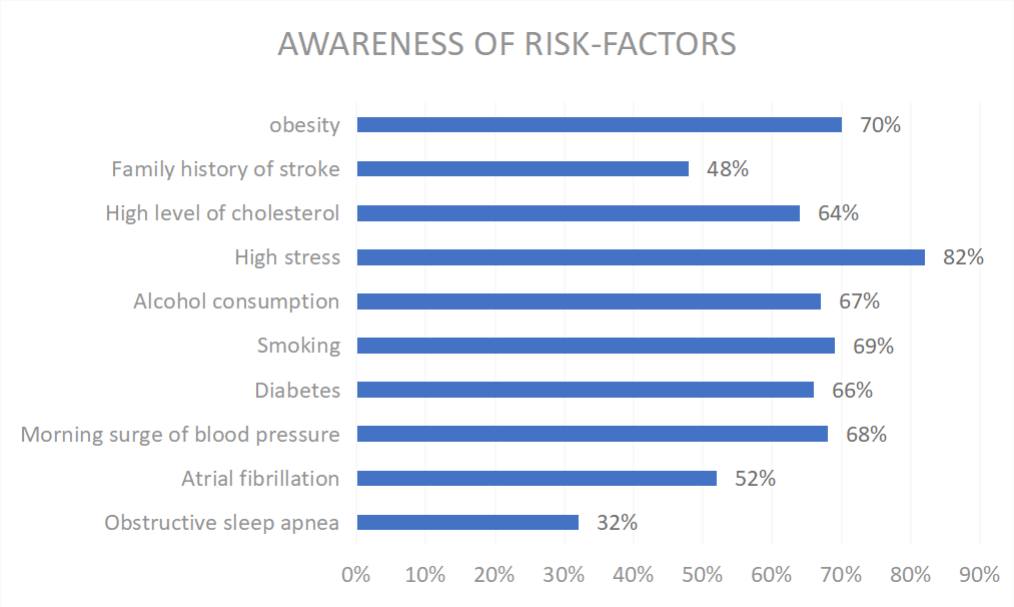
Graph 4-Awareness of physiotherapy intervention, physical disability, occurrence and full recovery from WUS

The graph 4 shows that 32% of the middle-aged adults are aware that full recovery from Wake-up stroke is possible, 68% of them think otherwise. 47% of the participants know that Wake-up can occur more than once whereas, 53% believe that it occurs only once. 25% of the participants are aware that Wake-up stroke causes physical disability and 75% are not aware about the same. 73% of the middle-aged adults recognise the importance of early physiotherapy intervention in Wake-up stroke patients and 27% of them think that physiotherapy is not important for them.

AWARENESS OF RISK-FACTORS OF WAKE-UP STROKE

Graph 5 shows that 32% participants are aware about Obstructive sleep apnea as a risk-factor of Wake-up stroke and 68% are not aware about Obstructive sleep apnea.

52% participants identified Atrial fibrillation as a risk-factor of Wake-up stroke and 48% of them did not think of it as a risk-factor of Wake-up stroke.



Graph 5- Awareness of risk-factors of WUS

68% of the participants know that morning surge of blood pressure is a risk-factor for Wake-up stroke and 32% believe otherwise.

66% of participants know that diabetes is a risk-factor of Wake-up stroke and 34% are not aware about it.

69% of the middle-aged adults know that smoking is a risk-factor of Wake-up stroke and 31% believe that smoking does not contribute to Wake-up stroke.

67% of the participants are aware that alcohol consumption is a risk-factor of Wake-up stroke and 33% are not aware about alcohol consumption being a risk-factor of Wake-up stroke.

82% of the participants know that high level of stress can contribute to Wake-up stroke and 18% believe that stress is not a factor contributing to Wake-up stroke.

64% of the middle-aged adults know that high level of cholesterol (Hyperlipidemia) is a risk-factor of Wake-up stroke and 36% think that Hyperlipidemia does not contribute to Wake-up stroke.

48% of the middle-aged adults know that history of stroke in the family can contribute to Wake-up stroke, 52% believe that family history of stroke does not lead to Wake-up stroke.

70% of the participants recognise obesity and physical inactivity as a risk-factor for Wake-up whereas, 30% are not aware that obesity and physical inactivity can contribute to Wake-up stroke.

47.73% of middle-aged adults were aware about symptoms, warning signs, physical disability, functional outcomes of Wake-up stroke and its early physiotherapy intervention. 61.8% of middle-aged adults were aware regarding the risk-factors of Wake-up stroke.

