



A PROSPECTIVE OBSERVATIONAL STUDY ON PRESCRIBING PATTERNS OF DIRECT ORAL ANTI-COAGULANTS IN STROKE PATIENTS WITH ATRIAL FIBRILLATION AND EVALUATION OF EFFECT OF PATIENT COUNSELLING IN IMPROVING THE MEDICATION RECONCILIATION

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ABSTRACT

Atrial fibrillation (AF) is the most prevalent sustained cardiac arrhythmia encountered in clinical practice and is associated with a significantly increased risk of ischemic stroke. Anticoagulant therapy is crucial for lowering the risk of stroke in patients with atrial fibrillation (AF), and because of their fixed dosage, predictable pharmacokinetics, and reduced dietary and medication interactions, Direct Oral Anticoagulants (DOACs) are gradually taking the place of conventional vitamin K antagonists.

Despite these benefits, real-world DOAC prescribing practices frequently deviate from professional recommendations because of things like patient characteristics, comorbidities, physician choice, and limitations in the healthcare system. To find practice gaps and improve patient outcomes, it is essential to comprehend these prescribing trends in the context of stroke patients who have AF. Furthermore, reducing adverse drug events depends on medication reconciliation, which makes sure that complete and correct prescription information is shared across care transitions. Although patient counselling has been acknowledged as a crucial tactic to improve drug comprehension and adherence, little is known about how well it works to improve medication reconciliation outcomes for stroke patients receiving DOAC therapy.

KEYWORDS:

Direct Oral Anticoagulants (DOACs), CHA₂DS₂-VASc Score, Atrial Fibrillation

1. INTRODUCTION

A stroke, also known as a cerebrovascular accident (CVA), is a medical condition that occurs when the blood supply to a part of the brain is interrupted or significantly reduced, depriving brain tissue of oxygen and nutrients. This can lead to the rapid death of brain cells ⁽¹⁾. Strokes can be classified into two main types: ischemic and hemorrhagic. Ischemic strokes, the more common type, are caused by a blockage in a blood vessel supplying the brain, often due to a clot ⁽²⁾. Hemorrhagic strokes occur when a blood vessel in the brain bursts, leading to bleeding within or around the brain tissue ⁽³⁾.

The symptoms of a stroke can vary depending on the area of the brain affected but often include sudden weakness or numbness in the face, arm, or leg, particularly on one side of the body; Confusion; Trouble Speaking or understanding speech; Difficulty Seeing in one or both eyes; Difficulty Walking; Dizziness; and Loss of Balance or Coordination ⁽⁴⁾. Prompt recognition and treatment of stroke symptoms are crucial, as early intervention can significantly improve outcomes and reduce the risk of long-term disability ⁽⁵⁾.

Risk factors for stroke include high blood pressure, smoking, diabetes, high cholesterol, obesity, physical inactivity, unhealthy diet, and a family history of stroke ⁽⁶⁾. Other conditions such as atrial fibrillation and heart disease also increase the risk ⁽⁷⁾. Preventive measures focus on lifestyle modifications and medical management of underlying conditions to reduce the likelihood of stroke occurrence ⁽⁸⁾.

The impact of a stroke can be life-altering, leading to physical, cognitive, and emotional challenges ⁽⁹⁾. Rehabilitation and recovery vary depending on the severity and location of the stroke, with many patients requiring multidisciplinary care involving physical therapy, occupational therapy, speech therapy, and psychological support ⁽¹⁰⁾. Advances in medical treatments, such as clot-dissolving medications and surgical interventions, have improved the prognosis for stroke patients, emphasizing the importance of timely medical attention ⁽¹¹⁾.

Atrial Fibrillation (AF) is the most common sustained cardiac arrhythmia, characterized by rapid and irregular electrical activity in the atria, leading to ineffective atrial contractions and increased

risk of blood clots. It is more common with advancing age and is associated with risk factors such as hypertension, heart failure, diabetes, obesity, and hyperthyroidism. Symptoms vary from palpitations and fatigue to dizziness and breathlessness, though some individuals may remain asymptomatic. AF is classified based on duration into paroxysmal, persistent, long-standing persistent, or permanent.

The most serious complication of AF is stroke, with AF increasing the risk by up to five times. Stroke risk is due to thrombus formation, particularly in the left atrial appendage⁽¹⁰⁾. Diagnosis is confirmed by ECG and further evaluated using echocardiography and lab investigations to determine underlying causes. Management focuses on three goals: rate control, rhythm control, and stroke prevention. Rate control is achieved using beta-blockers or calcium channel blockers, while rhythm control involves antiarrhythmic drugs, electrical cardioversion, or catheter ablation⁽¹¹⁾.

Stroke prevention is a key priority in AF management, and anticoagulation is guided by the CHA₂DS₂-VASc score. Warfarin, a vitamin K antagonist, has long been used, but newer direct oral anticoagulants (DOACs) like dabigatran, rivaroxaban, apixaban, and edoxaban offer similar or improved efficacy with fewer bleeding risks and without the need for frequent INR monitoring⁽¹²⁾. While DOACs may slightly increase gastrointestinal bleeding risk, they significantly reduce intracranial haemorrhage and overall mortality compared to warfarin.

Lifestyle modification is essential in reducing AF burden and improving outcomes. Managing hypertension, diabetes, obesity, and sleep apnoea, along with reducing alcohol and caffeine intake, plays a critical role⁽¹³⁾. With proper management, including the use of anticoagulants and rhythm or rate control strategies, many patients with AF can live normal lives and significantly reduce their risk of complications such as stroke and heart failure⁽¹⁴⁾.

