Nurses’ Knowledge regarding Nursing Care of Cerebrovascular Accident Patients at Wad Medani Emergency Hospital, Gezira State, Sudan (2014)

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Nurses’ Knowledge regarding Nursing Care of Cerebrovascular Accident Patients at Wad Medani Emergency Hospital, Gezira State, Sudan (2014)

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Date: 5/ March / 2015
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Examination Committee:

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Ietimad Ibrahim Abd Elrahman Kambal</td>
<td>Chair Person</td>
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</tr>
<tr>
<td>Dr. Faiza Ali Nasor Taha</td>
<td>External Examiner</td>
<td></td>
</tr>
<tr>
<td>Dr. Bothyna Bassypnie Elassyed Etewa</td>
<td>Internal Examiner</td>
<td></td>
</tr>
</tbody>
</table>

Date: 5/ 5/ 2015
Dedication

To my father . . .

mother . . .

aunt Mozdalefa

brothers and sisters . . .

family . .

friends and my colleagues . .
Acknowledgment

First I wish to thank Allah for affording me the time and the ability needed to stand face of difficulties.

I am deeply indebted to and grateful for the main supervisor: Dr. Ietimad Ibrahim Abdelrhman and co-supervisor Dr. Sayda Idres Abd Elrhman Fadol Alla for their helpful advices and valuable suggestions at the various stages of the research and their ultimate consultation. I also appreciate their patience and the effort that they expended and supplying me with valuable opinion and suggestions.

I would like to thank may colleague in the Faculty of Applied Medical Sciences, Gezira University for giving me this opportunity to continue my post graduate education.
Nurses’ Knowledge regarding Nursing Care of Cerebro Vascular Accident Patients at Wad Medani Emergency Hospital, Gezira State, Sudan (2014)

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Abstract

Cerebrovascular accident: The sudden death of some brain cells due to lack of oxygen when the blood flow to the brain is impaired by blockage or rupture of an artery. Nurses, are essential members of the stroke team frequently spend the highest proportion of time with patients. So nursing interventions contribute to improving stroke patients’ outcomes. A descriptive hospital-based study was conducted at Wad Medani Emergency Hospital aimed at assessing nurses’ knowledge regarding nursing care of Cerebro vascular Accident Patients at Wad Medani Emergency Hospital, Gezira State, Sudan in the period from September 2014 to February 2015. The study population was (57) available nurses who work in the hospital during the period of the study. Data was collected by using a structured questionnaire. The data was analyzed by using statistical package for social sciences (SPSS). The results showed that (56.1%) of the study sample responded with correct complete answers regarding definition of cerebro vascular accident while (64.9%) and (54.4%) of the study sample responded with correct complete answers regarding types and causes of cerebro vascular accident respectively. Half (52.6%) of the study sample responded with correct complete answers regarding risk factors of cerebro vascular accident, (57.9%) and (61.4%) of the study sample responded with correct complete answers regarding signs and symptoms of cerebro vascular accident and pathophysiology of ischemic stroke respectively. Also half (54.4%) of the study sample responded with correct complete answers regarding pathophysiology of hemorrhagic cerebro vascular accident, while (38.6%) of them responded with correct incomplete answers. The study concluded that nurses’ knowledge regarding care of patients with cerebro vascular accident was inadequate regarding nursing intervention. It recommended that routine and periodic training program must be done to all nurses to improve their knowledge about patients care with cerebro vascular accident in emergency hospital and a Logbook for care of patients with cerebro vascular accident must be designed and made available in the hospitals. A protocol for nursing management must be adopted by state ministry of health.
ملخص الدراسة

الحادث الوعائي الدماغي هو وقوع بعض خلايا الدماغ المختلفة بسبب نقص الأوكسجين عندما يضعف سريان الدم إلى الدماغ بإنسداد أو نزول شريان. السكتة الدماغية هي السبب الثاني للوفاة وهي السبب الرئيسي للإعاقة الخطيرة بالحياة. غالباً يقضي الممرضون الممرضات، والذين هم أعضاء أساسيون في فريق السكتة الدماغية، جزءاً كبيراً من الوقت مع المرضى. لذا يبدو من المنطقي أن تدخل الممرضين الممرضات يساهم في تحسين نتائج المرضى السكنت الدماغية. أجريت دراسة وصفية داخل مستشفى ودمدني للطواريء، ولاية الجزيرة، السودان في الفترة من سبتمبر 2014 إلى فبراير 2015 تضمنت العينة كل من الممرضون والممرضات، الذين يعملون بالمستشفى أثناء فترة الدراسة. وقد تم جمع البيانات باستخدام استبيان مهيكل صممه الباحث. تم تحليل البيانات بإستخدام الحزم الإحصائية للعلوم الإجتماعية (SPSS). أظهرت النتائج أن 56.1% من أفراد عينة الدراسة أستجابوا بإجابات صحيحة كاملة فيما يخص تعريف الحادث الوعائي الدماغي بينما أستجاب 64.9% و 54.5% من أفراد عينة الدراسة بإجابات صحيحة كاملة فيما يخص أسباب وأنواع حوادث الأوعية الدماغية على التوالي. نصف (52.6%) من أفراد عينة الدراسة أستجابوا بإجابات صحيحة كاملة فيما يخص عوامل خطر حوادث الأوعية الدماغية، (57.9%) و (61.4%) من أفراد عينة الدراسة أستجابوا بإجابات صحيحة كاملة فيما يخص علامات وأعراض وفسيولوجي الإصابة لحوادث الأوعية الدماغية الإقفارية على التوالي. أيضاً نصف (54.4%) من أفراد عينة الدراسة أستجابوا بإجابات صحيحة كاملة فيما يخص فسيولوجي الإصابة التشفيرية، بينما (38.6%) منهم أستجابوا بإجابات غير كاملة. خلصت الدراسة أن معرفة الممرضين والممرضات عن العناية بمريض الحادث الوعائي الدماغي غير كافية فيما يخص التعرف والأعراض والعلامات والتشخيص والعلاج. وأوصت بإقامة التدريب الروتيني الدوري لكافة الممرضين والممرضات لتحسين معرفتهم عن رعاية مرضى الحادث الوعائي الدماغي كما يجب تصميم سجل للعناية بهذه المرضى وجعله متاحاً في المستشفيات. وأن يقضي بروتوكلياً للإدارة التمريضية بواسطة وزارة الصحة الإدارية.
### List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure {4.1} Distribution of the study sample according to their years of experience:</td>
<td>45</td>
</tr>
<tr>
<td>Figure {4.2} Distribution of the study sample according to receiving training program before about cerebro vascular accident:</td>
<td>46</td>
</tr>
<tr>
<td>Figure {4.3} Distribution of the study sample according to their source of knowledge about cerebro vascular accident:</td>
<td>47</td>
</tr>
<tr>
<td>Table</td>
<td>Page</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>Table {4.1}: Distribution of the study sample according to their gender and age groups:</td>
<td>43</td>
</tr>
<tr>
<td>Table {4.2}: Distribution of the study sample according to their level of education:</td>
<td>44</td>
</tr>
<tr>
<td>Table {4.3}: Distribution of the study sample according to their knowledge about definition, types and causes of cerebro vascular accident:</td>
<td>48</td>
</tr>
<tr>
<td>Table {4.4}: Distribution of the study sample according to their knowledge about risk factors, signs and symptoms cerebro vascular accident and pathophysiology of ischemic stroke:</td>
<td>49</td>
</tr>
<tr>
<td>Table {4.5}: Distribution of the study sample according to their knowledge about pathophysiology of hemorrhage stroke, diagnosis of cerebro vascular accident and management of ischemic stroke:</td>
<td>50</td>
</tr>
<tr>
<td>Table {4.6}: Distribution of the study sample according to their knowledge about management of hemorrhage stroke, complications and prevention of cerebro vascular accident:</td>
<td>51</td>
</tr>
<tr>
<td>Table {4.7}: Distribution of the study sample according to their knowledge about prognosis, epidemiology and signs of stroke:</td>
<td>52</td>
</tr>
<tr>
<td>Table {4.8}: Distribution of the study sample according to their knowledge about nursing role acute phase, post acute phase of cerebro vascular accident and major goals of patients:</td>
<td>53</td>
</tr>
<tr>
<td>Table {4.9}: Distribution of the study sample according to their knowledge about nursing priorities of cerebro vascular accident, nursing role for improving mobility and How the nurses prepare the patients for ambulation:</td>
<td>54</td>
</tr>
<tr>
<td>Table {4.10}: Distribution of the study sample according to their knowledge about assess the patients to preventing shoulder pain and nursing role to enhance patients' self care and nursing management:</td>
<td>55</td>
</tr>
<tr>
<td>Table {4.11}: Distribution of the study sample according to their knowledge about nurses perform the patients to attaining bowel and bladder control and nursing role for maintaining skin integrity, improve the family coping and helping the patient cope with sexual dysfunction:</td>
<td>56</td>
</tr>
</tbody>
</table>
Table 4.12: Distribution of the study sample according to their attitudes about cerebrovascular accident patients:

Table 4.13: Distribution of the study sample according to their attitudes about cerebrovascular accident patients:
Chapter One Introduction

1.1 Background: 1
1.2 Problem statement 2
1.3 Justification: 3
1.4 Objectives:
  1.4.1 General Objective: 5
  1.4.2 Specific Objectives: 5

Chapter Two Literature Review

2.1 Introduction: 6
2.2 Classification 7
  2.2.1 Ischemic 7
  2.2.2 Hemorrhagic 8
2.3 Causes of Cerebrovascular accident: 8
2.4 Signs and symptoms 11
2.5 Pathophysiology 13
2.6 Diagnosis 16
2.7 Medical Management: 18
2.8 Complications: 22
2.9 Risk factors 23
2.10 Prevention: 26
2.11 Prognosis 27
2.12 Epidemiology 28
2.13 Nursing Role 29
<table>
<thead>
<tr>
<th>Chapter Three Materials and Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Study design:</td>
</tr>
<tr>
<td>3.2 Study area:</td>
</tr>
<tr>
<td>3.3 Study population:</td>
</tr>
<tr>
<td>3.3.1 Inclusion criteria:</td>
</tr>
<tr>
<td>3.3.2 Exclusion criteria:</td>
</tr>
<tr>
<td>3.4 Sample size:</td>
</tr>
<tr>
<td>3.5 Ethical and sampling techniques:</td>
</tr>
<tr>
<td>3.6 Data collection tool:</td>
</tr>
<tr>
<td>3.7 Data analysis:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter Four Results and Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Results:</td>
</tr>
<tr>
<td>4.2 Discussion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter Five Conclusion and Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Conclusion:</td>
</tr>
<tr>
<td>5.2 Recommendations:</td>
</tr>
<tr>
<td>References</td>
</tr>
<tr>
<td>Appendix</td>
</tr>
<tr>
<td>Abbreviation</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>ADLs</td>
</tr>
<tr>
<td>ATP</td>
</tr>
<tr>
<td>CABG</td>
</tr>
<tr>
<td>CVA</td>
</tr>
<tr>
<td>CHD</td>
</tr>
<tr>
<td>CPSS</td>
</tr>
<tr>
<td>DVT</td>
</tr>
<tr>
<td>FAST</td>
</tr>
<tr>
<td>LAPSS</td>
</tr>
<tr>
<td>LACI</td>
</tr>
<tr>
<td>OCSP</td>
</tr>
<tr>
<td>PACI</td>
</tr>
<tr>
<td>PFO</td>
</tr>
<tr>
<td>PEG</td>
</tr>
<tr>
<td>SSNF</td>
</tr>
<tr>
<td>SLP</td>
</tr>
<tr>
<td>TACI</td>
</tr>
<tr>
<td>TOAST</td>
</tr>
<tr>
<td>TMS</td>
</tr>
<tr>
<td>TOAST</td>
</tr>
<tr>
<td>US</td>
</tr>
<tr>
<td>UTI</td>
</tr>
<tr>
<td>WHO</td>
</tr>
</tbody>
</table>
1. Introduction

1.1 Background:

The World Health Organization defined stroke as a "neurological deficit of cerebrovascular cause that persists beyond 24 hours or is interrupted by death within 24 hours", although the word "stroke" is centuries old. This definition was supposed to reflect the reversibility of tissue damage and was devised for the purpose, with the time frame of 24 hours being chosen arbitrarily. The 24-hour limit divides stroke from transient ischemic attack, which is a related syndrome of stroke symptoms that resolve completely within 24 hours. With the availability of treatments which can reduce stroke severity when given early, many now prefer alternative terminology, such as brain attack and acute ischemic cerebrovascular syndrome (modeled after heart attack and acute coronary syndrome, respectively), to reflect the urgency of stroke symptoms and the need to act swiftly. (WHO, 2009)

A cerebrovascular accident is the medical term for a stroke. A stroke is when blood flow to a part of the brain is stopped either by a blockage or a rupture of a blood vessel. There are important signs of a stroke that you should be aware of and watch out for. If you think that you or someone around you might be having a stroke, it is important to seek medical attention immediately. The more quickly you get treatment, the better the prognosis. When a stroke goes untreated for too long, there can be permanent brain damage. (Sims N, et al, 2009).

Cerebrovascular accident: The sudden death of some brain cells due to lack of oxygen when the blood flow to the brain is impaired by blockage or rupture of an artery of to the brain. A CVA is also referred to as a stroke. (Kumar et al, 2010).

The role of the nurse is one of “care” and is undoubtedly broad, particularly as nurses are responsible for patients 24-hours a day. The broad discipline of nursing has been categorised in the literature in a number of different ways. Kirkevold (1997) described the therapeutic role of the stroke nurse by dividing it into 4 categories: Interpretative (help patients understand stroke); consoling (provide emotional support); conserving (preventing complications, maintaining normal functions and meeting essential patient needs); and integrative (helping patients meet rehabilitation goals). However, Kirkevold (1997) found little literature between 1989 and 1995 to
support the validity of this framework. By reviewing the literature, Bisnaire (1998) divided stroke nursing into 4 categories by the type of research study conducted by nurses, which included studies about: nurses; the experience of stroke; the caregiver of stroke survivors; and various interventions and their impact on outcome. A more recent qualitative study focusing on the nursing role within stroke rehabilitation found three role categories of the nurse including: the nurse as a caregiver; facilitator of personal recovery; and care manager (Burton 2000). However, stroke care is no longer confined to rehabilitation and should include acute care which aims to prevent damage to the already vulnerable brain. Nurses need to address the confusion that surrounds their role within the stroke unit multidisciplinary team. (Perry et al, 2004).

