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# CROSS-SECTIONAL STUDY OF KNOWLEDGE OF STROKE MANAGEMENT AMONGST DOCTORS OF A TERTIARY CARE HOSPITAL;PESHAWAR, PAKISTAN

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**ABSTRACT:**

**Bckground:** Stroke is one of the leading causes of mortality and neurological disability worldwide. 'Time is brain' and prompt management of stroke is vital to improve the outcomes. Knowledge of stroke management is important for clinicians working in various specialties and this study focused on evaluation of this vital aspect.

**Objective:** To document the knowledge of stroke management amongst doctors, working at different stages of career in different specialties at a tertiary care hospital.

**Materials & Methods:** A questionnaire was developed using current stroke guidelines of the Royal College of Physicians London and American Heart and Stroke Association. The questionnaire was distributed among 73 doctors working in various specialties and grades. Data analysis was done using SPSS version 21.0.

**Results:** House officers (n=33), Medical officers (n= 7), Post graduate trainees (n=20), Registrars (n=3), Consultants (n=9) participated. Diffusion weighted (DWI) MRI was recognised as the best diagnostic tool for acute ischaemic stroke (58.33%). BP management knowledge in haemorrhagic stroke was poor (60.56%). Less than half (40.85%) chose tissue plasminogen activator (t-PA) as the preferred initial treatment. Majority were unaware of percutaneous endoscopic gastrostomy (PEG) for unsafe swallowing (45.07%). Few recognised (19.72%) that the upper limit in blood pressure management for acute ischaemic stroke was 220/120 without other end organ damage. Only (55.56%) thought that IPCs (intermittent pneumatic compressions) were the safest method for DVT prophylaxis.

**Conclusion:** The survey shows that the knowledge of doctors was inadequate. Improving medical training of stroke management and awareness of stroke as an emergency ('Brain attack') needs to be improved for optimal outcomes.

**Keywords:** stroke; cerebrovascular accident; knowledge; thrombolysis; Pakistan.

**INTRODUCTION:** Stroke is amongst the most common causes of death and the first leading cause of disability in developed and developing countries.[1] To determine the true incidence of stroke, there are no large-scale epidemiological studies in Pakistan. In previous retrospective studies of patients of stroke in other medical units in two major hospitals over an 8-year period, incidence was 796/12,454 (6.4%).[2] Stroke is a medical emergency and the estimated annual incidence in Pakistan is 250/100,000, translating to 350,000 new cases every year.[3]

Around 40% of people aged 18 years or above have hypertension, dyslipidemia or a history of active smoking.[4] Burden of major vascular risk factors i.e. hypertension, diabetes mellitus, smoking, dyslipidemia and obesity is enormous in Pakistan. The study participants were healthy individuals who came for routine checkups and only 40% of the hypertensive patients had optimal blood pressure levels.4 There was significant family history of ischaemic heart disease in 42%, obesity in 24%, hypertension in 19%, and diabetes mellitus in 15%.[4]

Contrary to decline in the incidence of the disease in the Western population, the burden of stroke in South Asian countries (India, Pakistan, Bangladesh, and Sri Lanka) has been rising.[5]

These are challenging times in the health care system in Pakistan. Limited resources are allocated for prevention of vascular diseases. There are compelling epidemiological and scientific reasons that the incidence of such diseases will increase in the coming decades. Considering the high mortality and disability associated with stroke, good knowledge of identifying stroke risk factors, symptoms and management are important for doctors working in most specialties. This study documents the knowledge of stroke management amongst doctors, working at different stages of career in different specialties at a tertiary care hospital.

**Material and Methods:**

A cross-sectional survey design was used. Study was conducted at Rehman Medical Institute (RMI) Peshawar from June-July 2019. The data collection tool had three distinct parts. The first being an introduction to study objective, informed consent and assurance of anonymity of the data. The second section had demographic details, including the specialty and working grade of the doctor. The last part consisted of 15 multiple choice questions (MCQs) which were prepared in the single best choice format. A questionnaire was developed using current stroke guidelines (2016) of the Royal College of Physicians London and American Heart and Stroke Association. [6, 7]

The pre-tested self-administered questionnaire was distributed among 73 doctors. Data was analysed using SPSS Version 21.0.