1.1 STROKE:

A stroke is a medical emergency that occurs when the blood supply to a part of the brain is interrupted or reduced, preventing brain tissue from getting oxygen and nutrients⁽¹⁵⁾. This can cause brain cells to begin dying within minutes, leading to potential brain damage, disability, or even death if not treated promptly⁽¹⁸⁾

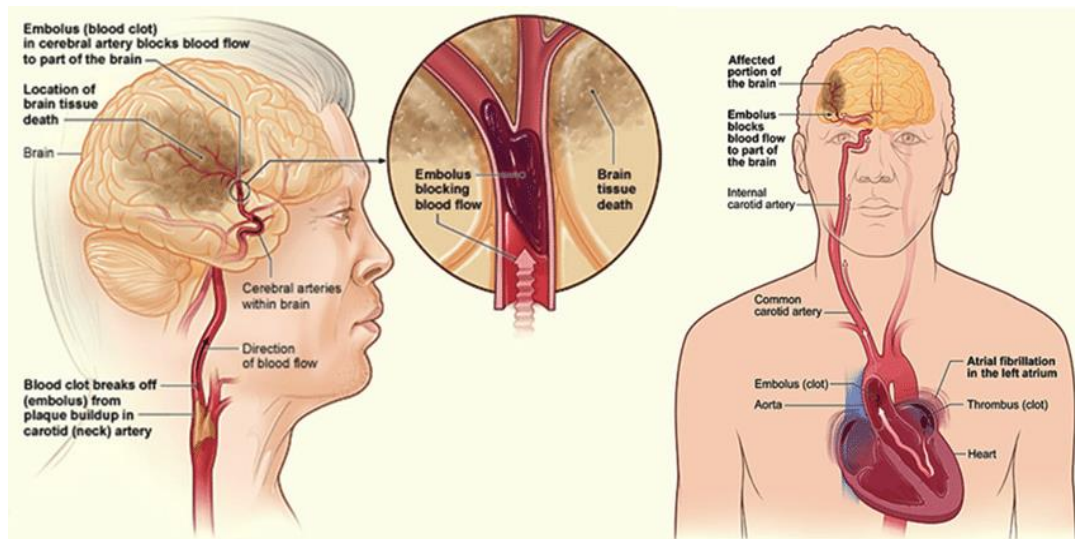


Fig 1.1 STROKE

1.2 TYPES OF STROKE

- Ischemic Stroke – Caused by a blockage (blood clot) in an artery supplying blood to the brain. It accounts for about 85% of all strokes ⁽¹⁹⁾.
- Haemorrhagic Stroke – Caused by bleeding in the brain due to a ruptured blood vessel ⁽²⁰⁾.
- Transient Ischemic Attack (TIA) – Also called a "mini-stroke," this is a temporary blockage that resolves on its own but serves as a warning sign for future strokes ⁽²¹⁾.

1.3 STAGES OF STROKE

A stroke occurs in progressive stages, from early warning signs to potential long-term effects. Understanding these stages can help in early intervention and recovery.

1.3.1. Pre-Stroke (Risk & Warning Signs)

- This stage includes factors that increase the risk of stroke, such as:
- High blood pressure, diabetes, high cholesterol ⁽²²⁾.
- Unhealthy lifestyle habits (smoking, alcohol, obesity) ⁽²³⁾.
- Transient Ischemic Attack (TIA) – also called a mini-stroke, which serves as an early warning sign of a major stroke ⁽²⁴⁾.

1.3.2. Acute Stroke (Onset & Immediate Effects)

A stroke occurs when blood flow to a part of the brain is blocked or a blood vessel bursts. Symptoms appear suddenly, including:

- Numbness or weakness in the face, arm, or leg (especially on one side) ⁽²⁵⁾.
- Confusion, trouble speaking, or understanding speech ⁽²⁶⁾.
- Vision problems, dizziness, loss of balance ⁽²⁷⁾.
- Severe headache (in hemorrhagic stroke) ⁽²⁷⁾.

1.3.3. Emergency Response & Treatment

For Ischemic Stroke (caused by a clot): Clot-busting drugs (tPA) or mechanical clot removal
For Hemorrhagic Stroke (caused by bleeding): Surgery or medications to control bleeding and pressure in the brain.

The golden window for treatment is within 3 to 4.5 hours of symptom onset for better recovery chances. ⁽²⁵⁾

1.3.4. Post-Stroke (Recovery & Rehabilitation)

After the stroke, brain function recovery depends on the severity and location of damage.
Physical therapy (to regain movement and strength)

Speech therapy (for communication difficulties) Occupational therapy
(to regain daily living skills)⁽²⁶⁾

1.3.5. Chronic Stage (Long-Term Effects & Management)

Some patients recover fully, while others may have permanent disabilities. Possible complications: paralysis, memory loss, speech problems, depression.

Lifestyle changes and continuous medical care help in preventing recurrent strokes. ⁽²⁷⁾

1.4 ETIOLOGY

The etiology of stroke refers to the underlying causes and risk factors that contribute to its occurrence. Strokes are primarily classified into ischemic (caused by blockages) and hemorrhagic (caused by bleeding), each with distinct causes ⁽¹⁾.