1.2 Problem statement

Almost 800,000 people will have a stroke this year in the United States. There is one stroke every forty seconds and one stroke-related death every four minutes in the United States (American Heart Association, 2010). Because of the remarkable frequency of strokes, it is probable that a stroke will affect each one of us at some point in our lives, either directly or indirectly. A stroke, also known as a brain attack, is a life-threatening condition that decreases oxygen delivery to the brain (National Stroke Association, 2010).

Developed countries: Over the last decade, particularly in Scotland there has been a substantial investment on stroke care. Publication of the Chest Heart Disease (CHD) and Stroke Strategy document of 2002, led to the government promising £40 million for CHD and Stroke over a 3 year period to help implement developments in line with the strategy (Scottish Executive, 2002). At this time the development of Managed Clinical Networks for stroke encouraged NHS boards to look closely at services and stroke service development, and a National Advisory Committee for Stroke was formed (Scottish Executive, 2004). In 2005 the Stroke Research Networks (including the Scottish Stroke Network) were set up across the country to increase participation in research studies, as well as involving stroke patients and their carers in network activities (UK Stroke Research Network, 2008). Another professional body, the Scottish Stroke Nurses Forum (SSNF), was officially launched in 2003. It aims to disseminate good practice, improve educational opportunity and support stroke nurses by facilitating knowledge and expertise. The forum recognised it would
require a greater understanding of stroke nurses’ clinical practice and their priorities for increased knowledge and awareness (Scottish Stroke Nurse Forum, 2008).

Developing countries: Family members may have a genetic tendency for stroke or share a lifestyle that contributes to stroke. Higher levels of Von Willebrand factor are more common amongst people who have had ischemic stroke for the first time. The results of this study found that the only significant genetic factor was the person's blood type. Having had a stroke in the past greatly increases one's risk of future strokes. (Stam, J. 2005).

A cerebrovascular accident or stroke is a sudden-onset cerebral deficit of vascular origin lasting more than 24 hours. These events represent the second leading cause of death in the world and take a particularly heavy toll in third world countries. The median size of ischemic and hemorrhagic lesions were 2.81 cm3, and 26.98 cm3 respectively. Hemorrhagic stroke and lacunar infarcts were more common in this sample. Discrepancies between results at the two hospitals may be due to the use of different imaging techniques. Indeed, MRI is known to be more sensitive than CT-scan for acute detection of stroke lesions.

In Sudan: Cerebrovascular accident (CVAs) represents a major cause of death and disability among women. Age, hypertension, diabetes mellitus, hyperlipidemia, obesity and heart disease are known predisposing factors for the development of stroke (Shadia, I et al, 2011

1.3 Justification:

Nurses, who are essential members of the stroke multidisciplinary team frequently spend the highest proportion of time with patients thus it seems reasonable to assume that in some way and to some extent nursing interventions contribute to improving stroke patients’ outcomes. However, there still remains a lack of nursing research in the literature, possibly because nursing is a difficult discipline to quantify. Currently, stroke is a research priority therefore it is vital to consult stroke nurses to determine their research priorities of particular relevance to nursing practice.
The role of the nurse is one of “care” and is undoubtedly broad, particularly as nurses are responsible for patients 24-hours a day. The therapeutic role of the stroke nurse by dividing it into 4 categories: Interpretative (help patients understand stroke); consoling (provide emotional support); conserving (preventing complications, maintaining normal functions and meeting essential patient needs); and integrative (helping patients meet rehabilitation goals).

The purpose of the overall study was to assess emergency registered nurses’ knowledge and attitudes of evidence-based stroke care. The research questions of investigation are: What is the knowledge based of emergency registered nurses of evidence-based stroke care? What are the levels of knowledge among different demographic groups of registered nurses? The study will focus exclusively on the latter research questions.
1.4 Objectives:

1.4.1 General Objective:

- To study nurses' knowledge regarding nursing care of cerebrovascular accident patients at Wad Medani Emergency Hospital, Wad Medani, Gezira State, Sudan in the period of September 2014 to February 2015.

1.4.2 Specific Objectives:

- To assess nurses' knowledge as regards to variables of cerebrovascular accident patients care during the period of the study.
- To assess nurse's knowledge regarding cerebrovascular accident patients' care during the period of the study.
2. Literature Review

2.1 Introduction:

Stroke is the second leading cause of death and the leading cause of severe adult disability (WHO, 2003). Specialist stroke unit care, provided by a multidisciplinary team who are knowledgeable and interested in stroke, saves lives and reduces the need for long term institutional care (Stroke Unit Trialists' Collaboration, 2007). The components of care that contribute most to the benefits and are the most cost effective are still being rigorously debated. Nurses, who are essential members of the stroke multidisciplinary team frequently spend the highest proportion of time with patients thus it seems reasonable to assume that in some way and to some extent nursing interventions contribute to improving stroke patients’ outcomes.

However, there still remains a lack of nursing research in the literature, possibly because nursing is a difficult discipline to quantify. Currently, stroke is a research priority therefore it is vital to consult stroke nurses to determine their research priorities of particular relevance to nursing practice (Scottish Government, 2008; Department of Health (DH), 2007). Through consultation with nurses we can ensure that the research truly reflects the nature of stroke nursing care and is of particular relevance to stroke nursing practice.

A stroke is caused by the interruption of the blood supply to the brain, usually because a blood vessel bursts or is blocked by a clot. This cuts off the supply of oxygen and nutrients, causing damage to the brain tissue. The most common symptom of a stroke is sudden weakness or numbness of the face, arm or leg, most often on one side of the body. Other symptoms include: confusion, difficulty speaking or understanding speech; difficulty seeing with one or both eyes; difficulty walking, dizziness, loss of balance or coordination; severe headache with no known cause; fainting or unconsciousness. The effects of a stroke depend on which part of the brain is injured and how severely it is affected. A very severe stroke can cause sudden death. (Donnan, GA, et al, 2008). A stroke occurs when blood flow to a part of the brain stops. A stroke is sometimes called a "brain attack". If blood flow is cut off for longer than a few seconds, the brain cannot get nutrients oxygen. Brain cells can die, causing lasting damage.
Cerebrovascular accident: The sudden death of some brain cells due to lack of oxygen when the blood flow to the brain is impaired by blockage or rupture of an artery of to the brain. A CVA is also referred to as a stroke. (Kumar et al, 2010). The most common symptom is weakness or paralysis of one side of the body with partial or complete loss of voluntary movement or sensation in a leg or arm. There can be speech problems and weak face muscles, causing drooling. Numbness or tingling is very common. A stroke involving the base of the brain can affect balance, vision, swallowing, breathing and even unconsciousness. A stroke is a medical emergency. Anyone suspected of having a stroke should be taken immediately to a medical facility for diagnosis and treatment. A cerebrovascular accident is the medial term for a stroke. A stroke is when blood flow to a part of your brain is stopped either by a blockage or a rupture of a blood vessel. There are important signs of a stroke around you might be having a stroke, it is important to seek medical attention immediately. The more quickly you get treatment, the better the prognosis. When a stroke goes untreated for too long, there can be permanent brain damage (Kumar et al, 2010).

2.2 Classification

Strokes can be classified in two major categories:

2.2.1 Ischemic

Cerebral infarction and Brain ischemia: In an ischemic stroke, blood supply to part of the brain is decreased, leading to dysfunction of the brain tissue in that area. There are four reasons why this might happen:

1. Thrombosis (obstruction of a blood vessel by a blood clot forming locally)

2. Embolism (obstruction due to an embolus from elsewhere in the body, see below),

3. Systemic hypoperfusion (general decrease in blood supply, e.g., in shock)

4. Venous thrombosis.

Stroke without an obvious explanation is termed "cryptogenic" (of unknown origin); this constitutes 30-40% of all ischemic strokes.
There are various classification systems for acute ischemic stroke. The Oxford Community Stroke Project classification (OCSP, also known as the Bamford or Oxford classification) relies primarily on the initial symptoms; based on the extent of the symptoms, the stroke episode is classified as total anterior circulation infarct (TACI), partial anterior circulation infarct (PACI), lacunar infarct (LACI) or posterior circulation infarct (POCI). These four entities predict the extent of the stroke, the area of the brain that is affected, the underlying cause, and the prognosis. The TOAST (Trial of Org 10172 in Acute Stroke Treatment) classification is based on clinical symptoms as well as results of further investigations; on this basis, a stroke is classified as being due to thrombosis or embolism due to atherosclerosis of a large artery, embolism of cardiac origin, occlusion of a small blood vessel, other determined cause, undetermined cause (two possible causes, no cause identified, or incomplete investigation). Users of stimulant drugs such as cocaine and methamphetamine are at a high risk for ischemic strokes. (O'Sullivan, B. 2007).

2.2.2 Hemorrhagic

Intracranial hemorrhage is the accumulation of blood anywhere within the skull vault. A distinction is made between intra-axial hemorrhage (blood inside the brain) and extra-axial hemorrhage (blood inside the skull but outside the brain). Intra-axial hemorrhage is due to intraparenchymal hemorrhage or intraventricular hemorrhage (blood in the ventricular system). The main types of extra-axial hemorrhage are epidural hematoma (bleeding between the dura mater and the skull), subdural hematoma (in the subdural space) and subarachnoid hemorrhage (between the arachnoid mater and pia mater). Most of the hemorrhagic stroke syndromes have specific symptoms (e.g., headache, previous head injury). (Kumar et al, 2010).

2.3 Causes of Cerebrovascular accident:

2.3.1 Thrombotic stroke:

In thrombotic stroke a thrombus (blood clot) usually forms around atherosclerotic plaques. Since blockage of the artery is gradual, onset of symptomatic thrombotic strokes is slower. A thrombus itself (even if non-occluding) can lead to an
embolic stroke (see below) if the thrombus breaks off, at which point it is called an "embolus." Two types of thrombosis can cause stroke

Large vessel disease involves the common and internal carotids, vertebral, and the Circle of Willis. Diseases that may form thrombi in the large vessels include (in descending incidence): atherosclerosis, vasoconstriction (tightening of the artery), aortic, carotid or vertebral artery dissection, various inflammatory diseases of the blood vessel wall (Takayasu arteritis, giant cell arteritis, vasculitis), noninflammatory vasculopathy, Moyamoya disease and fibromuscular dysplasia.

Small vessel disease involves the smaller arteries inside the brain: branches of the circle of Willis, middle cerebral artery, stem, and arteries arising from the distal vertebral and basilar artery. Diseases that may form thrombi in the small vessels include (in descending incidence): lipohyalinosis (build-up of fatty hyaline matter in the blood vessel as a result of high blood pressure and aging) and fibrinoid degeneration (stroke involving these vessels are known as lacunar infarcts) and microatheroma (small atherosclerotic plaques).

Sickle-cell anemia, which can cause blood cells to clump up and block blood vessels, can also lead to stroke. A stroke is the second leading killer of people under 20 who suffer from sickle-cell anemia (Kumar et al, 2010).

2.3.2 Embolic stroke

An embolic stroke refers to the blockage of an artery by an arterial embolus, a traveling particle or debris in the arterial bloodstream originating from elsewhere. An embolus is most frequently a thrombus, but it can also be a number of other substances including fat (e.g., from bone marrow in a broken bone), air, cancer cells or clumps of bacteria (usually from infectious endocarditis). Because an embolus arises from elsewhere, local therapy solves the problem only temporarily. Thus, the source of the embolus must be identified. Because the embolic blockage is sudden in onset, symptoms usually are maximal at start. Also, symptoms may be transient as the embolus is partially resorbed and moves to a different location or dissipates altogether (Kumar et al, 2010).

2.3.3 Cerebral hypoperfusion
Cerebral hypoperfusion is the reduction of blood flow to all parts of the body. It is most commonly due to heart failure from cardiac arrest or arrhythmias, or from reduced cardiac output as a result of myocardial infarction, pulmonary embolism, pericardial effusion, or bleeding. Hypoxemia (low blood oxygen content) may precipitate the hypoperfusion. Because the reduction in blood flow is global, all parts of the brain may be affected, especially "watershed" areas - border zone regions supplied by the major cerebral arteries. A watershed stroke refers to the condition when blood supply to these areas is compromised. Blood flow to these areas does not necessarily stop, but instead it may lessen to the point where brain damage can occur (Herderschee D, et al, 2009).

2.3.4 Venous thrombosis

Cerebral venous sinus thrombosis leads to stroke due to locally increased venous pressure, which exceeds the pressure generated by the arteries. Infarcts are more likely to undergo hemorrhagic transformation (leaking of blood into the damaged area) than other types of ischemic stroke. (Herderschee D, et al, 2009).

2.3.5 Intracerebral hemorrhage

It generally occurs in small arteries or arterioles and is commonly due to hypertension, intracranial vascular malformations (including cavernous angiomas or arteriovenous malformations), cerebral amyloid angiopathy, or infarcts into which secondary haemorrhage has occurred. Other potential causes are trauma, bleeding disorders, amyloid angiopathy, illicit drug use (e.g., amphetamines or cocaine). The hematoma enlarges until pressure from surrounding tissue limits its growth, or until it decompresses by emptying into the ventricular system, CSF or the pial surface. A third of intracerebral bleed is into the brain's ventricles. ICH has a mortality rate of 44 percent after 30 days, higher than ischemic stroke or subarachnoid hemorrhage (which technically may also be classified as a type of stroke). (Herderschee D, et al, 2009).

2.3.6 Silent stroke

A silent stroke is a stroke that does not have any outward symptoms, and the patients are typically unaware they have suffered a stroke. Despite not causing identifiable symptoms, a silent stroke still damages the brain, and places the patient at
increased risk for both transient ischemic attack and major stroke in the future. Conversely, those who have suffered a major stroke are also at risk of having silent strokes. In a broad study in 1998, more than 11 million people were estimated to have experienced a stroke in the United States. Approximately 770,000 of these strokes were symptomatic and 11 million were first-ever silent MRI infarcts or hemorrhages. Silent strokes typically cause lesions which are detected via the use of neuroimaging such as MRI. Silent strokes are estimated to occur at five times the rate of symptomatic strokes. The risk of silent stroke increases with age, but may also affect younger adults and children, especially those with acute anemia. (Verneer SE, et al, 2007)

2.4 Signs and symptoms

Stroke symptoms typically start suddenly, over seconds to minutes, and in most cases do not progress further. The symptoms depend on the area of the brain affected. The more extensive the area of brain affected, the more functions that are likely to be lost. Some forms of stroke can cause additional symptoms. For example, in intracranial hemorrhage, the affected area may compress other structures. Most forms of stroke are not associated with headache, apart from subarachnoid hemorrhage and cerebral venous thrombosis and occasionally intracerebral hemorrhage.