**Results:**

Respondents included House officers (n=33), Medical officers (n= 7), Post graduate trainees (n=20), Registrars (n=3), Consultants (n=9). Most correctly identified CT brain as the initial diagnostic modality (95.83%), DWI MRI as the best diagnostic tool for acute ischemic stroke (58.33%). Majority were was unaware of BP management in acute haemorrhagic stroke, (60.56%). Most were familiar with the risk of deep vein thrombosis in immobilised stroke patients (94.44%). On the other hand, less than half (40.85%) chose tissue plasminogen activator (t-PA) as the preferred initial choice of intervention in eligible patients within 4.5 hours of presentation with acute ischaemic stroke. Majority were unaware of percutaneous endoscopic gastrostomy (PEG) for unsafe swallowing greater than 4 weeks, correct answer was given by less than half of participants (45.07%). Very few recognised (19.72%) that the upper limit in blood pressure management for ischemic stroke was 220/120 within the first 48 to 72 hours without other end organ damage. Also, only (55.56%) thought that IPCs (intermittent pneumatic compressions) were the safest method for DVT prophylaxis after stroke. Knowledge that lowering and maintaining the blood pressure lowers the risk of stroke recurrence (80.28%) and that haemorrhagic stroke is an absolute contraindication to thrombolytic therapy (79.17%) was known to majority of the respondents. The percentage of missing responses ranged from 0.2 % - 1.0% which was not significant. The complete questionnaire with the highlighted correct answer is displayed in Table. 3.

**The detailed results are shown in Table 1.0.**

| S# | Item-wise Response Distribution on Stroke Knowledge Test | A | B | C | D |
|---|---|---|---|---|---|
| | | n (%) | n (%) | n (%) | n (%) |
| 1 | The first emergency investigation of choice in a patient suspected of having an acute stroke is | **95.8** | 4.2 | - | - |
| 2 | Urgent Computed tomography (CT) of brain in patients with stroke helps in | 1.4 | **95.8** | 2.8 | - |
| 3 | The most accurate diagnostic test for detecting ischaemic stroke is | 1.4 | **58.3** | 29.2 | 11.1 |
| 4* | A 55-year-old man is in Emergency Dept. with dysphasia and right sided weakness (power 1/5). He has been diagnosed as having acute left anterior circulation ischaemic stroke for last 2.5 hours. His CT brain is unremarkable and CT angiogram has not shown any large vessel occlusion. The emergency treatment should be | 48.6 | **40.3** | 1.4 | 8.3 |
| 5* | After managing airway and breathing, which of the following should be the next step in management of a patient with acute haemorrhagic stroke | **59.7** | 1.4 | 31.9 | 5.6 |
| 6 | Evidence shows that patients with acute stroke have better outcomes if managed | 1.4 | 2.8 | **94.4** | 1.4 |
| 7 | Intravenous thrombolysis in ischaemic stroke can be performed | **76.4** | 1.4 | 20.8 | 1.4 |
| 8* | The risk of recurrence of stroke can be significantly reduced by | - | 13.9 | 5.6 | **79.2** |
| 9 | Which of the following is an absolute contraindication to thrombolytic therapy | **79.2** | 13.9 | 2.8 | 4.2 |
| 10 | The development of which serious condition would you be concerned most in patients immobilised due to acute stroke | - | 4.2 | 1.4 | **94.4** |
| 11 | The most important contraindication to anticoagulation is | 2.8 | **80.6** | 2.8 | 13.9 |
| 12* | If swallowing is unsafe after 4 weeks of stroke, the next recommended step of management to consider is | 38.9 | 1.4 | 13.9 | **44.4** |
| 13 | The safest method of Deep Vein Thrombosis (DVT) prophylaxis after acute stroke is | 13.9 | 11.1 | 19.4 | **55.6** |
| 14* | Target systolic Blood Pressure in case of acute haemorrhagic stroke for initial one week is | - | 34.7 | 8.3 | **55.6** |
| 15 | Within 48 to 72 hours after acute ischaemic stroke (without other end organ damage), acceptable BP not requiring urgent lowering of BP is up to | **19.4** | 13.9 | 47.2 | 18.1 |