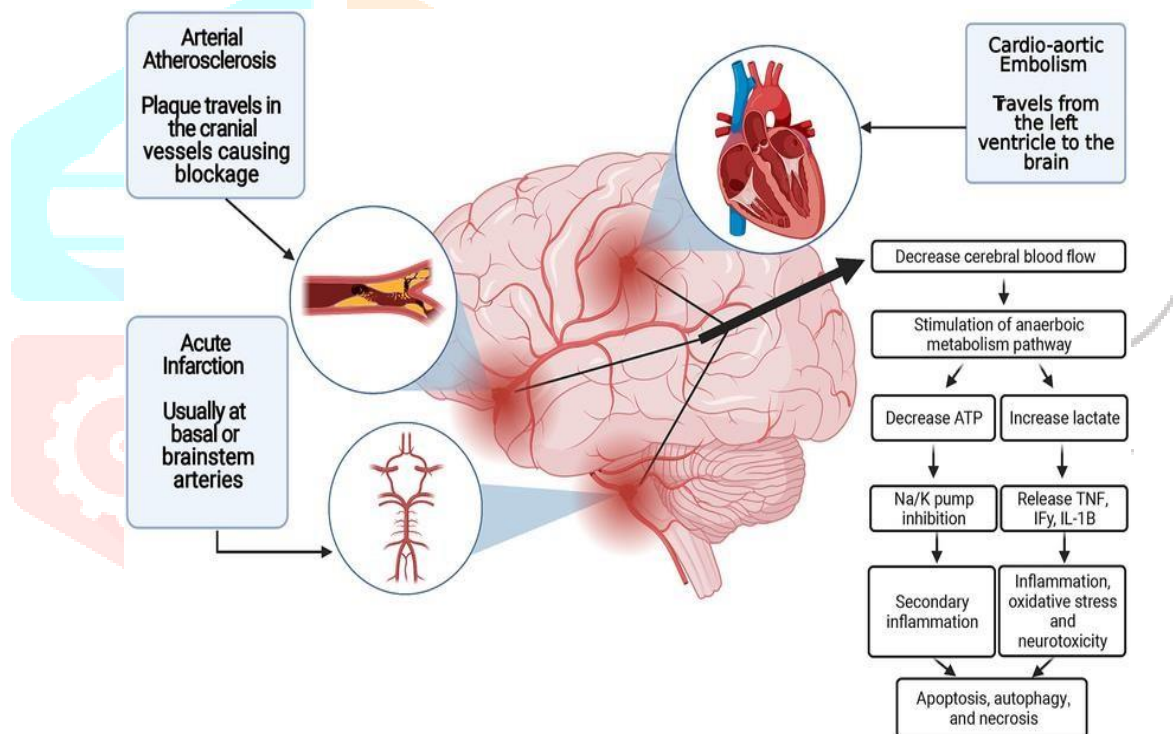


Fig1.4: Etiology of Stroke

1.4.1 Etiology of Ischemic Stroke (Blockage of Blood Flow) – 85% of Strokes

⁽²¹⁾. Occurs due to obstruction in blood supply to the brain, leading to oxygen deprivation.

- ❖ Thrombosis (Blood Clot in Brain Artery)
 - Atherosclerosis (fatty deposits in blood vessels) ⁽¹⁾.
 - High cholesterol levels ⁽²²⁾.
 - Diabetes
- ❖ Embolism (Blood Clot or Debris from Another Part of the Body)
 - Atrial fibrillation (irregular heartbeat causing clots in the heart) ⁽²⁴⁾.

- Heart valve diseases
- Carotid artery stenosis (narrowing of neck arteries)
- ❖ Reduced Systemic Blood Flow (Hypoperfusion)⁽²⁵⁾
- Severe dehydration
- Heart failure or shock
- Low blood pressure (hypotension)

1.4.2 Etiology of Hemorrhagic Stroke (Brain Bleeding) – 15% of Strokes

Occurs due to the rupture of a blood vessel, leading to internal bleeding in the brain.⁽²⁵⁾

- ❖ Intracerebral Hemorrhage (Bleeding Inside the Brain Tissue)
 - Hypertension (High Blood Pressure) – Most common cause
 - Aneurysm Rupture – Weakened blood vessel walls
 - Trauma or Head Injury
- ❖ Subarachnoid Haemorrhage (Bleeding Around the Brain)
 - Ruptured aneurysm
 - Arteriovenous malformation (AVM) – Abnormal blood vessel connections
 - Blood clotting disorders (coagulopathy)

1.4.3 Other Risk Factors Contributing to Stroke ⁽²⁶⁾.

- ❖ Non-Modifiable Risk Factors (Uncontrollable)
 - Age (risk increases with age)
 - Gender (men are more prone, but women have higher fatality rates)
 - Family history of stroke
 - Genetic disorders affecting blood vessels
- ❖ Modifiable Risk Factors (Controllable)⁽²⁷⁾
 - Hypertension (Primary Risk Factor for All Strokes)
 - Smoking & excessive alcohol consumption
 - High cholesterol & obesity
 - Diabetes & poor diet
 - Physical inactivity
 - Stress & chronic inflammation

SCREENING OF STROKE



Fig1.5:Screening for Stroke

Early detection of stroke risk factors and warning signs can help in timely prevention and treatment. Stroke screening involves a combination of clinical assessments, imaging techniques, and laboratory tests to identify potential risks. ⁽²⁷⁾

1.4.4 Clinical Screening (FAST Test for Early Signs)⁽²⁸⁾

The FAST method is a quick screening tool for stroke symptoms:

- F – Face drooping (Is one side of the face drooping or numb?)
- A – Arm weakness (Can the person lift both arms, or does one drift down?)
- S – Speech difficulty (Is speech slurred or hard to understand?)
- T – Time to call emergency services

1.4.5 Physical & Neurological Examination

Doctors assess stroke risk by checking:

- Blood pressure (high BP is a major risk factor)⁽²⁹⁾
- Pulse irregularities (detects atrial fibrillation)
- Neurological tests (reflexes, muscle strength, coordination)
- Carotid artery auscultation (listening for abnormal blood flow sounds)

1.4.6 Imaging Tests for Stroke Detection

- CT Scan (Computed Tomography) – Detects brain haemorrhages, clots, or swelling
- MRI (Magnetic Resonance Imaging) – Identifies early-stage ischemic strokes
- Carotid Ultrasound – Checks for blockages in neck arteries
- Cerebral Angiography – Visualizes blood flow in brain arteries

1.4.7 Laboratory Tests for Stroke Risk Factors

- Lipid Profile – Measures cholesterol levels (high LDL increases stroke risk)⁽³⁰⁾
- Blood Sugar (HbA1c Test) – Identifies diabetes, a stroke risk factor
- Complete Blood Count (CBC) – Checks for anaemia or infections affecting circulation
- Coagulation Tests (PT/INR, D-dimer) – Evaluates blood clotting abnormalities
- Homocysteine & C-Reactive Protein (CRP) Tests – Detects inflammation-related stroke risks

1.4.8 Heart & Blood Vessel Screening⁽³¹⁾

- Electrocardiogram (ECG/EKG) – Detects irregular heart rhythms like atrial fibrillation

- Echocardiography – Evaluates heart function and clot formation
- 24-hour Holter Monitoring – Monitors irregular heartbeat episodes

1.4.9 Genetic & Lifestyle Risk Assessments

- Family history screening for hereditary stroke risks
- Lifestyle evaluations – Smoking, alcohol use, diet, exercise habits

1.5 PATHOPHYSIOLOGY OF STROKE

The pathophysiology of stroke refers to the sequence of biological and physiological changes that occur when blood flow to the brain is disrupted, leading to brain tissue damage⁽³³⁾. Stroke is classified into ischemic stroke (caused by a blockage) and haemorrhagic stroke (caused by bleeding).⁽¹⁸⁾

Pathophysiology of Ischemic Stroke (Blocked Blood Flow - 85%)

- Step 1: Vascular Occlusion (Blocked Artery)⁽³⁴⁾

A blood clot (thrombus or embolus) blocks a cerebral artery, reducing or stopping oxygen-rich blood flow.

Common causes: Atherosclerosis, atrial fibrillation, carotid artery disease.

- Step 2: Ischemia & Energy Failure

Reduced oxygen (hypoxia) leads to decreased ATP production in brain cells.

Failure of ion pumps (Na^+/K^+ pump) causes sodium and calcium buildup inside neurons.

- Step 3: Cell Swelling & Excitotoxicity

Lack of ATP causes neuronal swelling (cytotoxic oedema).

Excess glutamate release leads to excitotoxicity, which damages neurons.

- Step 4: Free Radical Formation & Inflammation

Oxygen-starved brain tissue produces free radicals, causing oxidative stress. Inflammatory response (microglia activation) worsens tissue damage.

- Step 5: Ischemic Core vs. Penumbra

Ischemic core: Area with complete blood flow loss; irreversible cell death.

Penumbra: Surrounding region with partial blood flow; can be saved with quick treatment.

Pathophysiology of Haemorrhagic Stroke (Brain Bleeding - 15%)

- Step 1: Blood Vessel Rupture

A weakened blood vessel bursts, leading to intracerebral or subarachnoid haemorrhage⁽³⁸⁾. Causes: Hypertension, aneurysm rupture, head trauma, blood clotting disorders.

- Step 2: Blood Leakage & Pressure Buildup

Leaked blood accumulates inside the brain, increasing intracranial pressure (ICP). Increased pressure reduces oxygen delivery, causing brain cell injury.

- Step 3: Toxic Effects of Blood Breakdown

Breakdown products like haemoglobin and iron cause further oxidative stress. Inflammation

worsens swelling and neuron damage.

- Step 4: Brain Herniation & Tissue Death

Uncontrolled pressure leads to brain herniation (displacement of brain structures). Results in severe neurological deficits, coma, or death if untreated.