2.4.1 Early recognition

Various systems have been proposed to increase recognition of stroke. Different findings are able to predict the presence or absence of stroke to different degrees. Sudden-onset face weakness, arm drift (i.e., if a person, when asked to raise both arms, involuntarily lets one arm drift downward) and abnormal speech are the findings most likely to lead to the correct identification of a case of stroke increasing the likelihood by 5.5 when at least one of these is present). Similarly, when all three of these are absent, the likelihood of stroke is significantly decreased (~ likelihood ratio of 0.39). While these findings are not perfect for diagnosing stroke, the fact that they can be evaluated relatively rapidly and easily make them very valuable in the acute setting. Proposed systems include FAST (face, arm, speech, and time), as advocated by the Department of Health (United Kingdom) and the Stroke
Association, the American Stroke Association, the National Stroke Association (US), the Los Angeles Prehospital Stroke Screen (LAPSS) and the Cincinnati Prehospital Stroke Scale (CPSS). Use of these scales is recommended by professional guidelines.

For people referred to the emergency room, early recognition of stroke is deemed important as this can expedite diagnostic tests and treatments. A scoring system called ROSIER (recognition of stroke in the emergency room) is recommended for this purpose; it is based on features from the medical history and physical examination. (Kothari RU, et al, 2009).

2.4.2 Subtypes

If the area of the brain affected contains one of the three prominent central nervous system pathways—the spinothalamic tract, corticospinal tract, and dorsal column (medial lemniscus), symptoms may include:

- hemiplegia and muscle weakness of the face
- numbness
- reduction in sensory or vibratory sensation
- initial flaccidity (hypotonicity), replaced by spasticity (hypertonicity), hyperreflexia, and obligatory synergies.

In most cases, the symptoms affect only one side of the body (unilateral). Depending on the part of the brain affected, the defect in the brain is usually on the opposite side of the body. However, since these pathways also travel in the spinal cord and any lesion there can also produce these symptoms, the presence of any one of these symptoms does not necessarily indicate a stroke. (Kidwell CS, et al, 2004)

In addition to the above CNS pathways, the brainstem gives rise to most of the twelve cranial nerves. A stroke affecting the brain stem and brain therefore can produce symptoms relating to deficits in these cranial nerves:

- altered smell, taste, hearing, or vision (total or partial)
- drooping of eyelid (ptosis) and weakness of ocular muscles
- decreased reflexes: gag, swallow, pupil reactivity to light
- decreased sensation and muscle weakness of the face
- balance problems and nystagmus
• altered breathing and heart rate
• weakness in sternocleidomastoid muscle with inability to turn head to one side
• weakness in tongue (inability to protrude and/or move from side to side)  
  (O'Sullivan, B. 2007)

If the cerebral cortex is involved, the CNS pathways can again be affected, but also can produce the following symptoms:

• aphasia (difficulty with verbal expression, auditory comprehension, reading and/or writing; Broca's or Wernicke's area typically involved)
• dysarthria (motor speech disorder resulting from neurological injury)
• apraxia (altered voluntary movements)
• visual field defect
• memory deficits (involvement of temporal lobe)
• hemineglect (involvement of parietal lobe)
• disorganized thinking, confusion, hypersexual gestures (with involvement of frontal lobe)
• lack of insight of his or her, usually stroke-related, disability

If the cerebellum is involved, the patient may have the following:

• altered walking gait
• altered movement coordination
• vertigo and or disequilibrium. (Nor A, et al, 2005)

2.4.3 Associated symptoms

Loss of consciousness, headache, and vomiting usually occurs more often in hemorrhagic stroke than in thrombosis because of the increased intracranial pressure from the leaking blood compressing the brain.

If symptoms are maximal at onset, the cause is more likely to be a subarachnoid hemorrhage or an embolic stroke. (O'Sullivan, Susan B. 2007)

2.5 Pathophysiology
Ischemic: Micrograph showing cortical pseudolaminar necrosis, a finding seen in strokes on medical imaging and at autopsy. H&E-LFB stain.

Micrograph of the superficial cerebral cortex showing neuron loss and reactive astrocytes in a person that suffered a stroke. H&E-LFB stain.

Ischemic stroke occurs because of a loss of blood supply to part of the brain, initiating the ischemic cascade. Brain tissue ceases to function if deprived of oxygen for more than 60 to 90 seconds, and after approximately three hours will suffer irreversible injury possibly leading to death of the tissue, i.e., infarction. (This is why fibrinolytics such as alteplase are given only until three hours since the onset of the stroke.) Atherosclerosis may disrupt the blood supply by narrowing the lumen of blood vessels leading to a reduction of blood flow, by causing the formation of blood clots within the vessel, or by releasing showers of small emboli through the disintegration of atherosclerotic plaques. Embolic infarction occurs when emboli formed elsewhere in the circulatory system, typically in the heart as a consequence of atrial fibrillation, or in the carotid arteries, break off, enter the cerebral circulation, then lodge in and occlude brain blood vessels. Since blood vessels in the brain are now occluded, the brain becomes low in energy, and thus it resorts into using anaerobic metabolism within the region of brain tissue affected by ischemia. Anaerobic metabolism produces less adenosine triphosphate (ATP) but releases a by-product called lactic acid. Lactic acid is an irritant which could potentially destroy cells since it is an acid and disrupts the normal acid-base balance in the brain. The ischemia area is referred to as the "ischemic penumbra" (Wang, J. 2010).

As oxygen or glucose becomes depleted in ischemic brain tissue, the production of high energy phosphate compounds such as adenosine triphosphate (ATP) fails, leading to failure of energy-dependent processes (such as ion pumping) necessary for tissue cell survival. This sets off a series of interrelated events that result in cellular injury and death. A major cause of neuronal injury is release of the excitatory neurotransmitter glutamate. The concentration of glutamate outside the cells of the nervous system is normally kept low by so-called uptake carriers, which are powered by the concentration gradients of ions (mainly Na+) across the cell membrane. However, stroke cuts off the supply of oxygen and glucose which powers the ion pumps maintaining these gradients. As a result the transmembrane ion...
gradients run down, and glutamate transporters reverse their direction, releasing glutamate into the extracellular space. Glutamate acts on receptors in nerve cells (especially NMDA receptors), producing an influx of calcium which activates enzymes that digest the cells' proteins, lipids and nuclear material. Calcium influx can also lead to the failure of mitochondria, which can lead further toward energy depletion and may trigger cell death due to apoptosis. (Wang, J. 2010)

Ischemia also induces production of oxygen free radicals and other reactive oxygen species. These react with and damage a number of cellular and extracellular elements. Damage to the blood vessel lining or endothelium is particularly important. In fact, many antioxidant neuroprotectants such as uric acid and NXY-059 work at the level of the endothelium and not in the brain per se. Free radicals also directly initiate elements of the apoptosis cascade by means of redox signaling.

These processes are the same for any type of ischemic tissue and are referred to collectively as the ischemic cascade. However, brain tissue is especially vulnerable to ischemia since it has little respiratory reserve and is completely dependent on aerobic metabolism, unlike most other organs.

In addition to injurious effects on brain cells, ischemia and infarction can result in loss of structural integrity of brain tissue and blood vessels, partly through the release of matrix metalloproteases, which are zinc- and calcium-dependent enzymes that break down collagen, hyaluronic acid, and other elements of connective tissue. Other proteases also contribute to this process. The loss of vascular structural integrity results in a breakdown of the protective blood brain barrier that contributes to cerebral edema, which can cause secondary progression of the brain injury (Wang, J. 2010).

**Hemorrhagic:** Bleeding within the skull cavity can occur from various causes. Subdural and epidural bleeding mostly are the result of trauma. Hemorrhagic strokes arise from bleeding within the brain parenchyma or intraventricular spaces, and are classified based on their underlying pathology. Some examples of hemorrhagic stroke are hypertensive hemorrhage, ruptured aneurysm, ruptured AV fistula, transformation of prior ischemic infarction, and drug induced bleeding. They result in tissue injury by causing compression of tissue from an expanding hematoma or hematomas. This can distort and injure tissue. In addition, the pressure may lead to a loss of blood supply to
affected tissue with resulting infarction, and the blood released by brain hemorrhage appears to have direct toxic effects on brain tissue and vasculature. Inflammation contributes to the secondary brain injury after hemorrhage. (Wang, J. 2010)

2.6 Diagnosis

A CT showing early signs of a middle cerebral artery stroke with loss of definition of the gyri and grey white boundary

Dens media sign in a patient with middle cerebral artery infarction shown on the left. Right image after 7 hours.

Stroke is diagnosed through several techniques: a neurological examination (such as the NIHSS), CT scans (most often without contrast enhancements) or MRI scans, Doppler ultrasound, and arteriography. The diagnosis of stroke itself is clinical, with assistance from the imaging techniques. Imaging techniques also assist in determining the subtypes and cause of stroke. There is yet no commonly used blood test for the stroke diagnosis itself, though blood tests may be of help in finding out the likely cause of stroke. (Hill M, 2005).

2.6.1 Physical examination

A physical examination, including taking a medical history of the symptoms and a neurological status, helps giving an evaluation of the location and severity of a stroke. It can give a standard score on e.g., the NIH stroke scale.

2.6.2 Imaging

For diagnosing ischemic stroke in the emergency setting:

CT scans (without contrast enhancements)

sensitivity= 16%

specificity= 96%

MRI scan

sensitivity= 83%
specificity= 98%

For diagnosing hemorrhagic stroke in the emergency setting:

- CT scans (without contrast enhancements)
- sensitivity= 89%
- specificity= 100%
- MRI scan
- sensitivity= 81%
- specificity= 100%

For detecting chronic hemorrhages, MRI scan is more sensitive.

For the assessment of stable stroke, nuclear medicine scans SPECT and PET/CT may be helpful. SPECT documents cerebral blood flow and PET with FDG isotope the metabolic activity of the neurons.

**Underlying cause:** 12-lead ECG of a patient with a stroke, showing large deeply inverted T-waves. Various ECG changes may occur in people with strokes and other brain disorders.

When a stroke has been diagnosed, various other studies may be performed to determine the underlying cause. With the current treatment and diagnosis options available, it is of particular importance to determine whether there is a peripheral source of emboli. Test selection may vary, since the cause of stroke varies with age, comorbidity and the clinical presentation. Commonly used techniques include:

- an ultrasound/doppler study of the carotid arteries (to detect carotid stenosis) or dissection of the precerebral arteries;
- an electrocardiogram (ECG) and echocardiogram (to identify arrhythmias and resultant clots in the heart which may spread to the brain vessels through the bloodstream);
- a Holter monitor study to identify intermittent arrhythmias;
- an angiogram of the cerebral vasculature (if a bleed is thought to have originated from an aneurysm or arteriovenous malformation);
- blood tests to determine hypercholesterolemia, bleeding diathesis and some rarer causes such as homocysteinuria. (Kidwell, C, 2004).
2.7 Medical Management:

2.7.1 Ischemic stroke

Definitive therapy is aimed at removing the blockage by breaking the clot down (thrombolysis), or by removing it mechanically (thrombectomy). The philosophical premise underlying the importance of rapid stroke intervention was crystallized as Time is Brain! in the early 1990s. Years later, that same idea, that rapid cerebral blood flow restoration results in fewer brain cells dying, has been proved and quantified. Tight control of blood sugars in the first few hours does not improve outcomes and may cause harm. High blood pressure is also not typically lowered as this has not been found to be helpful.

**Thrombolysis**: Thrombolysis, such as with recombinant tissue plasminogen activator (rtPA), in acute ischemic stroke, when given within three hours of symptom onset results in an overall benefit of 10% with respect to living without disability. It does not, however, improve chances of survival. Benefit is greater the earlier it is used. Between three and four and a half hours the effects are less clear. A 2014 review found a 5% increase in the number of people living without disability at three to six months; however, there was a 2% increased risk of death in the short term. After four and a half hours thrombolysis worsens outcomes. These benefits or lack of benefits occurred regardless of the age of the person treated. There is no reliable way to determine who will have an intracranial hemorrhage post treatment versus who will not.

Its use is endorsed by the American Heart Association and the American Academy of Neurology as the recommended treatment for acute stroke within three hours of onset of symptoms as long as there are not other contraindications (such as abnormal lab values, high blood pressure, or recent surgery). This position for tPA is based upon the findings of two studies by one group of investigators which showed that tPA improves the chances for a good neurological outcome. When administered within the first three hours thrombolysis improves functional outcome without affecting mortality. 6.4% of people with large strokes developed substantial brain hemorrhage as a complication from being given tPA thus part of the reason for increased short term mortality. Additionally, it is the position of the American
Academy of Emergency Medicine that objective evidence regarding the efficacy, safety, and applicability of tPA for acute ischemic stroke is insufficient to warrant its classification as standard of care. Intra-arterial fibrinolysis, where a catheter is passed up an artery into the brain and the medication is injected at the site of thrombosis, has been found to improve outcomes in people with acute ischemic stroke. (Kernan W, 2014).

Hemicraniectomy: Large territory strokes can cause significant edema of the brain with secondary brain injury in surrounding tissue. This phenomenon is mainly encountered in strokes of the middle cerebral artery territory, and is also called "malignant cerebral infarction" because it carries a dismal prognosis. Relief of the pressure may be attempted with medication, but some require hemicraniectomy, the temporary surgical removal of the skull on one side of the head. This decreases the risk of death, although some more people survive with disability who would otherwise have died (Kernan W, 2014).

2.7.2 Hemorrhagic stroke

People with intracerebral hemorrhage require neurosurgical evaluation to detect and treat the cause of the bleeding, although many may not need surgery. Anticoagulants and antithrombotics, key in treating ischemic stroke, can make bleeding worse. People are monitored for changes in the level of consciousness, and their blood pressure, blood sugar, and oxygenation are kept at optimum levels.