**Table. 1.0 Question-wise response distribution on stroke knowledge test**
**Correct answer bold | *1-3 participants did not respond to these questions.**

| QUESTIONS | | PARTICIPANT STATUS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | HOUSE OFFICERS | | MEDICAL OFFICERS | | TRAINEE MEDICAL OFFICERS | | REGISTRARS | | CONSULTANTS | |
| | | Frequency (n) | Percentage (%) | Frequency (n) | Percentage (%) | Frequency (n) | Percentage (%) | Frequency (n) | Percentage (%) | Frequency (n) | Percentage (%) |
| Question 1 | Incorrect | 1 | 3 | 0 | 0 | 2 | 10 | 0 | 0 | 0 | 0 |
| | Correct | **32** | **97** | **8** | **100** | **18** | **90** | **2** | **100** | **9** | **100** |
| Question 2 | Incorrect | 2 | 6 | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 0 |
| | Correct | **31** | **94** | **8** | **100** | **19** | **95** | **2** | **100** | **9** | **100** |
| Question 3 | Incorrect | 22 | 67 | 3 | 38 | 4 | 20 | 1 | 50 | 0 | 0 |
| | Correct | **11** | **33** | **5** | **63** | **16** | **80** | **1** | **50** | **9** | **100** |
| Question 4 | Incorrect | 21 | 64 | 6 | 75 | 10 | 50 | 2 | 100 | 3 | 33 |
| | Correct | **12** | **36** | **2** | **25** | **10** | **50** | **0** | **0** | **5** | **56** |
| Question 5 | Incorrect | 16 | 48 | 2 | 25 | 7 | 35 | 2 | 100 | 2 | 22 |
| | Correct | **17** | **52** | **6** | **75** | **13** | **65** | **0** | **0** | **7** | **78** |
| Question 6 | Incorrect | 3 | 9 | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 0 |
| | Correct | **30** | **91** | **8** | **100** | **19** | **95** | **2** | **100** | **9** | **100** |
| Question 7 | Incorrect | 12 | 36 | 3 | 38 | 2 | 10 | 0 | 0 | 0 | 0 |
| | Correct | **21** | **64** | **5** | **63** | **18** | **90** | **2** | **100** | **9** | **100** |
| Question 8 | Incorrect | 7 | 21 | 3 | 38 | 4 | 20 | 0 | 0 | 1 | 11 |
| | Correct | **26** | **79** | **5** | **63** | **16** | **80** | **2** | **100** | **8** | **89** |
| Question 9 | Incorrect | 9 | 27 | 1 | 13 | 4 | 20 | 0 | 0 | 0 | 0 |
| | Correct | **24** | **73** | **7** | **88** | **16** | **80** | **2** | **100** | **9** | **100** |
| Question 10 | Incorrect | 3 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 11 |
| | Correct | **30** | **91** | **8** | **100** | **20** | **100** | **2** | **100** | **8** | **89** |
| Question 11 | Incorrect | 6 | 18 | 1 | 13 | 5 | 25 | 0 | 0 | 1 | 11 |
| | Correct | **26** | **79** | **7** | **88** | **15** | **75** | **2** | **100** | **8** | **89** |
| Question 12 | Incorrect | 23 | 70 | 2 | 25 | 14 | 70 | 0 | 0 | 1 | 11 |
| | Correct | **10** | **30** | **6** | **75** | **6** | **30** | **2** | **100** | **8** | **89** |
| Question 13 | Incorrect | 15 | 45 | 1 | 13 | 13 | 65 | 2 | 100 | 1 | 11 |
| | Correct | **18** | **55** | **7** | **88** | **7** | **35** | **0** | **0** | **8** | **89** |
| Question 14 | Incorrect | 19 | 58 | 3 | 38 | 6 | 30 | 0 | 0 | 4 | 44 |
| | Correct | **14** | **42** | **5** | **63** | **14** | **70** | **2** | **100** | **5** | **56** |
| Question 15 | Incorrect | 27 | 82 | 5 | 63 | 16 | 80 | 2 | 100 | 8 | 89 |
| | Correct | **6** | **18** | **3** | **38** | **4** | **20** | **0** | **0** | **1** | **11** |