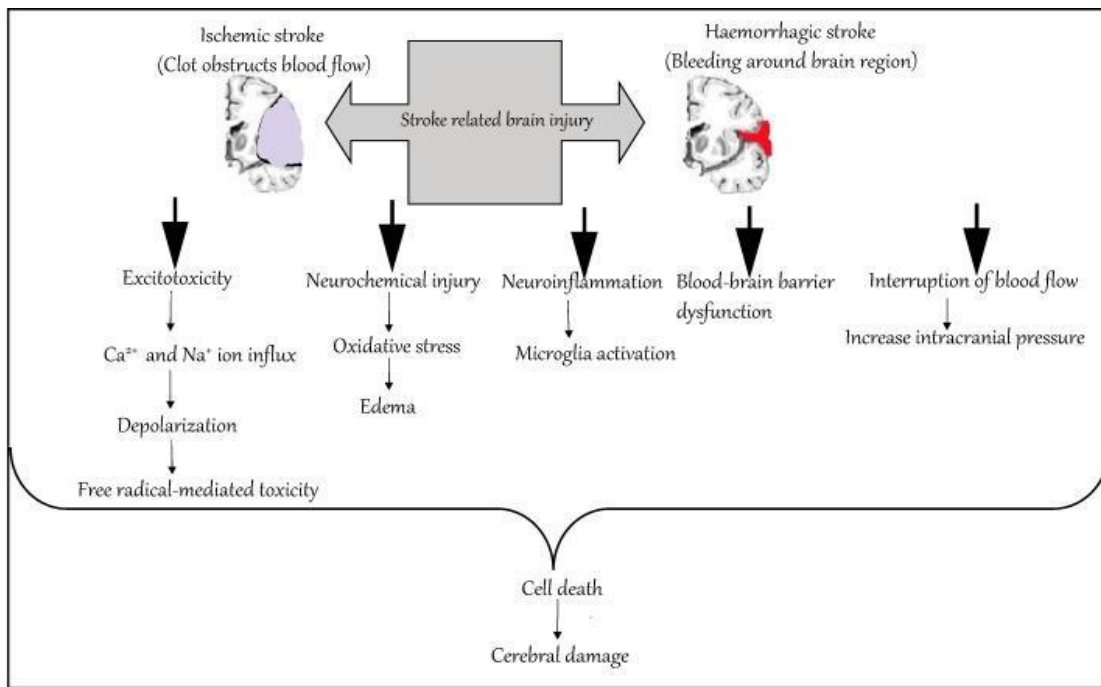


Fig1.6 Pathophysiology of Stroke

RISK FACTORS OF STROKE

Stroke risk factors are classified into modifiable (can be controlled) and non-modifiable (cannot be changed). Addressing modifiable factors can significantly reduce stroke risk. ⁽⁴⁰⁾

1.6.1 Non-Modifiable Risk Factors (Cannot be Changed)⁽⁴¹⁾

- Age: Risk increases after 55 years
- Gender: Men have a higher risk, but women have worse outcomes
- Family History: Genetic predisposition to cardiovascular diseases
- Previous Stroke or TIA: History of stroke or Transient Ischemic Attack (TIA) increases risk
- Ethnicity: Higher risk in African, South Asian populations due to hypertension prevalence

1.6.2 Modifiable Risk Factors (Can be Controlled)⁽⁴⁵⁾

Cardiovascular & Metabolic Risk Factors

- Hypertension (High Blood Pressure) – Most Important Risk Factor
- Diabetes Mellitus – Damages blood vessels, increasing stroke risk

- High Cholesterol (Dyslipidaemia) – Leads to plaque buildup in arteries
- Atrial Fibrillation (AFib) – Causes blood clots that can travel to the brain
- Obesity & Metabolic Syndrome – Increases overall cardiovascular risk

1.6.3 Lifestyle Risk Factors

- Smoking – Damages blood vessels and promotes clot formation⁽⁴⁶⁾
- Excess Alcohol Consumption – Raises blood pressure and weakens heart function
- Physical Inactivity – Increases risk of obesity, diabetes, and hypertension
- Unhealthy Diet – High salt, saturated fat, and low-fiber diet increases risk

1.6.4 Medical Conditions & Other Risk Factors

- Chronic Kidney Disease – Associated with high blood pressure and vascular disease⁽⁴⁷⁾
- Obstructive Sleep Apnea (OSA) – Causes oxygen deprivation and hypertension
- Use of Oral Contraceptives (in Women) – Especially in smokers & hypertensive individuals
- Excessive Stress & Depression – Increases inflammation and cardiovascular strain

1.6.5 High-Risk Conditions Leading to Stroke

- Atherosclerosis – Plaque buildup in arteries reduces blood flow⁽⁴⁸⁾
- Hypercoagulable States – Conditions like DVT, Protein C/S deficiency increase clot risk
- Carotid Artery Stenosis – Narrowing of carotid arteries can cause embolic stroke

1.7 CATEGORIES OF STROKE RISK FACTORS

1.8.1 Clinical Risk Factors (Medical Conditions That Increase Stroke Risk) ⁽⁴⁹⁾.

- Hypertension (High Blood Pressure) – The most important risk factor
- Diabetes Mellitus – Increases vascular damage and clot risk
- Dyslipidaemia (High Cholesterol) – Leads to atherosclerosis and plaque formation
- Atrial Fibrillation & Heart Disease – Causes embolic strokes due to irregular heart rhythm
- Obesity & Metabolic Syndrome – Associated with hypertension and diabetes
- Smoking & Alcohol Consumption – Damages blood vessels and raises blood pressure
- Obstructive Sleep Apnoea – Causes intermittent oxygen deprivation
- Chronic Kidney Disease (CKD) – Linked to vascular disease and hypertension
- Sedentary Lifestyle – Lack of exercise increases cardiovascular risk

1.8.2 Socio-Demographic Risk Factors (Non-Medical Factors That Influence Stroke Risk)

- Age – Risk increases significantly after 55 years⁽⁵⁰⁾
- Sex – Men have a higher risk, but women have worse outcomes

- Socioeconomic Status – Lower income groups have higher risk due to poor healthcare access, nutrition, and lifestyle factors
- Education Level – Lower education is linked to higher stroke risk due to poor health literacy
- Ethnicity – Higher risk in African, South Asian, and Hispanic populations due to genetic and lifestyle factors
- Geographical Location – Stroke rates are higher in regions with limited access to healthcare or high pollution levels
- Psychosocial Stress & Depression – Chronic stress and mental health disorders increase stroke risk
- Dietary Habits – High salt, processed food intake, and low fruit/vegetable consumption contribute to hypertension and obesity