Stroke unit: Ideally, people who have had a stroke are admitted to a "stroke unit", a ward or dedicated area in hospital staffed by nurses and therapists with experience in stroke treatment. It has been shown that people admitted to a stroke unit have a higher chance of surviving than those admitted elsewhere in hospital, even if they are being cared for by doctors without experience in stroke. When an acute stroke is suspected by history and physical examination, the goal of early assessment is to determine the cause. Treatment varies according to the underlying cause of the stroke, thromboembolic (ischemic) or hemorrhagic. (Kernan, W, et al, 2014).

2.7.3 Rehabilitation
Stroke rehabilitation is the process by which those with disabling strokes undergo treatment to help them return to normal life as much as possible by regaining and relearning the skills of everyday living. It also aims to help the survivor understand and adapt to difficulties, prevent secondary complications and educate family members to play a supporting role.

A rehabilitation team is usually multidisciplinary as it involves staff with different skills working together to help the patient. These include physicians trained in rehabilitation medicine, clinical pharmacists, nursing staff, physiotherapists, occupational therapists, speech and language therapists, and orthotists. Some teams may also include psychologists and social workers, since at least one third of the people manifest post stroke depression. Validated instruments such as the Barthel scale may be used to assess the likelihood of a stroke patient being able to manage at home with or without support subsequent to discharge from hospital. (Brazzelli, M, et al, 2011).

Good nursing care is fundamental in maintaining skin care, feeding, hydration, positioning, and monitoring vital signs such as temperature, pulse, and blood pressure. Stroke rehabilitation begins almost immediately.

For most people with stroke, physical therapy (PT), occupational therapy (OT) and speech-language pathology (SLP) are the cornerstones of the rehabilitation process. Often, assistive technology such as wheelchairs, walkers and canes may be beneficial. Many mobility problems can be improved by the use of ankle foot orthoses. PT and OT have overlapping areas of expertise, however PT focuses on joint range of motion and strength by performing exercises and re-learning functional tasks such as bed mobility, transferring, walking and other gross motor functions. Physiotherapists can also work with patients to improve awareness and use of the hemiplegic side. Rehabilitation involves working on the ability to produce strong movements or the ability to perform tasks using normal patterns. Emphasis is often concentrated on functional tasks and patient’s goals. One example physiotherapists employ to promote motor learning involves constraint-induced movement therapy. Through continuous practice the patient relearns to use and adapt the hemiplegic limb during functional activities to create lasting permanent changes. OT is involved in training to help relearn everyday activities known as the Activities of daily living.
(ADLs) such as eating, drinking, dressing, bathing, cooking, reading and writing, and toileting. Speech and language therapy is appropriate for patients with the speech production disorders: dysarthria and apraxia of speech, aphasia, cognitive-communication impairments and/or dysphagia (problems with swallowing). (Brazzelli, M, et al, 2011)

Patients may have particular problems, such as dysphagia, which can cause swallowed material to pass into the lungs and cause aspiration pneumonia. The condition may improve with time, but in the interim, a nasogastric tube may be inserted, enabling liquid food to be given directly into the stomach. If swallowing is still deemed unsafe, then a percutaneous endoscopic gastrostomy (PEG) tube is passed and this can remain indefinitely. (Kernan, W, 2014).

Treatment of spasticity related to stroke often involves early mobilizations, commonly performed by a physiotherapist, combined with elongation of spastic muscles and sustained stretching through various positionings. Gaining initial improvement in range of motion is often achieved through rhythmic rotational patterns associated with the affected limb. After full range has been achieved by the therapist, the limb should be positioned in the lengthened positions to prevent against further contractures, skin breakdown, and disuse of the limb with the use of splints or other tools to stabilize the joint. Cold in the form of ice wraps or ice packs have been proven to briefly reduce spasticity by temporarily dampening neural firing rates. Electrical stimulation to the antagonist muscles or vibrations has also been used with some success.

Stroke rehabilitation should be started as quickly as possible and can last anywhere from a few days to over a year. Most return of function is seen in the first few months, and then improvement falls off with the "window" considered officially by U.S. state rehabilitation units and others to be closed after six months, with little chance of further improvement. However, patients have been known to continue to improve for years, regaining and strengthening abilities like writing, walking, running, and talking. Daily rehabilitation exercises should continue to be part of the stroke patient’s routine. Complete recovery is unusual but not impossible and most patients will improve to some extent: proper diet and exercise are known to help the brain to recover.
Some current and future therapy methods include the use of virtual reality and video games for rehabilitation. These forms of rehabilitation offer potential for motivating patients to perform specific therapy tasks that many other forms do not. Many clinics and hospitals are adopting the use of these off-the-shelf devices for exercise, social interaction and rehabilitation because they are affordable, accessible and can be used within the clinic and home.

Other novel non-invasive rehabilitation methods are currently being developed to augment physical therapy to improve motor function of stroke patients, such as transcranial magnetic stimulation (TMS) and transcranial direct-current stimulation (tDCS) and robotic therapies.

A stroke can also reduce people's general fitness. Reduced fitness can reduce capacity for rehabilitation as well as general health. A systematic review found that there are inadequate long-term data about the effects of exercise and training on death, dependence and disability after a stroke. However, cardiorespiratory training added to walking programs in rehabilitation can improve speed, tolerance and independence during walking. (Westover A, et al, 2007).

2.8 Complications:

Complications vary with the severity of the stroke, the part of the brain affected and the amount of time between the onset of stroke and treatment. Individuals who have had an ischemic strokes are at increased risk for having another stroke or myocardial infarction. Heart monitors should be used following stroke, as individuals often will have abnormal or irregular heart rhythms (cardiac arrhythmia), especially atrial fibrillation, which can contribute to thrombus and/or embolus formation and another stroke. Decreased muscle activity following stroke may increase risk of blood clot formation in veins (deep vein thrombosis [DVT]). These blood clots can travel to the lungs (pulmonary embolism) and cause serious respiratory problems or death. Deep vein thrombosis can be prevented by walking for individuals who are ambulatory, compression stroking for individuals who are confined to bed, and/or by medications.

Cognitive dysfunction may affect memory, level of attention and alertness, ability to communicate clearly, and motor skills. Instruction may be misunderstood or
forgotten and the individual may not be able to process information and respond appropriately. The individual may become a threat to his or her own safety, and unable to function responsibly, complete tasks, or operate equipment. Depression affects at least one-third of individuals with stroke (Lokk).

Difficulty swallowing and decreased alertness can allow food or saliva to enter the lungs (aspiration) and cause sudden death due to choking or lung infection (aspiration pneumonia). Seizures occur in approximately 10% of individuals with ischemic stroke (NSA). Urinary incontinence and poor bladder function may result in urinary tract infection (UTI) or kidney problems. Individuals who have had a stroke are at increased risk of falls due to factors such as impaired judgment, poor balance and coordination, and muscle weakness. Uncontrolled muscle spasm can lead to joint stiffness and immobility (contractures). Shoulder injury can result due to decreased muscle tone. Pressure sores (decubitus ulcers) may occur if the individual is immobile and unable to make frequent position changes or is not moved frequently by caretakers. Poor healing of pressure sores and related bacterial contamination may become a source of systemic infection (sepsis). (Law M, 2009).

2.9 Risk factors

The most important modifiable risk factors for stroke are high blood pressure and atrial fibrillation (although magnitude of this effect is small: the evidence from the Medical Research Council trials is that 833 patients have to be treated for 1 year to prevent one stroke). Other modifiable risk factors include high blood cholesterol levels, diabetes, cigarette smoking (active and passive), heavy alcohol consumption and drug use, lack of physical activity, obesity, processed red meat consumption and unhealthy diet. Alcohol use could predispose to ischemic stroke, and intracerebral and subarachnoid hemorrhage via multiple mechanisms (for example via hypertension, atrial fibrillation, rebound thrombocytosis and platelet aggregation and clotting disturbances). Drugs, most commonly amphetamines and cocaine, can induce stroke through intracranial vasculopathy and/or acute hypertension. (Law M, 2009)

No high-quality studies have shown the effectiveness of interventions aimed at weight reduction, promotion of regular exercise, reducing alcohol consumption or smoking cessation. Nonetheless, given the large body of circumstantial evidence, best
medical management for stroke includes advice on diet, exercise, smoking and alcohol use. Medication or drug therapy is the most common method of stroke prevention; carotid endarterectomy can be a useful surgical method of preventing stroke. (Ederle, J, 2006).

Blood pressure: Hypertension (high blood pressure) accounts for 35-50% of stroke risk. Blood pressure reduction of 10 mmHg systolic or 5 mmHg diastolic reduces the risk of stroke by ~40%. Lowering blood pressure has been conclusively shown to prevent both ischemic and hemorrhagic strokes. It is equally important in secondary prevention. Even patients older than 80 years and those with isolated systolic hypertension benefit from antihypertensive therapy. The available evidence does not show large differences in stroke prevention between antihypertensive drugs—therefore, other factors such as protection against other forms of cardiovascular disease should be considered and cost. The routine use of beta-blockers following a stroke or TIA has not been shown to result in benefits.

Blood lipids: High cholesterol levels have been inconsistently associated with (ischemic) stroke. Statins have been shown to reduce the risk of stroke by about 15%. Since earlier meta-analyses of other lipid-lowering drugs did not show a decreased risk, statins might exert their effect through mechanisms other than their lipid-lowering effects.

Diabetes mellitus: Diabetes mellitus increases the risk of stroke by 2 to 3 times. While intensive control of blood sugar has been shown to reduce microvascular complications such as nephropathy and retinopathy it has not been shown to reduce macrovascular complications such as stroke. (Ederle, J2006).

Anticoagulation drugs: Oral anticoagulants such as warfarin have been the mainstay of stroke prevention for over 50 years. However, several studies have shown that aspirin and antiplatelet drugs are highly effective in secondary prevention after a stroke or transient ischemic attack. Low doses of aspirin (for example 75–150 mg) are as effective as high doses but have fewer side effects; the lowest effective dose remains unknown. Thienopyridines (clopidogrel, ticlopidine) "might be slightly more effective" than aspirin and have a decreased risk of gastrointestinal bleeding, but they are more expensive. Their exact role remains controversial. Ticlopidine has more skin rash, diarrhea, neutropenia and thrombotic thrombocytopenic purpura. Dipyridamole
can be added to aspirin therapy to provide a small additional benefit, even though headache is a common side effect. Low-dose aspirin is also effective for stroke prevention after sustaining a myocardial infarction. (Law MR, Morris JK, 2009)

Those with atrial fibrillation have a 5% a year risk of stroke, and this risk is higher in those with valvular atrial fibrillation. Depending on the stroke risk, anticoagulation with medications such as warfarin or aspirin is useful for prevention. Except for in atrial fibrillation, oral anticoagulants are not advised for stroke prevention — any benefit is offset by bleeding risk.

In primary prevention however, antiplatelet drugs did not reduce the risk of ischemic stroke while increasing the risk of major bleeding. Further studies are needed to investigate a possible protective effect of aspirin against ischemic stroke in women.

Surgery: Carotid endarterectomy or carotid angioplasty can be used to remove atherosclerotic narrowing (stenosis) of the carotid artery. There is evidence supporting this procedure in selected cases. Endarterectomy for a significant stenosis has been shown to be useful in the prevention of further strokes in those who have already had one. Carotid artery stenting has not been shown to be equally useful. Patients are selected for surgery based on age, gender, degree of stenosis, time since symptoms and patients' preferences. Surgery is most efficient when not delayed too long — the risk of recurrent stroke in a patient who has a 50% or greater stenosis is up to 20% after 5 years, but endarterectomy reduces this risk to around 5%. The number of procedures needed to cure one patient was 5 for early surgery (within two weeks after the initial stroke), but 125 if delayed longer than 12 weeks. (Brazzelli M, et al, 2011).

Screening for carotid artery narrowing has not been shown to be a useful screening test in the general population. Studies of surgical intervention for carotid artery stenosis without symptoms have shown only a small decrease in the risk of stroke. To be beneficial, the complication rate of the surgery should be kept below 4%. Even then, for 100 surgeries, 5 patients will benefit by avoiding stroke, 3 will develop stroke despite surgery, 3 will develop stroke or die due to the surgery itself, and 89 will remain stroke-free but would also have done so without intervention. (Law MR, Morris JK, 2009)
Diet: Nutrition, specifically the Mediterranean-style diet, has the potential for decreasing the risk of having a stroke by more than half. It does not appear that lowering levels of homocysteine with folic acid affects the risk of stroke.

Women: A number of specific recommendations have been made for women including: taking aspirin after the 11th week of pregnancy if there is a history of previous chronic high blood pressure, blood pressure medications in pregnancy if the blood pressure is greater than 150 mmHg systolic or greater than 100 mmHg diastolic. In those who have previously had preeclampsia other risk factors should be treated more aggressively.

Previous stroke or TIA: Keeping blood pressure below 140/90 mmHg is recommended. Anticoagulation can prevent recurrent ischemic strokes. Among people with nonvalvular atrial fibrillation, anticoagulation can reduce stroke by 60% while antiplatelet agents can reduce stroke by 20%. However, a recent meta-analysis suggests harm from anti-coagulation started early after an embolic stroke. Stroke prevention treatment for atrial fibrillation is determined according to the CHADS/CHADS2 system. The most widely used anticoagulant to prevent thromboembolic stroke in patients with nonvalvular atrial fibrillation is the oral agent warfarin while a number of newer agents including dabigatran are alternatives which do not require prothrombin time monitoring.

Anticoagulants, when used following stroke, should not be stopped for dental procedures. If studies show carotid stenosis, and the person has residual function in the affected side, carotid endarterectomy (surgical removal of the stenosis) may decrease the risk of recurrence if performed rapidly after stroke. (Law M, 2009).

2.10 Prevention:

Given the disease burden of strokes, prevention is an important public health concern. Primary prevention is less effective than secondary prevention (as judged by the number needed to treat to prevent one stroke per year). Recent guidelines detail the evidence for primary prevention in stroke. In those who are otherwise healthy aspirin does not appear beneficial and thus is not recommended. In people who have had a myocardial infarction or those with a high cardiovascular it provides some protection against a first stroke. In those who have previously had a stroke, treatment
with medications such as aspirin, clopidogrel and dipyridamole be beneficial. The U.S. Preventive Services Task Force (USPSTF) recommends against screening for carotid artery stenosis in those without symptoms. (Brazzelli, M, et al, 2011).