DISCUSSION

In this study, total 216 participants were included out of which 126 were female and 90 were male. The awareness of Wake-up stroke was observed to be 57% in males and 54% in females. The demographic profiles included age and gender of the participants. A majority of participants (80%) were aware about stroke and 90% of participants were aware about the symptoms of stroke like weakness of one side of body, turning of face to one side and difficulty in speaking. A study conducted by Jeyaraj D. Pandian, et.al, about public awareness of warning symptoms and treatment of stroke in north-west India stated that a minority of participants were able to correctly identify brain as an affected organ in stroke and there is lack of awareness of stroke even in

developed countries like USA and Australia, which supports our study. They also found that weakness of one side of the body was the most common warning symptom of stroke and percentage of the respondent who mentioned this as a symptom of stroke was similar to other studies from Korea and USA. [10]

In present study, awareness of stroke occurring during sleep was 78%. A study done by A. Ferre stated that there is increased relationship between sleep-disorders and stroke as a risk and prognosis. They also found that most ischemic strokes occur upon awakening and are typically embolic, but 20 to 40% of ischemic strokes occur during onset of sleep. Relation between stroke and sleep influences the stroke outcome, recovery and quality of life. Hence, it is important to aware people about stroke occurring during sleep. [11] In this study, only 15% of participants had awareness of Wake-up stroke. A study done by Mark N. Rubin stated that roughly around 1 in 5 acute ischemic strokes is a Wake-up stroke, they are excluded from Ischemic stroke treatment trials and are not eligible for Acute perfusion therapy leading to poor outcome and functional disability. He also described Wake-up stroke as patients who go to sleep normal and awaken with stroke symptoms; and describes clinical and radiological difference between Wake-up stroke from other stroke onsets. [12]

As there is limited research data available and not many studies done on awareness of Wake-up stroke in India, even the health-care professionals are not aware about it. A study about Knowledge, attitude and practice of stroke in India versus other developing countries conducted by Sujata Das and Shyamal Das stated that there is inadequate knowledge among Indian community due to lack of governmental and other organizational efforts to empower the community with adequate knowledge about stroke, warning signs. The role of doctors and health-care personnel remains unsatisfactory in order to deliver knowledge about stroke. They also reported that there was better awareness of specific risk-factors among those affected by it, which is due to frequent contact with medical personnel for regular monitoring and treatment. The study also suggested that hypertension and smoking are identified as common risk-factors for stroke globally. In India, the most identified risk-factor for stroke is Diabetes. [3] In this study, 64% of participants were unable to differentiate between Wake-up stroke and stroke. These results predict that most of the participants believed stroke and Wake-up stroke were the same, leading to late identification of symptoms and delayed hospitalization. Only 36% of participants could identify that symptoms of stroke and Wake-up stroke were the same. A study conducted by Jaw W. Dankbaar, et.al, observed that there were minor differences in clinical and imaging characteristics of Wake-up stroke patients and patients with known onset of time of stroke.[8] Whereas, a study conducted by Yeon-Jung Kim, et.al, observed that daytime-unwitnessed stroke patients were more likely to be treated with reperfusion therapy, as the symptom identification is early and early hospitalization is possible as compared to Wake-up stroke patients.[13] Therefore, awareness of difference between stroke of known onset of time and Wake-up stroke should be increased to reduce unfavourable outcomes and to promote early medical intervention. In present study, 65% of participants were not aware about IV-rtPA being used as a treatment for management of Wake-up stroke. A study conducted by Konark Malhotra, et.al, stated that the IV-rtPA administration has been proved useful, if administrated within 3 hours. Also, the duration of clinical symptoms determine the eligibility for thrombolysis while narrowing the therapeutic window of IV-rtPA precludes its usage for patients of Wake-up stroke.[14] Therefore, the awareness of treatment options of Wake-up stroke is necessary for early identification of stroke warning signs and early hospitalization. In this study, 32%

participants were aware that full recovery from Wake-up stroke is not possible, 72% participants were unaware that recovery period for Wake-up stroke is longer than non-Wake-up stroke and 75% participants were unaware that Wake-up stroke causes any physical disability. A study done by Beom Joon Kim, et.al, concluded that there was an association between Wake-up stroke and worse functional outcome, as it led to delayed admission and higher functional dependency. [15]