**Table 2: Question-wise response distribution on stroke knowledge test based on participants' career status (missing responses taken as incorrect, 1-2%)**

**Table 3: Complete Questionnaire with highlighted answers.**

| | Question | Stem A | Stem B | Stem C | Stem D |
|---|---|---|---|---|---|
| 1. | **The first emergency investigation of choice in a patient suspected of having an acute stroke is?** | **Computed tomography (CT) scan** | Magnetic Resonance Imaging (MRI) | X-ray head | Lumbar puncture |
| 2. | **Urgent Computed tomography (CT) of brain in patients with stroke helps in?** | Identification of post stroke depression | **Distinguishing between haemorrhagic and ischaemic stroke** | Localizing the aneurysm | Preventing further haemorrhage |
| 3. | **The most accurate diagnostic test for detecting ischaemic stroke is?** | Non-Diffusion Weighted Magnetic Resonance Imaging (MRI) | **Diffusion Weighted (DWI) Magnetic Resonance Imaging (MRI)** | Computed Tomography (CT) with contrast | CT Intracranial Angiogram |
| 4. | **A 55-year-old man is in Emergency Dept. with dysphasia and right sided weakness (power 1/5). He has been diagnosed as having acute left anterior circulation ischaemic stroke for last 2.5 hours. His CT brain is unremarkable and CT angiogram has not shown any large vessel occlusion. The emergency treatment should be?** | Aspirin | **Tissue Plasminogen Activator (tPA)/Alteplase** | Warfarin | Clopidogrel |

| | | | | | |
|---|---|---|---|---|---|
| 5. | **After managing airway and breathing, which of the following should be the next step in management of a patient with acute haemorrhagic stroke?** | **Lower blood pressure to optimal targets** | Give statins | Administer intravenous fluids | Administer subcutaneous Heparin |
| 6. | **Evidence shows that patients with acute stroke have better outcomes if managed?** | In General Medicine ward | Coronary Care Unit | **Dedicated Stroke Unit** | Vascular surgery ward |
| 7. | **Intravenous thrombolysis in ischemic stroke can be performed?** | **Within 4.5 hours after onset of symptoms** | After 4.5hours of onset of symptoms | Within 12 hours of onset of symptoms | After 12 hours |
| 8. | **The risk of recurrence of stroke can be significantly reduced by?** | Good sleep | Regular exercise | Subcutaneous Heparin | **Optimal control of blood pressure** |
| 9. | **Which of the following is an absolute contraindication to thrombolytic therapy?** | **Intracerebral haemorrhage** | Pregnancy | Age >70 years | Major surgery within the last 1 year |
| 10. | **The development of which serious condition would you be concerned most in patients immobilised due to acute stroke?** | Depression | Hemiplegic Shoulder pain | Urinary tract infection | **Deep vein thrombosis** |
| 11. | **The most important contraindication to anticoagulation is?** | Epilepsy | **Acute subarachnoid haemorrhage** | Deep vein thrombosis | Pregnancy |
| 12. | **If swallowing is unsafe after 4 weeks of stroke, the next recommended step of management to consider is?** | Continue Nasogastric feeding | Oral sips while accepting risk of aspiration | Total Parenteral Nutrition | **Percutaneous Endoscopic Gastrostomy** |
| 13. | **The safest method of Deep Vein Thrombosis (DVT) prophylaxis after acute stroke is?** | Enoxaparin | Warfarin | Rivaroxaban | **Intermittent Pneumatic Compression (IPC)** |
| 14. | **Target systolic Blood Pressure in case of acute hemorrhagic stroke for initial one week is?** | 200mmHg | <130 mmHg | 120 mmHg | **140-150 mmHg** |
| 15. | **Within 48 to 72 hours after acute ischaemic stroke (without other end organ damage), acceptable BP not requiring urgent lowering of BP is up to?** | **220/120 mmHg** | 190/100 mmHg | 140/90 mmHg | 120/80 mmHg |