2.11 Prognosis

Disability affects 75% of stroke survivors enough to decrease their employability. Stroke can affect peoples physically, mentally, emotionally, or a combination of the three. The results of stroke vary widely depending on size and location of the lesion. Dysfunctions correspond to areas in the brain that have been damaged. Some of the physical disabilities that can result from stroke include muscle weakness, numbness, pressure sores, pneumonia, incontinence, apraxia (inability to perform learned movements), difficulties carrying out daily activities, appetite loss, speech loss, vision loss and pain. If the stroke is severe enough, or in a certain location such as parts of the brainstem, coma or death can result. (Brazzelli, M, et al, 2011).

Emotional problems following a stroke can be due to direct damage to emotional centers in the brain or from frustration and difficulty adapting to new limitations. Post-stroke emotional difficulties include anxiety, panic attacks, flat affect (failure to express emotions), mania, apathy and psychosis. Other difficulties may include a decreased ability to communicate emotions through facial expression, body language and voice.

Disruption in self-identity, relationships with others, and emotional well-being can lead to social consequences after stroke due to the lack of ability to communicate. Many patients who experience communication impairments after a stroke find it more difficult to cope with the social issues rather than physical impairments. Broader aspects of care must address the emotional impact speech impairment has on those who experience difficulties with speech after a stroke. Those who experience a stroke are at risk for paralysis which could result in a self disturbed body image which may also lead to other social issues.

30 to 50% of stroke survivors suffer post-stroke depression, which is characterized by lethargy, irritability, sleep disturbances, lowered self-esteem and
withdrawal. Depression can reduce motivation and worsen outcome, but can be treated with antidepressants.

Emotional lability, another consequence of stroke, causes the patient to switch quickly between emotional highs and lows and to express emotions inappropriately, for instance with an excess of laughing or crying with little or no provocation. While these expressions of emotion usually correspond to the patient's actual emotions, a more severe form of emotional lability causes patients to laugh and cry pathologically, without regard to context or emotion. Some patients show the opposite of what they feel, for example crying when they are happy. Emotional lability occurs in about 20% of stroke patients.

Cognitive deficits resulting from stroke include perceptual disorders, Aphasia, dementia, and problems with attention and memory. A stroke sufferer may be unaware of his or her own disabilities, a condition called anosognosia. In a condition called hemispatial neglect, a patient is unable to attend to anything on the side of space opposite to the damaged hemisphere.

Cognitive and psychological outcome after a stroke can be affected by the age at which the stroke happened, pre-stroke baseline intellectual functioning, psychiatric history and whether there is pre-existing brain pathology.

Up to 10% of people following a stroke develop seizures, most commonly in the week subsequent to the event; the severity of the stroke increases the likelihood of a seizure. (Brazzelli, M, et al, 2011).

2.12 Epidemiology

- **Morbidity:** In 2005, prevalence of stroke was estimated at 2.3 million males and 3.4 million females; many of the approximately 5.7 million U.S. stroke survivors have permanent stroke-related disabilities.
- **Mortality:** In 2004, stroke ranked fifth as the cause of death for those aged 45 to 64 years and third for those aged 65 years or older (National Heart, Lung and Blood Institute [NHLBI], 2007), with 150,000 deaths (American Heart Association and American Stroke Association, 2008); hemorrhagic strokes are more severe, and mortality rates are higher than ischemic strokes, with a 30-day
mortality rate of 40% to 80%. (American Heart Association and American Stroke Association, 2008).

2.13 Nursing Role

Acute Phase

Acute phase starts during the first three days. Weigh patient (used to determine medication dosages), and maintain a neurologic flow sheet to reflect the following nursing assessment parameters:

- Change in level of consciousness or responsiveness, ability to speak, and orientation
- Presence or absence of voluntary or involuntary movements of the extremities: muscle tone, body posture, and head position
- Stiffness or flaccidity of the neck
- Eye opening, comparative size of pupils and pupillary reactions to light, and ocular position
- Color of face and extremities; temperature and moisture of skin
- Quality and rates of pulse and respiration; ABGs, body temperature, and arterial pressure
- Volume of fluids ingested or administered and volume of urine excreted per 24 hours
- Signs of bleeding
- Blood pressure maintained within normal limits

Postacute Phase

Assess the following functions:

- Mental status (memory, attention span, perception, orientation, affect, speech/language).
- Sensation and perception (usually the patient has decreased awareness of pain and temperature).
- Motor control (upper and lower extremity movement); swallowing ability, nutritional and hydration status, skin integrity, activity tolerance, and bowel and bladder function.
• Continue focusing nursing assessment on impairment of function in patient’s daily activities.

Nursing Diagnoses

• Impaired physical mobility related to hemiparesis, loss of balance and coordination, spasticity, and brain injury
• Acute pain related to hemiplegia and disuse
• Deficient self-care (bathing, hygiene, toileting, dressing, grooming, and feeding) related to stroke sequelae
• Disturbed sensory perception (kinesthetic, tactile, or visual) related to altered sensory reception, transmission, and/or integration
• Impaired swallowing
• Impaired urinary elimination related to flaccid bladder, detrusor instability, confusion, or difficulty in communicating
• Disturbed thought processes related to brain damage
• Impaired verbal communication related to brain damage
• Risk for impaired skin integrity related to hemiparesis or hemiplegia, decreased mobility
• Interrupted family processes related to catastrophic illness and caregiving burdens
• Sexual dysfunction related to neurologic deficits or fear of failure

Potential Complications

• Decreased cerebral blood flow due to increased ICP
• Inadequate oxygen delivery to the brain
• Pneumonia

Planning and Goals

The major goals for the patient (and family) may include improved mobility, avoidance of shoulder pain, achievement of self-care, relief of sensory and perceptual deprivation, prevention of aspiration, incontinence of bowel and bladder, improved thought processes, achieving a form of communication, maintaining skin integrity,
restored family functioning, improved sexual function, and absence of complications.
Goals are affected by knowledge of what the patient was like before the stroke.

**Nursing Priorities**

1. Promote adequate cerebral perfusion and oxygenation.
2. Prevent/minimize complications and permanent disabilities.
3. Assist patient to gain independence in ADLs.
5. Provide information about disease process/prognosis and treatment/rehabilitation needs.

**Nursing Interventions**

**Improving Mobility and Preventing Deformities**

- Position to prevent contractures; use measures to relieve pressure, assist in maintaining good body alignment, and prevent compressive neuropathies.
- Apply a splint at night to prevent flexion of affected extremity.
- Prevent adduction of the affected shoulder with a pillow placed in the axilla.
- Elevate affected arm to prevent edema and fibrosis.
- Position fingers so that they are barely flexed; place hand in slight supination. If upper extremity spasticity is noted, do not use a hand roll; dorsal wrist splint may be used.
- Change position every 2 hours; place patient in a prone position for 15 to 30 minutes several times a day.

**Establishing an Exercise Program**

- Provide full range of motion four or five times a day to maintain joint mobility, regain motor control, prevent contractures in the paralyzed extremity, prevent further deterioration of the neuromuscular system, and enhance circulation. If tightness occurs in any area, perform range of motion exercises more frequently.
- Exercise is helpful in preventing venous stasis, which may predispose the patient to thrombosis and pulmonary embolus.
• Observe for signs of pulmonary embolus or excessive cardiac workload during exercise period (eg, shortness of breath, chest pain, cyanosis, and increasing pulse rate).

• Supervise and support patient during exercises; plan frequent short periods of exercise, not longer periods; encourage patient to exercise unaffected side at intervals throughout the day.

Preparing for Ambulation

• Start an active rehabilitation program when consciousness returns (and all evidence of bleeding is gone, when indicated).

• Teach patient to maintain balance in a sitting position, then to balance while standing (use a tilt table if needed).

• Begin walking as soon as standing balance is achieved (use parallel bars and have wheelchair available in anticipation of possible dizziness).

• Keep training periods for ambulation short and frequent.

Preventing Shoulder Pain

• Never lift patient by the flaccid shoulder or pull on the affected arm or shoulder.

• Use proper patient movement and positioning (eg, flaccid arm on a table or pillows when patient is seated, use of sling when ambulating).

• Range of motion exercises are beneficial, but avoid over strenuous arm movements.

• Elevate arm and hand to prevent dependent edema of the hand; administer analgesic agents as indicated.

Enhancing Self Care

• Encourage personal hygiene activities as soon as the patient can sit up; select suitable self care activities that can be carried out with one hand.

• Help patient to set realistic goals; add a new task daily.
• As a first step, encourage patient to carry out all self care activities on the unaffected side.
• Make sure patient does not neglect affected side; provide assistive devices as indicated.
• Improve morale by making sure patient is fully dressed during ambulatory activities.
• Assist with dressing activities (eg, clothing with Velcro closures; put garment on the affected side first); keep environment uncluttered and organized.
• Provide emotional support and encouragement to prevent fatigue and discouragement.

Managing Sensory-Perceptual Difficulties

• Approach patient with a decreased field of vision on the side where visual perception is intact; place all visual stimuli on this side.
• Teach patient to turn and look in the direction of the defective visual field to compensate for the loss; make eye contact with patient, and draw attention to affected side.
• Increase natural or artificial lighting in the room; provide eyeglasses to improve vision.
• Remind patient with hemianopsia of the other side of the body; place extremities so that patient can see them.

Assisting with Nutrition

• Observe patient for paroxysms of coughing, food dribbling out or pooling in one side of the mouth, food retained for long periods in the mouth, or nasal regurgitation when swallowing liquids.
• Consult with speech therapist to evaluate gag reflexes; assist in teaching alternate swallowing techniques, advise patient to take smaller boluses of food, and inform patient of foods that are easier to swallow; provide thicker liquids or pureed diet as indicated.
• Have patient sit upright, preferably on chair, when eating and drinking; advance diet as tolerated.
• Prepare for GI feedings through a tube if indicated; elevate the head of bed during feedings, check tube position before feeding, administer feeding
slowly, and ensure that cuff of tracheostomy tube is inflated (if applicable); monitor and report excessive retained or residual feeding.

Attaining Bowel and Bladder Control

- Perform intermittent sterile catheterization during period of loss of sphincter control.
- Analyze voiding pattern and offer urinal or bedpan on patient’s voiding schedule.
- Assist the male patient to an upright posture for voiding.
- Provide highfiber diet and adequate fluid intake (2 to 3 L/day), unless contraindicated.
- Establish a regular time (after breakfast) for toileting.

Improving Thought Processes

- Reinforce structured training program using cognitive perceptual retraining, visual imagery, reality orientation, and cueing procedures to compensate for losses.
- Support patient: Observe performance and progress, give positive feedback, convey an attitude of confidence and hopefulness; provide other interventions as used for improving cognitive function after a head injury.

Improving Communication

- Reinforce the individually tailored program.
- Jointly establish goals, with patient taking an active part.
- Make the atmosphere conducive to communication, remaining sensitive to patient’s reactions and needs and responding to them in an appropriate manner; treat patient as an adult.
- Provide strong emotional support and understanding to allay anxiety; avoid completing patient’s sentences.
- Be consistent in schedule, routines, and repetitions. A written schedule, checklists, and audiotapes may help with memory and concentration; a communication board may be used.
- Maintain patient’s attention when talking with patient, speak slowly, and give one instruction at a time; allow patient time to process.
• Talk to aphasic patients when providing care activities to provide social contact.

Maintaining Skin Integrity

• Frequently assess skin for signs of breakdown, with emphasis on bony areas and dependent body parts.
• Employ pressure relieving devices; continue regular turning and positioning (every 2 hours minimally); minimize shear and friction when positioning.
• Keep skin clean and dry, gently massage healthy dry skin, and maintain adequate nutrition.

Improving Family Coping

• Provide counseling and support to family.
• Involve others in patient’s care; teach stress management techniques and maintenance of personal health for family coping.
• Give family information about the expected outcome of the stroke, and counsel them to avoid doing things for patient that he or she can do.
• Develop attainable goals for patient at home by involving the total health care team, patient, and family.
• Encourage everyone to approach patient with a supportive and optimistic attitude, focusing on abilities that remain; explain to family that emotional lability usually improves with time.

Helping the Patient Cope with Sexual Dysfunction

• Perform indepth assessment to determine sexual history before and after the stroke.
• Interventions for patient and partner focus on providing relevant information, education, reassurance, adjustment
• of medications, counseling regarding coping skills, suggestions for alternative sexual positions, and a means of sexual expression and satisfaction.

Teaching Points

• Teach patients about the “act FAST” Campaign
Teach patient to resume as much selfcare as possible; provide assistive devices as indicated.

• Have occupational therapist make a home assessment and recommendations to help patient become more independent.

• Coordinate care provided by numerous health care professionals; help family plan aspects of care.

• Advise family that patient may tire easily, become irritable and upset by small events, and show less interest in daily events.

• Make referral for home speech therapy. Encourage family involvement. Provide family with practical instructions to help patient between speech therapy sessions.

• Discuss patient’s depression with physician for possible antidepressant therapy.

• Encourage patient to attend community based stroke clubs to give a feeling of belonging and fellowship with others.

• Encourage patient to continue with hobbies, recreational and leisure interests, and contact with friends to prevent social isolation.

• Encourage family to support patient and give positive reinforcement.

• Remind spouse and family to attend to personal health and wellbeing.

**Evaluation**

**Expected Patient Outcomes**

• Achieves improved mobility.

• Has no complaints of pain.

• Achieves self care; performs hygiene care; uses adaptive equipment.

• Demonstrates techniques to compensate for altered sensory reception, such as turning the head to see people or objects.
• Demonstrates safe swallowing.

• Achieves normal bowel and bladder elimination.

• Participates in cognitive improvement program.

• Demonstrates improved communication.

• Maintains intact skin without breakdown.

• Family members demonstrate a positive attitude and coping mechanisms.

• Develops alternative approaches to sexual expression.

**Discharge Goals**

1. Cerebral function improved, neurological deficits resolving/stabilized.
2. Complications prevented or minimized.
3. ADL needs met by self or with assistance of other(s).
4. Coping with situation in positive manner, planning for the future.
5. Disease process/prognosis and therapeutic regimen understood.