1.8.3 Genetic & Family History Risk Factors⁽⁵⁷⁾

- Family History of Stroke or Cardiovascular Disease – Increases individual risk
- Genetic Mutations Related to Coagulation Disorders⁽⁵⁷⁾
 - Factor V Leiden Mutation – Increases risk of clot formation
 - Prothrombin Gene Mutation – Associated with increased blood clotting
 - Protein C, Protein S, or Antithrombin Deficiencies – Lead to thrombosis risk
- Genetic Disorders Affecting Blood Vessels
 - Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy (CADASIL) – Affects small blood vessels in the brain
 - Hereditary Hypertension & Hyperlipidemia – Genetic predisposition to high blood pressure and cholesterol.

1.8 DIETARY MANAGEMENT FOR STROKE PATIENTS⁽⁵⁸⁾

A healthy diet plays a crucial role in stroke recovery and prevention by controlling blood pressure, cholesterol, blood sugar, and weight. A well-balanced diet helps improve brain function, reduces the risk of stroke recurrence, and promotes overall recovery.

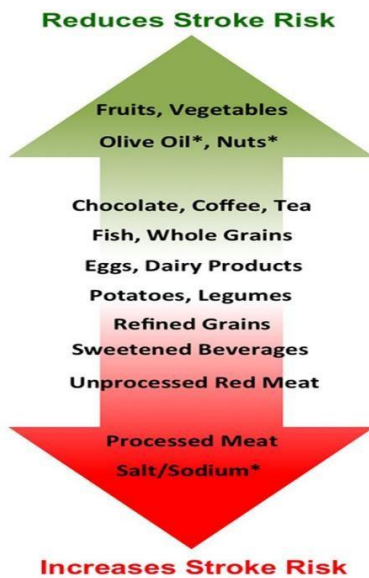


Fig1.9: Dietary Management For Stroke Patients

1.9.1 Key Dietary Recommendations for Stroke Patients

- Nutrients to Include
 - Fruits & Vegetables – Rich in antioxidants, vitamins, and fibre to support brain health⁽⁹³⁾.
 - Whole Grains (Brown Rice, Oats, Whole Wheat, Quinoa) – Helps maintain stable blood sugar levels.
 - Lean Proteins (Fish, Skinless Poultry, Eggs, Beans, Tofu) – Supports muscle recovery and brain function.
 - Healthy Fats (Olive Oil, Nuts, Seeds, Avocado, Fatty Fish - Salmon, Tuna) – Contains Omega-3, which reduces inflammation.
 - Low-Fat Dairy (Skim Milk, Yogurt, Cottage Cheese) – Provides calcium and protein.
 - Hydration (Water, Herbal Teas, Coconut Water) – Prevents dehydration, which can affect brain function.

1.9.2 Foods to Avoid

- Excess Salt (Pickles, Processed Foods, Chips, Canned Soups) – Can raise blood pressure.
- Saturated & Trans Fats (Fried Foods, Fast Food, Margarine, Processed Meat) – Increases cholesterol and stroke risk.
- Refined Carbohydrates (White Bread, Pastries, Sugary Cereals) – Causes blood sugar spikes.
- Sugary Drinks (Sodas, Artificial Juices, Energy Drinks) – Contributes to obesity and diabetes.
- Red & Processed Meats (Bacon, Sausages, Hot Dogs) – High in saturated fats and sodium.
- Excessive Alcohol & Caffeine – Can raise blood pressure and cause dehydration.

1.10 NON-PHARMACOLOGICAL THERAPY FOR STROKE

Non-pharmacologic therapy for stroke focuses on rehabilitation and lifestyle modifications to improve recovery and prevent future strokes. Here are the key components:

1.10.1 Physical Therapy (PT)

- Helps restore movement, balance, and coordination.
- Includes strength training, gait training, and mobility exercises.

1.10.2 Occupational Therapy (OT)

- Assists in regaining daily living activities (e.g., dressing, eating, bathing).
- Uses adaptive tools and techniques to promote independence.

1.10.3 Speech and Language Therapy (SLT)

- Addresses speech, language, and swallowing difficulties (aphasia, dysphagia).
- Uses exercises to improve communication and cognitive skills.

1.10.4 Cognitive Rehabilitation

- Helps with memory, problem-solving, and attention deficits.
- Involves structured tasks and mental exercises.

1.10.5 Psychological and Emotional Support

- Stroke survivors may experience depression, anxiety, or PTSD.
- Counselling, therapy, and support groups help in emotional well-being.

1.10.6 Lifestyle Modifications

- **Diet:** A heart-healthy diet (low salt, low-fat, high-fiber) to manage blood pressure and cholesterol.
- **Exercise:** Regular physical activity to improve cardiovascular health.
- **Smoking & Alcohol Cessation:** Reducing or quitting these reduces stroke risk.
- **Blood Pressure & Diabetes Management:** Regular monitoring and healthy habits.

1.10.7 Assistive Devices and Technology

- Walking aids, orthotics, and robotic-assisted therapy can enhance mobility.
- Brain stimulation and virtual reality therapy are emerging rehabilitation tools.
- These non-pharmacologic interventions play a crucial role in stroke

recovery and secondary prevention.