Risk factors of Wake-up stroke are morning surge of blood pressure, Obstructive sleep apnea, Atrial fibrillation, diabetes, smoking, alcohol consumption, high level of cholesterol, stress, family history of stroke and obesity or physical inactivity. The awareness of Obstructive sleep apnea being an important risk-factor was relatively less than any other risk-factors i.e., only 32% awareness. A study conducted by Tuuli- Maria Haula, et.al, on Wake-up stroke patients to find association between obstructive sleep apnea in Wake-up stroke and they observed that obstructive sleep apnea was more frequent in Wake-up stroke patients than in non-Wake-up stroke patients.[16] A study done by Terry Young, et.al, observed that obstructive sleep apnea with daytime impairment occurs in 1 to 20 adults and it remains undiagnosed and untreated due to lack of awareness about the condition, which supports present study.[17] The awareness of Atrial fibrillation as a risk-factor of Wake-up stroke was only in 52% participants. Morning surge of blood pressure was identified as a risk-factor for Wake-up stroke in 68% participants, whereas only 48% participants identified family history of stroke as risk-factor for Wake-up stroke. In present study, 60% participants believed that Wake-up stroke affects elderly population more than younger population and 43% participants believed that men and women were not equally affected by Wake-up stroke. A study conducted by Elyar Sadeghi-Hokmabadi, et.al, on evaluation of stroke-related risk factors in Wake-up stroke and non-Wake-up stroke patients stated that the maximum and minimum age for Wake-up stroke ranges from 35 and 81 years old. They also concluded that the percentage of hypertension and familial history occurrence was higher in WUS patients. The results of the study also concluded that Wake-up stroke rarely occurs in early age and risk of stroke increases with aging.[18] In this study, 66% participants identified diabetes as a risk-factor of Wake-up stroke; 69% participants identified smoking, 67% identified alcohol consumption, 64% identified high cholesterol and 82% participants identified stress as a risk-factor of Wake-up stroke. A study conducted by Deborath Lucia De OliveriaDiniz, et.al, observed patients with Wake-up stroke had diabetes and sedentary lifestyle. They also concluded daytime sleepiness is associated with alcohol consumption.[9] In present study, 70% participants identified obesity and physical inactivity as risk-factors of Wake-up stroke.

In present study, awareness of risk-factors of Wake-up stroke was relatively higher than symptoms, warning signs, physical disability, functional outcomes and early physiotherapy intervention of Wake-up stroke. A study on public awareness of Stroke by Pandian et.al, stated that knowledge about stroke varies according to income and education. Furthermore, in countries like India, factors like paternalistic cultural practices, educational status, opportunities and income can also affluence the knowledge regarding same. A study about the awareness of stroke in North-west India has concluded that the knowledge of stroke and its risk-factors, is relatively poor in India as compared to developed nations due to lack of access to proper education regarding stroke in the Lower socioeconomic group. In India, the awareness of stroke and its types is typically low due to various belief systems existing in different cultural groups, due to lack of availability of knowledge and community awareness campaigns.[19] A study observed that the role of doctors and health-care

professionals in delivering such knowledge in Indian society is also unsatisfactory.[3] Wake-up stroke is less known to Indian community. This study has been done in order to assess the awareness of Wake-up stroke in the individuals who are most likely to be affected by it.

In present study, it is observed that the middle-aged adults had Poor level of awareness of Wake-up stroke. Awareness about stroke can be successfully increased by using media including television, magazines and newspapers. Similarly, awareness of Wake-up stroke can be increased by educating at community health-centres by organising campaigns, awareness programmes, newspapers, television advertisement and magazines. Future scope of the study is, study can be done in equal male to female ratio and in healthcare professionals or medical and allied healthcare students. A study can be done to assess and create awareness about Wake-up stroke in all age-groups. The study set-up was restricted to one city only which is major limitation of the study.

CONCLUSION

In this study, awareness of stroke was good in a majority of middle-aged adults but awareness of Wake-up stroke was relatively low. The awareness of risk factors of Wake-up stroke was comparatively more. The frequent encounters of individuals with history of stroke, and their family members with healthcare professionals could be a reason for awareness of risk-factors of Wake-up stroke. There is a need to increase awareness of Wake-up stroke in the community, especially individuals at risk of having Wake-up stroke. Campaigns organised by the Government and other organisations could also help increase awareness. Multiple strategies such as verbal and written along with other visual information through newspapers, books, magazines and educational programmes may also help. For the rural population particularly in inaccessible areas and localities without electricity, radio broadcasting is an important source of information.

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