**2.14 Previous Studies:**

Study done by Harper JP, (2007). Introduction: The purpose of this pilot study was to assess emergency nurses' knowledge of evidence-based ischemic stroke care. Design and methods: A descriptive, correlational design was used. Emergency nurses (N = 20) working in 2 hospitals in the Mid-Atlantic region completed a 10-item multiple choice test on evidence-based ischemic stroke care. Results: Test scores ranged from 30% to 90%, with a mean of 53% (SD = 12.93) on a scale of 0 to 100%. Forty-five percent (N = 9) of respondents indicated that they read literature on evidence-based ischemic stroke care within the previous 12 months. Respondents who read literature on evidence-based ischemic stroke care had a significantly higher mean test score (P = .04) than did respondents who did not read any literature on evidence-based ischemic stroke care. Only 15% (N = 3) of respondents reported that they had participated in continuing education on evidence-based ischemic stroke care within the previous 12 months. In addition, there was a significant correlation (P =
between number of years worked in emergency nursing as a registered nurse and test scores. Nurses with more years experience in emergency nursing had higher test scores. Discussion: Overall, emergency nurses demonstrated a knowledge deficit in evidence-based ischemic stroke care. The majority of nurses had not participated in continuing education on evidence-based ischemic stroke care within the previous 12 months. Nurses should be provided with evidence-based education on ischemic stroke care and opportunities to participate in continuing education. Harper JP. (2007).

Another study done by Shadia Ibrahim, Abbashar Hussein, et al, (2011). Cerebrovascular Accident (CVAs) represents a major cause of death and disability among women. Age, hypertension, diabetes mellitus, hyperlipidemia, obesity and heart disease are known predisposing factors for the development of stroke. To describe clinical presentation of (CVAs) and to identify risk factors among adult Sudanese female.: This prospective cross sectional hospital based study it was done in (ETH) ELshaab Teaching hospital, in the period between April 2007 and July 2008. 309 Sudanese female where included in the study. The common age group affected was between 70-79 years (27.2%), followed by age group 60-69 (21.4%). Limbs weakness, symptoms in favour of cranial nerves involvement, headache, convulsion, loss of conscious, were the main presenting symptoms. Hypertension is the most common risk factor. Considerable number of our patients had protein C, protein S and Antithrombin 111 deficiency, rare risk factors included anti phospholipids syndrome. The clinical presentation of CVA among Sudanese female dose not differed from what was reported worldwide except there is increased incidence of protein C, protein S and Antithrombin 111 deficiency among our studied group. Keywords: Sudanese, women, stroke. (Shadia I, et al, 2011).

Study done by Thomas, L. et al (2009). Objective: To develop and test an evidence-based scale to assess nurses' knowledge of stroke. Design: Question development by a multidisciplinary group of experts in stroke. Two self-completion questionnaire surveys. Setting: Two stroke units, one general medical and two elderly care wards in three hospitals in the North-East of England. Subjects: Fifty-eight qualified nurses. Interventions: Scale to assess nurses' knowledge of stroke. Results: The overall response rate was 60%. Nurses on stroke units knew more about stroke than those in medical/elderly care wards. The scale was capable of discriminating
between stroke units and medical/elderly care wards: mean difference was 4.18 (95% confidence intervals 1.68-6.69; p <0.001). Cronbach’s alpha was 0.7 indicating adequate internal consistency. Item non-response did not exceed 10% for any question. Conclusions: We have developed a knowledge of stroke scale capable of discriminating between nurses based in stroke units and medical/elderly care wards, with low item non-response and adequate internal consistency. The scale is suitable for use as a component of studies evaluating the nursing of stroke patients. (Thomas, L. et al 2009).

Study done by Othman, Olla Abdulbasit (2011): Cerebrovascular accident is the sudden brain death due to lack of oxygen, when blood flow is impaired by blockage or rupture of a blood vessel in the brain, CVA is also referred to as stroke, it got two main types, ischemic and hemorrhagic, CT scan has become the standard imaging technique to rule out whether if the stroke is ischemic or hemorrhagic, the goal of this research was to evaluate the pattern of CT findings in patients with a clinically diagnosed CVA and show the accuracy of CT scan in diagnosing CVA by giving the type, the size and the location of it also to describe the non-enhanced CT appearance of normal and abnormal brain tissue and to identify the pathologic condition found on CT after relating it to the symptoms and clinical diagnose. This study was carried out in United Arab Emirates, Alqassime hospital in Sharjah, with a group size of 75 patients that were clinically diagnosed with CVA with a group ages that falls between 20 years to 99 years old, 46 patients revealed positive CT diagnose for CVA, most of them were in ages between (40 – 59 years old), females showed high incidence than males in this study both in ischemic and hemorrhagic stroke, ischemic strokes recorded 33 cases of positive scans, while hemorrhagic strokes recorded 13 cases of positive scans percentage of positive CT scans was 61.3% of the whole study. (Othman, Olla Abdulbasit 2011).
3. Materials and Methods

3.1 Study design:

This is a descriptive hospital-based study was conducted aimed at assessing nurses’ knowledge regarding nursing care of cerebrovascular accident patients at Wad Emergency Hospital, Wad Medani Town, Gezira State, Sudan, 2014.

3.2 Study area:

The study was conducted Wad Emergency Hospital, Wad Medani Town, Gezira State, Sudan, 2014. It respondent was from the whole state and neighbouring states (Sinnar, Elgadarif).

This hospital was established on 21 June 2014. It receive patients from whole state and neighbouring states (Sinnar, Elgadarif and Kassala). There are two wards: female ward contents (4 rooms and 16 beds) and male ward contents (3 rooms and 18 beds) and output patients unit (triage), ICU unit contents (14 beds) and critical ill patients unit contents (room B female 4 beds and room B male 6 beds), ECG room (1 bed), Laboratory and statistical unit. Source: Statistical Department of Wad Emergency Hospital, Wad Medani Town, Gezira State, Sudan, 2014.

**Table (3.1): Distribution of manpower in the Wad Medani Emergency Hospital:**

<table>
<thead>
<tr>
<th>Position</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultants</td>
<td>5</td>
</tr>
<tr>
<td>Registrars</td>
<td>15</td>
</tr>
<tr>
<td>Medical officers</td>
<td>21</td>
</tr>
<tr>
<td>Nursing staff</td>
<td>85</td>
</tr>
<tr>
<td>Lab technician</td>
<td>16</td>
</tr>
<tr>
<td>Medical engineering</td>
<td>6</td>
</tr>
<tr>
<td>Radiology technician</td>
<td>8</td>
</tr>
<tr>
<td>Anesthesia technician</td>
<td>10</td>
</tr>
<tr>
<td>Workers</td>
<td>77</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>243</strong></td>
</tr>
</tbody>
</table>

Source: Statistical Department of Wad Emergency Hospital, Wad Medani Town, Gezira State, Sudan, 2014.
3.3 Study population:

All (85) nurses were registered and work in Wad Emergency Hospital, Wad Medani Town, Gezira State, Sudan, during the period of the study from September 2014 to February 2015.

3.3.1 Inclusion criteria:

All the registered nurses who work at the Wad Emergency Hospital, in all wards and come contact with cerebro vascular accident patients.

3.3.2 Exclusion criteria:

All nurses who were not registered and under training in Wad Medani Emergency hospital those who are not available at the time of the study.

3.4 Sample size:

All (57) nurses who are available in Wad Emergency Hospital, Wad Medani Town, Gezira State, Sudan, during the study period from September 2014 to February 2015.

3.5 Ethical and sampling techniques:

- Permission was taken from the manager and matron of Wad Medani emergency hospital.
- Explanation for all nurses about the study and the tool of data collection.
- Each nurse has to complete this questionnaire within 30 – 35 minutes by guidance of the researcher.

3.6 Data collection tool:

Data was collected during September 2014 to February 2015 covering all nurses as follows: developed questionnaire containing questions about socio-demographic characteristic of the nurses, and their knowledge and attitudes about cerebro vascular accident patients care.
3.7 Data analysis:

For the purposes of this study the data was coded, processed and transferred to computer coding. The descriptive analysis was adopted which includes percentages, frequency distribution, table and figures software program statistical package for social science (SPSS).
4. Results

4.1 Results:

Table {4.1}: Distribution of the study sample according to their gender and age groups:

<table>
<thead>
<tr>
<th>Gender</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>8</td>
<td>14.0%</td>
</tr>
<tr>
<td>Female</td>
<td>49</td>
<td>86.0%</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age groups</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 – 25 years</td>
<td>39</td>
<td>68.4%</td>
</tr>
<tr>
<td>26 – 30 years</td>
<td>12</td>
<td>21.1%</td>
</tr>
<tr>
<td>31 – 35 years and more</td>
<td>6</td>
<td>10.5%</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table {4.1} shows that 86.0% of the study sample were females and 68.4% of them at age range between 20 – 25 years.
Table (4.2): Distribution of the study sample according to their level of education:

\[ \text{no} = 57 \]

<table>
<thead>
<tr>
<th>Educational level</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical diploma</td>
<td>20</td>
<td>35.1%</td>
</tr>
<tr>
<td>Bachelor</td>
<td>30</td>
<td>52.6%</td>
</tr>
<tr>
<td>Post graduate</td>
<td>7</td>
<td>12.3%</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (4.2) revealed that 52.6% of the study sample their level of education were bachelor, while 35.1% were technical diploma and only 12.3% post graduate.
Figure 4.1) Distribution of the study sample according to their years of experience:

Figure 4.1 illustrate that 68.4% of the study sample their years of experience range from 1 to 5 years.
Figure {4.2} Distribution of the study sample according to receiving training program before about cerebro vascular accident:

Figure {4.2} illustrate that 70.20% of the study sample had received training program regarding cerebro vascular accident before while 29.80% didn’t.
Figure {4.3} Distribution of the study sample according to their source of knowledge about cerebro vascular accident:

Figure {4.3} illustrate that 87.7% of the study sample their source of knowledge about cerebro vascular accident from college while 8.80% of them from literature.
Table 4.3: Distribution of the study sample according to their knowledge about definition, types and causes of cerebro vascular accident:

No= 57

<table>
<thead>
<tr>
<th>Nurses’ knowledge</th>
<th>Correct complete answers</th>
<th>Correct incomplete answers</th>
<th>Incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Definition of cerebro vascular accident</td>
<td>32</td>
<td>56.1</td>
<td>19</td>
<td>33.3</td>
</tr>
<tr>
<td>Types of cerebro vascular accident</td>
<td>37</td>
<td>64.9</td>
<td>20</td>
<td>35.1</td>
</tr>
<tr>
<td>Causes of cerebro vascular accident</td>
<td>31</td>
<td>54.4</td>
<td>24</td>
<td>42.1</td>
</tr>
</tbody>
</table>

Table 4.3 shows that 56.1% of the study sample responded with correct complete answers regarding definition of cerebro vascular accident and 64.9% and 54.4% of the study sample responded with correct complete answers regarding types and causes of cerebro vascular accident respectively.
Table 4.4: Distribution of the study sample according to their knowledge about risk factors, signs and symptoms cerebro vascular accident and pathophysiology of ischemic stroke:

\[ \text{no } = 57 \]

<table>
<thead>
<tr>
<th>Nurses’ knowledge</th>
<th>Correct complete answers</th>
<th>Correct incomplete answers</th>
<th>Incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Risk factors of cerebro vascular accident</td>
<td>30</td>
<td>52.6</td>
<td>22</td>
<td>38.6</td>
</tr>
<tr>
<td>Signs and symptoms of cerebro vascular accident</td>
<td>33</td>
<td>57.9</td>
<td>18</td>
<td>31.6</td>
</tr>
<tr>
<td>Pathophysiology of ischemic stroke</td>
<td>35</td>
<td>61.4</td>
<td>20</td>
<td>35.1</td>
</tr>
</tbody>
</table>

Table 4.4 revealed that 52.6% of the study sample responded with correct complete answers regarding risk factors of cerebro vascular accident. 57.9% and 61.4% of the study sample responded with correct complete answers regarding signs and symptoms of cerebro vascular accident and pathophysiology of ischemic stroke respectively.
Table 4.5: Distribution of the study sample according to their knowledge about pathophysiology of hemorrhage stroke, diagnosis of cerebro vascular accident and management of ischemic stroke:

<table>
<thead>
<tr>
<th>Nurses’ knowledge</th>
<th>Correct complete answers</th>
<th>Correct incomplete answers</th>
<th>Incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pathophysiology of hemorrhage stroke</td>
<td>31 54.4</td>
<td>22 38.6</td>
<td>4 7.0</td>
<td>57 100</td>
</tr>
<tr>
<td>Diagnosis of cerebro vascular accident</td>
<td>39 68.4</td>
<td>15 26.3</td>
<td>3 5.3</td>
<td>57 100</td>
</tr>
<tr>
<td>Management of ischemic stroke</td>
<td>36 63.2</td>
<td>19 33.3</td>
<td>2 3.5</td>
<td>57 100</td>
</tr>
</tbody>
</table>

Table 4.5 showed that 54.4% of the study sample responded with correct complete answers regarding pathophysiology of hemorrhage stroke while 38.6% of them responded with correct incomplete answers. 68.4% of the subjects responded with correct complete answers regarding diagnosis of cerebro vascular accident while 26.3% of them responded with correct incomplete answers. 63.2% of the study sample responded with correct complete answers regarding management of ischemic stroke while 33.3% of them responded with correct incomplete answers.
Table {4.6}: Distribution of the study sample according to their knowledge about management of hemorrhage stroke, complications and prevention of cerebro vascular accident:

<table>
<thead>
<tr>
<th>Nurses’ knowledge</th>
<th>Correct complete answers</th>
<th>Correct incomplete answers</th>
<th>Incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Management of hemorrhage stroke</td>
<td>35</td>
<td>61.4</td>
<td>18</td>
<td>31.6</td>
</tr>
<tr>
<td>Complications of cerebro vascular accident</td>
<td>45</td>
<td>78.9</td>
<td>10</td>
<td>17.5</td>
</tr>
<tr>
<td>Preventions of cerebro vascular accident</td>
<td>43</td>
<td>75.4</td>
<td>14</td>
<td>24.6</td>
</tr>
</tbody>
</table>

Table {4.6} showed that 61.4% of the study sample responded with correct complete answers regarding management of hemorrhage stroke while 7.0% of them responded with incorrect answers. Regarding complications of cerebro vascular accident 78.9% of the subjects responded with correct complete answers while 3.5% of them responded with incorrect answers. 75.4% of the study sample responded with correct complete answers regarding preventions of cerebro vascular accident while 24.6% of them responded with correct incomplete answers.
Table 4.7: Distribution of the study sample according to their knowledge about prognosis, epidemiology and signs of stroke:

<table>
<thead>
<tr>
<th>Nurses’ knowledge</th>
<th>Correct complete answers</th>
<th>Correct incomplete answers</th>
<th>Incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Prognosis of cerebro vascular accident</td>
<td>40</td>
<td>70.2</td>
<td>15</td>
<td>26.3</td>
</tr>
<tr>
<td>Epidemiology of cerebro vascular accident</td>
<td>39</td>
<td>68.4</td>
<td>16</td>
<td>28.1</td>
</tr>
<tr>
<td>If it is stroke? Check these signs</td>
<td>45</td>
<td>78.9</td>
<td>12</td>
<td>21.1</td>
</tr>
</tbody>
</table>

Table 4.7 showed that 70.2% of the study sample responded with correct complete answers regarding prognosis of cerebro vascular accident while 3.5% of them responded with incorrect answers. 68.4% of the study sample responded with correct complete answers regarding epidemiology of cerebro vascular accident while 3.5% of them responded with incorrect answers.
Table {4.8}: Distribution of the study sample according to their knowledge about nursing role acute phase, post acute phase of cerebro vascular accident and major goals of patients:

<table>
<thead>
<tr>
<th>Nurses’ knowledge</th>
<th>Correct complete answers</th>
<th>Correct incomplete answers</th>
<th>Incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Nursing role of cerebro vascular accident patients</td>
<td>49</td>
<td>86.0</td>
<td>8</td>
<td>14.0</td>
</tr>
<tr>
<td>in acute phase during the first three days</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing role of cerebro vascular accident patients</td>
<td>43</td>
<td>75.4</td>
<td>14</td>
<td>24.6</td>
</tr>
<tr>
<td>in post phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The major goals for patients</td>
<td>30</td>
<td>52.6</td>
<td>25</td>
<td>43.9</td>
</tr>
</tbody>
</table>

Table {4.8} showed that 86.0% of the study sample responded with correct complete answers regarding nursing role of cerebro vascular accident patients in acute phase during the first three days while 14.0% of them responded with correct incomplete answers. 75.4% of the study sample responded with correct complete answers regarding nursing role of cerebro vascular accident patients in post phase while 24.6% of them responded with correct incomplete answers. 52.6% of the study sample responded with correct complete answers regarding the major goals for patients with cerebro vascular accident while 43.9% of them responded with correct incomplete answers.
Table {4.9}: Distribution of the study sample according to their knowledge about nursing priorities of cerebro vascular accident, nursing role for improving mobility and How the nurses prepare the patients for ambulation:

\[no = 57\]

<table>
<thead>
<tr>
<th>Nurses’ knowledge</th>
<th>Correct complete answers</th>
<th>Correct incomplete answers</th>
<th>Incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Nursing priorities of cerebro vascular accident patients</td>
<td>23</td>
<td>40.4</td>
<td>28</td>
<td>49.1</td>
</tr>
<tr>
<td>Nursing role for improving mobility and preventing deformities</td>
<td>20</td>
<td>35.1</td>
<td>29</td>
<td>50.9</td>
</tr>
<tr>
<td>How the nurses prepare the patients for ambulation</td>
<td>31</td>
<td>54.4</td>
<td>26</td>
<td>45.6</td>
</tr>
</tbody>
</table>

Table {4.9} showed that 40.0% of the study sample responded with correct complete answers regarding nursing priorities of cerebrovascular accident patients and 49.1% of the responded with correct incomplete answers.
Table {4.10}: Distribution of the study sample according to their knowledge about assess the patients to preventing shoulder pain and nursing role to enhance patients' self care and nursing management:

\[ n = 0 \ 57 \]

<table>
<thead>
<tr>
<th>Nurses’ knowledge</th>
<th>Correct complete answers</th>
<th>Correct incomplete answers</th>
<th>Incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess the patients to preventing shoulder pain</td>
<td>33 57.9</td>
<td>24 42.1</td>
<td>0 0.0</td>
<td>57 100</td>
</tr>
<tr>
<td>Nursing role to enhance patients' self care</td>
<td>36 63.2</td>
<td>20 35.1</td>
<td>1 1.7</td>
<td>57 100</td>
</tr>
<tr>
<td>Nurses management the sensory perceptual difficulties</td>
<td>37 64.9</td>
<td>20 35.1</td>
<td>0 0.0</td>
<td>57 100</td>
</tr>
</tbody>
</table>

Table {4.10} showed that 57.9% of the study sample responded with correct complete answers regarding to assess the patients to preventing shoulder pain while 42.1% of them responded with correct incomplete answers. 63.2% of the study sample responded with correct complete answers regarding nursing role to enhance patients' self care while 35.1% of them responded with correct incomplete answers.
Table {4.11}: Distribution of the study sample according to their knowledge about nurses perform the patients to attaining bowel and bladder control and nursing role for maintaining skin integrity, improve the family coping and helping the patient cope with sexual dysfunction:

<table>
<thead>
<tr>
<th>Nurses’ knowledge</th>
<th>Correct complete answers</th>
<th>Correct incomplete answers</th>
<th>Incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Nurses perform the patients to attaining bowel and bladder control</td>
<td>30</td>
<td>52.6</td>
<td>27</td>
<td>47.4</td>
</tr>
<tr>
<td>Nursing role for how to assess and maintaining skin integrity</td>
<td>29</td>
<td>50.9</td>
<td>28</td>
<td>49.1</td>
</tr>
<tr>
<td>Nursing role to improve the family coping</td>
<td>27</td>
<td>47.4</td>
<td>30</td>
<td>52.6</td>
</tr>
<tr>
<td>Nursing role to helping the patient cope with sexual dysfunction</td>
<td>25</td>
<td>43.9</td>
<td>31</td>
<td>54.4</td>
</tr>
</tbody>
</table>

Table {4.11} showed that 52.6% of the study sample responded with correct complete answers regarding nurses perform the patients to attaining bowel and bladder control while 47.4% of them responded with correct incomplete answers. 50.9% of the study sample responded with correct complete answers regarding nursing role for how to assess and maintaining skin integrity while 49.1% of them responded with correct incomplete answers. 47.4% of the study sample responded with correct complete answers regarding nursing role to improve the family coping while 52.6% of them responded with correct incomplete answers. 43.9% of the study sample responded with correct complete answers regarding nursing role to help the patient cope with sexual dysfunction improve the family coping while 54.4% of them responded with correct incomplete answers.
Table 4.12: Distribution of the study sample according to their knowledge about cerebro vascular accident patients:

$no = 57$

<table>
<thead>
<tr>
<th>Nurses 'knowledge</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Do you think that cerebro vascular accident can lead</td>
<td>54</td>
<td>94.7</td>
<td>3</td>
</tr>
<tr>
<td>to death</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment of cerebro vascular accident depend on the</td>
<td>53</td>
<td>93.0</td>
<td>4</td>
</tr>
<tr>
<td>time of started treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think all the patients of cerebro vascular</td>
<td>13</td>
<td>22.8</td>
<td>44</td>
</tr>
<tr>
<td>accident discharge from hospital with disability</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.12 showed that 94.7% of the subject said that cerebro vascular accident lead to death and 93.0% of them believed that the treatment of cerebro vascular accident depend on the time of started treatment. 22.8% of respondent think that all the patients of cerebro vascular accident discharge from hospital with disability.
Table {4.13}: Distribution of the study sample according to their knowledge about cerebro vascular accident patients:

\[ \text{no} = 57 \]

<table>
<thead>
<tr>
<th>Nurses’ knowledge</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Do you think the hypertension is the major cause of cerebro vascular accident can lead to death</td>
<td>50</td>
<td>87.7</td>
<td>7</td>
</tr>
<tr>
<td>Do you think the women is highly risk of cerebro vascular accident</td>
<td>22</td>
<td>38.6</td>
<td>35</td>
</tr>
<tr>
<td>Do you think the cerebro vascular accident depending on ethnicity</td>
<td>20</td>
<td>35.1</td>
<td>37</td>
</tr>
</tbody>
</table>

Table {4.12} showed that 87.7% of the subject said that the hypertension is the major cause of cerebro vascular accident and 38.6% of them believed that the women is highly risk of cerebro vascular accident. 35.1% of respondent think that the cerebro vascular accidents depend on ethnicity.
4.2 Discussion

Cerebrovascular accident: The sudden death of some brain cells due to lack of oxygen when the blood flow to the brain is impaired by blockage or rupture of an artery. Brain Stroke is the second leading cause of death and the leading cause of severe adult disability. Nurses, who are essential members of the stroke team frequently spend the highest proportion of time with patients. Thus it seems reasonable to assume that in some way and to some extent nursing interventions contribute to improving stroke patients’ outcomes. A descriptive hospital-based study was conducted at Wad Medani Emergency Hospital aimed at assessing nurses’ knowledge regarding nursing care of Cerebrovascular Accident Patients at Wad Medani Emergency Hospital, Gezira State, Sudan in the period from September 2014 to February 2015. The sample size comprised all (57) available nurses who work in the hospital during the period of the study. Data Collection tool was a structured questionnaire designed by The researcher. The data was analyzed by using statistical package for social sciences (SPSS).

The results showed that (86.0%) of the study sample were females and (68.4%) of them at age range between (20 – 25) years. (52.6%) of the study sample their level of education were bachelor, while (35.1%) were technical diploma and only( 12.3%) post graduate. Also the results illustrate that (68.4%) of the study sample their years of experience range from (1 to 5) years. (70.20%) of the study sample had received training program regarding cerebrovascular accident before while (29.80%) didn’t. (87.7%) of the study sample their source of knowledge about cerebrovascular accident from college while (8.80%) of them from literature. These results was differ to study done by Harper JP, (2007). The purpose of this pilot study was to assess emergency nurses' knowledge of evidence-based ischemic stroke care.

Design and methods: A descriptive, correlational design was used. Emergency nurses (N = 20) working in 2 hospitals in the Mid-Atlantic region completed a 10-item multiple choice test on evidence-based ischemic stroke care. Results: Test scores ranged from (30% to 90%), with a mean of (53%) (SD = 12.93) on a scale of (0 to 100%). Forty-five percent (N = 9) of respondents indicated that they read literature on evidence-based ischemic stroke care within the previous 12 months.
Regarding nurses knowledge the results shows that (56.1%) of the study sample responded with correct complete answers regarding definition of cerebro vascular accident and (64.9%) and (54.4%) of the study sample responded with correct complete answers regarding types and causes of cerebro vascular accident respectively. (52.6%) of the study sample responded with correct complete answers regarding risk factors of cerebro vascular accident. (57.9%) and (61.4%) of the study sample responded with correct complete answers regarding signs and symptoms of cerebro vascular accident and pathophysiology ischemic stroke respectively.

It revealed that (54.4%) of the study sample responded with correct complete answers regarding pathophysiology of hemorrhage stroke while (38.6%) of them responded with correct incomplete answers. (68.4%) of the subjects responded with correct complete answers regarding diagnosis of cerebro vascular accident while (26.3%) of them responded with correct incomplete answers. (63.2%) of the study sample responded with correct complete answers regarding management of ischemic stroke while (33.3%) of them responded with correct incomplete answers.

(61.4%) of the study sample responded with correct complete answers regarding management of hemorrhage stroke while (7.0%) of them responded with incorrect answers. Regarding complications of cerebro vascular accident (78.9%) of the subjects responded with correct complete answers while (3.5%) of them responded with incorrect answers. (75.4%) of the study sample responded with correct complete answers regarding preventions of cerebro vascular accident while (24.6%) of them responded with correct incomplete answers. (70.2%) of the study sample responded with correct complete answers regarding prognosis of cerebro vascular accident while (3.5%) of them responded with incorrect answers. (68.4%) of the study sample responded with correct complete answers regarding epidemiology of cerebro vascular accident while (3.5%) of them responded with incorrect answers.

On the other hand (86.0%) of the study sample responded with correct complete answers regarding nursing role of cerebro vascular accident patients in acute phase during the first three days while (14.0%) of them responded with correct incomplete answers. (75.4%) of the study sample responded with correct complete answers regarding nursing role of cerebro vascular accident patients in post phase while (24.6%) of them responded with correct incomplete answers. (52.6%) of the
study sample responded with correct complete answers regarding the major goals for patients with cerebro vascular accident while (43.9%) of them responded with correct incomplete answers. (57.9%) of the study sample responded with correct complete answers regarding to assess the patients to preventing shoulder pain while (42.1%) of them responded with correct incomplete answers. (63.2%) of the study sample responded with correct complete answers regarding nursing role to enhance patients' self care while (35.1%) of them responded with correct incomplete answers.

(52.6%) of the study sample responded with correct complete answers regarding nurses perform the patients to attaining bowel and bladder control while (47.4%) of them responded with correct incomplete answers. (50.9%) of the study sample responded with correct complete answers regarding nursing role for how to assess and maintaining skin integrity while (49.1%) of them responded with correct incomplete answers. (47.4%) of the study sample responded with correct complete answers regarding nursing role to improve the family coping while (52.6%) of them responded with correct incomplete answers. (43.9%) of the study sample responded with correct complete answers regarding nursing role for how to assess and maintaining skin integrity while (49.1%) of them responded with correct incomplete answers.

Regarding nurses' knowledge the results revealed that (94.7%) of the subject said that cerebro vascular accident lead to death and (93.0%) of them believed that the treatment of cerebro vascular accident depend on the time of started treatment. (22.8%) of respondent think that all the patients of cerebro vascular accident discharge from hospital with disability.

(87.7%) of the subject said that the hypertension is the major cause of cerebro vascular accident and (38.6%) of them believed that the women is highly risk of cerebro vascular accident. (35.1%) of respondent think that the cerebro vascular accidents depend on ethnicity.