1.11 PHARMACOLOGICAL THERAPY FOR STROKE

The treatment of stroke depends on its type (Ischemic or Haemorrhagic). Medications aim to dissolve clots, prevent recurrence, control symptoms, and manage complications.

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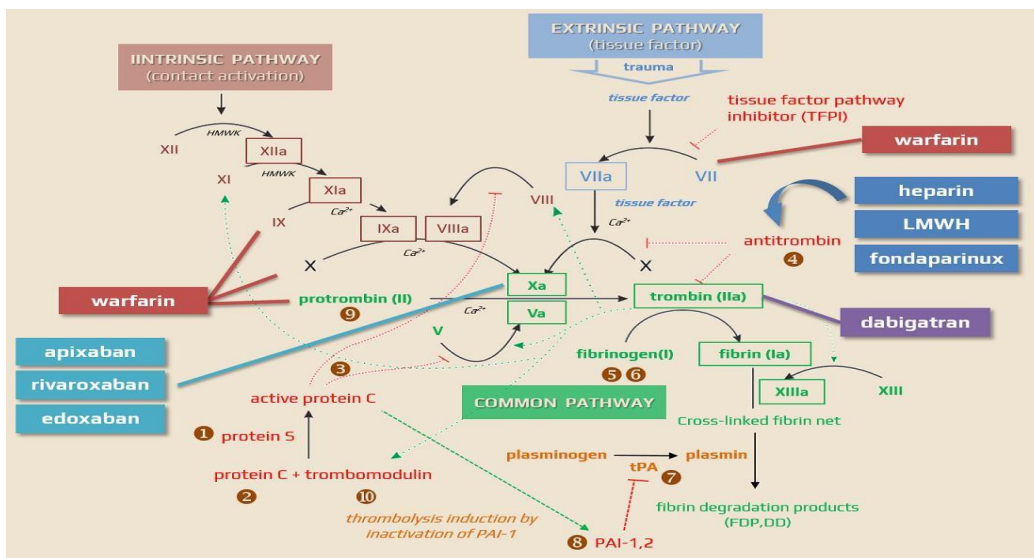


Fig1.11:Pharmacological Therapy For Stroke

1.11.1 Pharmacologic Therapy for Ischemic Stroke (Clot-Related Stroke)

Ischemic stroke occurs due to a blood clot blocking an artery supplying the brain⁽³⁵⁾. The goal of treatment is to restore blood flow and prevent future strokes.

- Acute Phase Treatment (Emergency Care)
 - ❖ Thrombolytics (Clot-Busting Drugs)
 - Alteplase (tPA - Tissue Plasminogen Activator)
 - Tenecteplase (TNK-tPA) (Alternative to tPA in some cases)
 - Dissolves blood clots and restores blood flow
 - Given within 4.5 hours of stroke onset
 - Not used if the patient has bleeding risk or very high BP
 - ❖ Antiplatelet Agents (Prevent Clot Formation)
 - Aspirin (First-line therapy within 24-48 hours)
 - Clopidogrel (Plavix) (Alternative or combined with aspirin)
 - Aspirin + Dipyridamole (Aggrenox) (Used for stroke prevention)
 - Prevents platelets from sticking together
 - ❖ Anticoagulants (Blood Thinners, Used for Atrial Fibrillation)
 - Heparin (IV, Used in severe cases)
 - Warfarin (Coumadin)
 - Direct Oral Anticoagulants (DOACs): Apixaban, Rivaroxaban, Dabigatran
 - Prevents clot formation in high-risk patients (e.g., atrial fibrillation, DVT)
 - Requires monitoring (Warfarin needs INR checks)
 - ❖ Statins (Cholesterol-Lowering Drugs, Stroke Prevention)
 - Atorvastatin (Lipitor)
 - Rosuvastatin (Crestor)

- Reduces LDL (bad cholesterol) and prevents further stroke

1.11.2 Pharmacologic Therapy for Haemorrhagic Stroke (Bleeding Stroke)

Haemorrhagic stroke occurs due to bleeding in the brain from a ruptured blood vessel⁽³⁷⁾. Treatment focuses on controlling bleeding, reducing brain swelling, and managing blood pressure.

- Emergency Treatment
 - ❖ Blood Pressure Control (Prevents Further Bleeding)
 - Labetalol, Nicardipine, Clevidipine (IV antihypertensives)
- Lowers blood pressure to prevent worsening haemorrhage
 - ❖ Reversal of Anticoagulants (For Patients on Blood Thinners)
 - Vitamin K & Fresh Frozen Plasma (FFP) – Reverses Warfarin effects
 - Protamine Sulphate – Reverses Heparin effects
 - Idarucizumab – Reverses Dabigatran effects
 - Andexanet Alfa – Reverses Apixaban & Rivaroxaban

Used to stop bleeding in patients on blood thinners

- ❖ Anti-Seizure Medications (If Seizures Occur)
 - Levetiracetam (Keppra)
 - Phenytoin (Dilantin)
- Prevents post-stroke seizures
- ❖ Osmotic Agents (Reduce Brain Swelling/Pressure)
 - Mannitol (IV) or Hypertonic Saline
- Reduces intracranial pressure (ICP) and brain oedema

1.11.3 Supportive Medications for Both Types of Stroke

- Pain & Fever Control – Acetaminophen (Paracetamol) if fever is present
- DVT Prevention – Low-dose Heparin or Enoxaparin for immobile patients
- Neuroprotective Agents (Experimental) – Citicoline, Edaravone (not widely used)

1.11.4 Long-Term Stroke Prevention (Post-Stroke Medications)

- Antiplatelets or Anticoagulants – Prevent recurrent strokes
- Statins – Reduce cholesterol & plaque buildup
- Blood Pressure Medications – ACE inhibitors, Beta-blockers, Calcium channel blockers

1.11.5 Direct oral anticoagulants

Direct Oral Anticoagulants (DOACs) are a class of medications that directly inhibit specific clotting factors in the blood to prevent and treat thromboembolic disorders⁽⁴⁰⁾. Unlike traditional anticoagulants like warfarin, DOACs do not require routine monitoring and have fewer dietary restrictions.