**Discussion:**

In our study only a few recognised (19.72%) that the upper limit in blood pressure management for ischaemic stroke was 220/120 within the first 48 to 72 hours, in that study less than half adequately treated hypertension.[8] The practical implications can lead to inadequate or even detrimental outcomes.

In Pakistan, 50% of transient ischemic attacks (TIAs) and more than 35% strokes are most often misdiagnosed.9 Multiple surveys around the world have revealed that the generic knowledge of stroke in the general population is generally inadequate in both the developed10-12 and developing countries.13-16 In a study carried out in the Gulf countries, many patients were not aware of the term 'stroke'.[13] Also, in Pakistan respondents from high schools in a single district showed that they were unaware of the risk factors for stroke and the symptoms and did not know what to do in a case of acute stroke. [16]

Less than half (40.84%) of the respondent's chose tPA as the correct initial intervention in eligible candidates within time window. It also shows that awareness and knowledge of use of thrombolytic therapy is insufficient amongst the doctors. There is urgent need of promoting stroke care education amongst the doctors and public so that patients can present early to the tertiary care stroke centres within the 4.5 hours, 'golden timeframe' for intravenous thrombolysis. Evidence clearly shows that strokes are preventable and treatable. And thousands of people are dying due to inadequate care and all these lives could be saved and could avoid living with permanent disability with service improvements.[18]

The public and private tertiary care hospitals should ensure establishment of fully resourced and dedicated stroke units. Majority of the respondents in our study had a consensus that a dedicated stroke unit is required for better outcome in patients and such units could curtail the rate of death and dependency rates by as great as 20% - which in terms of numbers mean saving thousands of lives and reducing lifelong disabilities.[18]

As an estimate, Pakistan's population might have 4.8% stroke annually. 17 It is equivalent to approximately 8.7 million stroke patients countrywide. Amongst these patients, 63% develop complications of stroke, and 7-20% unfortunately die. 18 Stroke is a huge burden on the healthcare system, families and the economy, hence the necessity of timely diagnosis and early intervention can prevent death and disability.

All medical professionals should be educated in a structured manner, e.g. lectures, interactive workshops and seminars. All hospitals must follow a standard, evidence-based stroke management protocol. Stroke management should be an important part of curriculum in the medical colleges. There is a need to perform a

nationwide survey on stroke that will reveal its accurate epidemiological factors. There is also an urgent need to establish dedicated stroke units at tertiary care hospitals.

Future studies need to be conducted, involving higher number of physicians to yield more detailed analysis of the knowledge and in turn it could help to highlight the short comings, to deduce the solutions and improvement of the quality of stroke care.

The survey shows that the knowledge of doctors was inadequate. Improving medical training of stroke management and awareness of stroke as an emergency ('Brain attack') needs to be improved for optimal outcomes. This study provides a basis for further research and analyses the trends in stroke knowledge amongst doctors working at a large tertiary care hospital. Training sessions, curriculum improvements and public awareness campaigns are likely to significantly improve stroke care in Pakistan.

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**MFK** designed and led the project
**FB, ON, MFK** did data collection/correction, manuscript writing & editing of the manuscript
**ON, MSI, SK** did data collection, statistical analysis & manuscript writing
**ON, FB** did data correction, computer generation of the data bank
**MKH, MFK, MSI, SK** did the editing, review & final approval of the manuscript