These results was differ to study done by Thomas, L. et al (2009). Objective: To develop and test an evidence-based scale to assess nurses' knowledge of stroke. Design: Question development by a multidisciplinary group of experts in stroke. Two self-completion questionnaire surveys. Setting: Two stroke units, one general medical and two elderly care wards in three hospitals in the North-East of England. Subjects:
Fifty-eight qualified nurses. Interventions: Scale to assess nurses' knowledge of stroke. Results: The overall response rate was (60%). Nurses on stroke units knew more about stroke than those in medical/elderly care wards. The scale was capable of discriminating between stroke units and medical/elderly care wards: mean difference was 4.18 (95% confidence intervals 1.68-6.69; p <0.001). Cronbach’s alpha was 0.7 indicating adequate internal consistency. (Thomas, L. et al (2009))
5.1 Conclusion

5.1 Conclusion:

The study concluded that:

- Nurses’ knowledge regarding care of patients with cerebro vascular accident were inadequate especially regarding definition, signs and symptoms, diagnosis and treatment.
- As regard to nurses’ knowledge regarding care of patients with cerebro vascular accident were inadequate.
5.2 Recommendations:

Based on the conclusion of this study it recommended that:

- Routine and periodic training program must be done to all nurses to improve knowledge about patients care with cerebro vascular accident in emergency hospital.
- Proper and continues monitoring and supervision of nurses’ performance is essential.
- Logbook for care of patients with cerebro vascular accident must be design and available in the hospitals, also protocol for nursing management must be done by state ministry of health.
References

1 - WHO Disease and injury country estimates". World Health Organization. Archived from the original on 11 November 2009.

2 - Sims NR, Muyderman H (September 2009). "Mitochondria, oxidative metabolism and cell death in stroke". Biochimica et Biophysica Acta 1802 (1): 80–91


8 - Shadia Ibrahim, Abbashar Hussein, et al, (2011). Stroke in women (Sudanese experience). Corresponding author, Consultant Neurologist, Associated Prof. of Medicine, University of Khartoum, Faculty of Medicine, Department of Medicine, Neurology section. Sudan, American Journal Of Scientific And Industrial Research, Science Huβ, http://www.scihub.org/AJSIR


Questionnaire about Nurses Knowledge Regarding Nursing Care of cerebro Vascular Accident Patients at Wad Medani Emergency Hospital

Gezira state sudan 2014

Personal data:
1. Gender
   - Male ( )
   - Female ( )

2. Age:
   - 20-25 ( )
   - 26-30 ( )
   - 31-35 ( )
   - More than 3 ( )

3. Educational level:
   - Diploma ( )
   - Bachelor ( )
   - Post Graduate ( )

4. Years of Experiences:
   a. 1 to 5 years ( )
   b. 6 to 10 years ( )
   c. 11 to 15 years ( )
   d. More than 15 years ( )

5. Source of Knowledge:
   - From college ( )
   - Literature ( )
   - Others ( )

6. Training program about Cerebro Vascular Accident:
   - Yes ( )
   - No ( )

Nurses Knowledge:

1. Definition of Cerebro Vascular Accident:
   a. A Cerebro Vascular Accident is a medical term for a stroke ( )
   b. A stroke is caused by the interruption of the blood supply to the brain ( )
   b. The sudden death of some brain cells due to lack of oxygen when the blood flow to the brain is impaired by blockage or rupture of an artery to the brain ( )
   d. A stroke is sometimes called “brain attack” ( )
   e. All of the above ( )
   f. None of the above ( )

2. Types of Cerebro Vascular Accident:
A. Ischemic stroke ( )
b. Hemorrhagic stroke ( )
c. All of the above ( )
d. Non of the above ( )
3. Causes of Cerebro Vascular Accident:
   a. Thrombotic stroke ( )
   b. Embolic stroke ( )
   d. Cerebral hypo perfusion ( )
   e. Venous thrombosis ( )
   f. Intra cerebral hemorrhage ( )
   g. Silent stroke ( )
   h. All of the above ( )
i. Non of the above ( )
4. Risk factors:
   a. Hypertension ( )
   b. Diabetes mullets ( )
   g. Heart diseases ( )
   c. Smokers ( )
   e. Women ( )
   f. Age ( )
   g. All of the above ( )
h. Non of the above ( )
5. Sings and symptoms:
   a. Numbness or weakness of the face, arm, leg, especially one side of the body ( )
   b. Confusion or change in mental status ( )
   c. Trouble speaking or understanding speech ( )
   d. Visual disturbance ( )
e. Difficulty walking, dizziness, loss of balance or coordination ( )
f. Sudden severe headache (    )
g. All of the above (    )
h. None of the above (    )

6. Pathophysiology of Ischemic stroke:

a. Ischemic stroke occurs because of a loss of blood supply to part of the brain (    )
b. Narrowing of blood vessels to the brain leading to a reduction of blood flow (    )
c. Blood clots leading to reduction of oxygen to the brain (    )
d. Blood clots leading to reduction of blood glucose to the brain (    )
e. All of the above (    )
f. None of the above (    )

7. Pathophysiology of hemorrhage stroke:

a. Subdural and epidural bleeding mostly are the result of trauma (    )
b. Hemorrhagic strokes arise from bleeding within the brain parenchyma or intra ventricular spaces (    )
c. Ruptured aneurysm or AV fistula (    )
d. Transformation of prior ischemic infarction, and drug induced bleeding (    )
e. All of the above (    )
f. None of the above (    )

8. Diagnosis:

a. CT scan (    )
b. MRI scan (    )
c. Doppler ultrasound, and arteriography (    )
d. Electrocardiogram (ECG) and echocardiogram (    )
e. Blood tests to determine hypercholesterolemia, bleeding diathesis (    )
f. Angiogram of the cerebral vasculature (    )
g. All of the above (    )
h. None of the above (    )

9. Management of Ischemic stroke (    )
a. Thrombolysis, such as with recombinant tissue plasminogen activator (rtPA), in acute ischemic stroke

b. Hemicraniectomy removal of blood clots from the blood vessels by surgery

d. All of the above

e. None of the above

10. management of hemorrhagic stroke:

a. People with intracerebral hemorrhage require neurosurgical evaluation to detect and treat the cause of the bleeding

b. Anticoagulants and antithrombotics, key in treating ischemic stroke, can make bleeding

c. People are monitored for changes in the level of consciousness, and their blood pressure, blood sugar, and oxygenation are kept at optimum levels

11. Complication of Cerebrovascular Accident:

a. Decrease cerebral blood flow

b. Inadequate oxygen delivery to the brain

c. Difficulty swallowing (aspiration - aspiration pneumonia)

d. Seizures

e. Sudden death due to choking or lung infections

f. Urinary and power incontinence

g. Poor balance and coordination, and muscle weakness

h. Shoulder injury can result due to decreased muscle tone

i. Poor healing of pressure sores and related bacterial contamination may become a source of systemic infection (sepsis)

m. All of the above

12. Prevention of Cerebrovascular Accident:

a. Control of hypertension

b. Control of blood glucose

c. Stop smoking and alcohol consumption

d. Control of cholesterol level
13. Prognosis of Cerebro Vascular Accident:
   a. Disability
   b. Emotional problems
   c. Cognitive deficits resulting from stroke include perceptual disorders, Aphasia, dementia, and problems with attention and memory
   d. All of the above
   e. Non of the above

14. Epidemiology of Cerebro Vascular Accident:
   a. Stroke is a second leading cause of death in the world wide
   b. Cerebro Vascular Accident have incidence rate after heart disease and before cancer
   c. All of the above
   d. Non of the above

15. Is it stroke? Check these signs:
   a. Face
   b. Arm
   c. Speech
   d. Time
   e. All of the above
   f. Non of the above

16. What is the nursing role of Cerebro Vascular Accident patients in acute phase starts during the first three days:
   a. Change in level of consciousness or responsiveness, ability to speak, and orientation
   b. Presence or absence of voluntary or involuntary movements of the extremities: muscle tone, body posture, and head position
c. Stiffness or flaccidity of the neck (   )
d. Eye opening, comparative size of pupils and pupillary reactions to light, and ocular position (   )
e. Color of face and extremities; temperature and moisture of skin (   )
f. Quality and rates of pulse and respiration; ABGs, body temperature, and arterial pressure (   )
g. Volume of fluids ingested or administered and volume of urine excreted per 24 hours (   )
h. Signs of bleeding (   )
i. Blood pressure maintained within normal limits (   )
j. All of the above (   )
k. All of the above (   )

17. What is the nursing role of Cerebro Vascular Accident patients in post acute phase

a. Mental status (memory, attention span, perception, orientation, affect, speech/language). (   )
b. Sensation and perception (usually the patient has decreased awareness of pain and temperature). (   )
c. Motor control (upper and lower extremity movement); swallowing ability, nutritional and hydration status, skin integrity, activity tolerance, and bowel and bladder function. (   )
d. Continue focusing nursing assessment on impairment of function in patient’s daily activities (   )
e. All of the above (   )
f. None of the above (   )

18. The major goals of the patient (and family) may include:

a. Improved mobility (   )
b. Avoidance of shoulder pain (   )
c. Achievement of self-care (   )
d. Relief of sensory and perceptual deprivation (   )
e. Prevention of aspiration, incontinence of bowel and bladder (   )
f. improved thought processes achieving a form of communication ( )

g. maintaining skin integrity, restored family functioning, improved sexual function, and absence of complications
h. All of the above ( )

i. None of the above ( )

19. Nursing priorities of Cerebro Vascular Accident:

a. Promote adequate cerebral perfusion and oxygenation ( )

b. Prevent/minimize complications and permanent disabilities ( )

c. Assist patient to gain independence in ADLs ( )

d. Support coping process and integration of changes into self-concept. ( )

e. Provide information about disease process/prognosis and treatment/rehabilitation needs. ( )

g. All of the above ( )

h. None of the above ( )

20. For Improving Mobility and Preventing Deformities the nursing role are:

a. Position to prevent contractures; use measures to relieve pressure, assist in maintaining good body alignment, and prevent compressive neuropathies. ( )

b. Apply a splint at night to prevent flexion of affected extremity. ( )

c. Prevent adduction of the affected shoulder with a pillow placed in the axilla.

d. Elevate affected arm to prevent edema and fibrosis. ( )

e. Position fingers so that they are barely flexed; place hand in slight supination. If upper extremity spasticity is noted, do not use a hand roll; dorsal wrist splint may be used. ( )

f. Change position every 2 hours; place patient in a prone position for 15 to 30 minutes several times a day. ( )

  g. All of the above ( )

  h. None of the above ( )

21. How the nurse preparing the patient for ambulation:

a. Start an active rehabilitation program when consciousness returns (and all evidence of bleeding is gone, when indicated). ( )
b. Teach patient to maintain balance in a sitting position, then to balance while standing (use a tilt table if needed). (   )

c. Begin walking as soon as standing balance is achieved (use parallel bars and have wheelchair available in anticipation of possible dizziness). (   )

d. Keep training periods for ambulation short and frequent. (   )

e. All of the above (   )

f. Non of the above (   )

22. How the nurse to assist the patients to preventing shoulder pain:

a. Never lift patient by the flaccid shoulder or pull on the affected arm or shoulder (   )

b. Use proper patient movement and positioning (eg, flaccid arm on a table or pillows when patient is seated, use of sling when ambulating). (   )

c. Range of motion exercises are beneficial, but avoid over strenuous arm movements. (   )

d. Elevate arm and hand to prevent dependent edema of the hand; administer analgesic agents as indicated. (   )

e. All of the above (   )

f. Non of the above (   )

23. The nursing role to enhancing patients self care:

a. Encourage personal hygiene activities as soon as the patient can sit up; select suitable self care activities that can be carried out with one hand. (   )

b. Help patient to set realistic goals; add a new task daily. (   )

c. As a first step, encourage patient to carry out all self care activities on the unaffected side.

d. Make sure patient does not neglect affected side; provide assistive devices as indicated. (   )

e. Improve morale by making sure patient is fully dressed during ambulatory activities. (   )

f. Assist with dressing activities (eg, clothing with Velcro closures; put garment on the affected side first); keep environment uncluttered and organized (   )

g. Provide emotional support and encouragement to prevent fatigue and discouragement. (   )

h. All of the above (   )
24. How the nurse managing the Sensory-Perceptual Difficulties:

a. Approach patient with a decreased field of vision on the side where visual perception is intact; place all visual stimuli on this side. ( )

b. Teach patient to turn and look in the direction of the defective visual field to compensate for the loss; make eye contact with patient, and draw attention to affected side. ( )

c. Increase natural or artificial lighting in the room; provide eyeglasses to improve vision. ( )

d. Remind patient with hemianopsia of the other side of the body; place extremities so that patient can see them. ( )

e. All of the above ( )

f. Non of the above ( )

25. How the nurse perform the patient to attaining bowel and bladder control:

a. Perform intermittent sterile catheterization during period of loss of sphincter control ( )

b. Analyze voiding pattern and offer urinal or bedpan on patient’s voiding schedule ( )

c. Assist the male patient to an upright posture for voiding. ( )

d. Provide highfiber diet and adequate fluid intake (2 to 3 L/day), unless contraindicated. ( )

e. Establish a regular time (after breakfast) for toileting. ( )

f. All of the above ( )

g. Non of the above ( )

26. The nursing role for how to assess and maintain skin integrity:

a. Frequently assess skin for signs of breakdown, with emphasis on bony areas and dependent body parts. ( )

b. Employ pressure relieving devices; continue regular turning and positioning (every 2 hours minimally); minimize shear and friction when positioning. ( )
d. Keep skin clean and dry, gently massage healthy dry skin, and maintain adequate nutrition. ( )

27. To improving family coping:
   a. Provide counseling and support to family ( )
   b. Involve others in patient’s care; teach stress management techniques and maintenance of personal health for family coping ( )
   c. Give family information about the expected outcome of the stroke, and counsel them to avoid doing things for patient that he or she can do. ( )
   d. Develop attainable goals for patient at home by involving the total health care team, patient, and family. ( )
   e. Encourage everyone to approach patient with a supportive and optimistic attitude, focusing on abilities that remain; explain to family that emotional lability usually improves with time. ( )
   f. All of the above ( )
   g. Non of the above ( )

28. Helping the patient cope with sexual dysfunction:
   a. Perform indepth assessment to determine sexual history before and after the stroke. ( )
   b. Interventions for patient and partner focus on providing relevant information, education, reassurance, adjustment ( )
   c. All of the above ( )
   d. Non of the above ( )

29. Answer by Yes or No:

<table>
<thead>
<tr>
<th>Questions</th>
<th>Yes</th>
<th>NO</th>
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<tbody>
<tr>
<td>You think that cerebro vascular accident can be lead to death</td>
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<tr>
<td>Treatment of cerebro vascular accident dependent on the time of started treatment</td>
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<td>Do you think all the patients of cerebro vascular accident discharge from hospital with disability</td>
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<td>Do you think the hypertension is the major cause of cerebro vascular accident</td>
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<td>Do you think the women is highly risk for cerebro vascular accident</td>
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<td>Do you think the of cerebro vascular accident depending on ethnicity</td>
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