Types of DOACs and Their Targets:

1. Direct Thrombin Inhibitor:
 - Dabigatran (inhibits Factor IIa - thrombin)

2. Direct Factor Xa Inhibitors:

- Rivaroxaban
- Apixaban
- Edoxaban
- Betrixaban

❖ Direct Thrombin Inhibitor

(Dabigatran) Mechanism of Action

- Inhibits thrombin (Factor IIa) → prevents fibrin formation → inhibits clot formation.

Adverse Drug Reactions (ADR)

- Bleeding (GI & Intracranial)
- Dyspepsia (indigestion)
- Nausea, vomiting
- Thrombocytopenia (rare)
- Reversal Agent: Idarucizumab (used in cases of major bleeding).

Indications & Uses⁽⁴¹⁾

- Stroke Prevention in Atrial Fibrillation (AF)
- Treatment & Prevention of DVT and PE
- Post-Surgical Thromboprophylaxis (hip/knee replacement)

❖ **Direct Factor Xa Inhibitors (DOACs)**

Rivaroxaban, Apixaban, Edoxaban, and Betrixaban are Direct Oral Anticoagulants (DOACs) that inhibit Factor Xa, a key enzyme in the coagulation cascade. By blocking Factor Xa, these drugs prevent the formation of thrombin and reduce clot formation.⁽³⁶⁾

➤ **Rivaroxaban**

Mechanism of Action:

- ❖ Rivaroxaban is a direct Factor Xa inhibitor that selectively binds to Factor Xa⁽⁴⁰⁾.
- ❖ By inhibiting Factor Xa, it prevents the conversion of prothrombin (Factor II) to thrombin (Factor IIa).
- ❖ This reduces fibrin clot formation, preventing thrombosis. Adverse Drug Reactions (ADR):

- ❖ Bleeding (most common)
 - Gastrointestinal (GI) bleeding (higher risk than Apixaban)⁽⁴⁰⁾.
 - Intracranial hemorrhage (lower than Warfarin but still a risk).
- ❖ Other ADRs:
 - Nausea, vomiting, diarrhea.
 - Liver enzyme elevations.
 - Rare hypersensitivity reactions.
- ❖ Reversal Agent:

- Andexanet alfa
- ❖ Indications & Uses:
 - Stroke Prevention in Atrial Fibrillation (AF)
 - Treatment & Prevention of Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE)
 - Post-Surgical Thromboprophylaxis (after hip/knee replacement)
 - Extended Thromboprophylaxis (for hospitalized patients with acute medical conditions)

➤ **Apixaban**

Mechanism of Action:

- ❖ Apixaban is a direct Factor Xa inhibitor that selectively blocks Factor Xa in the coagulation cascade⁽³⁴⁾.
- ❖ By inhibiting Factor Xa, it prevents the conversion of prothrombin (Factor II) to thrombin (Factor IIa).
- ❖ This reduces fibrin clot formation and decreases the risk of thromboembolism. Adverse Drug Reactions (ADR):
 - ❖ Bleeding (Lower risk than Rivaroxaban)
 - ❖ Lower risk of gastrointestinal (GI) bleeding compared to Rivaroxaban⁽³⁴⁾.
 - ❖ Intracranial haemorrhage (ICH) risk lower than Warfarin.
- ❖ Other ADRs:
 - ❖ Nausea, vomiting.
 - ❖ Liver enzyme elevation (rare).
 - ❖ Hypersensitivity reactions (rash, itching, rare anaphylaxis).
- ❖ Reversal Agent:
 - ❖ Andexanet alfa (used in emergencies for severe bleeding).
- ❖ Indications & Uses:
 - Stroke Prevention in Atrial Fibrillation (AF) (non-valvular).
 - Treatment & Prevention of Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE).
 - Post-Surgical Thromboprophylaxis (hip/knee replacement).

➤ **Edoxaban**

Mechanism of Action:

- ❖ Edoxaban is a direct Factor Xa inhibitor that selectively blocks Factor Xa in the coagulation cascade.
- ❖ By inhibiting Factor Xa, it prevents the conversion of prothrombin (Factor II) to thrombin (Factor IIa).
- ❖ This reduces fibrin clot formation, lowering the risk of thromboembolism.

Adverse Drug Reactions (ADR):

- ❖ Bleeding (Similar to Rivaroxaban & Apixaban)
- ❖ Lower risk of intracranial hemorrhage (ICH) than Warfarin.
- ❖ Higher risk of GI bleeding than Apixaban.
- ❖ Other ADRs:
 - ❖ Nausea, vomiting, dizziness.
 - ❖ Liver enzyme abnormalities (rare).
 - ❖ Rash or hypersensitivity reactions.
- ❖ Reversal Agent:
 - ❖ No FDA-approved reversal agent.
 - ❖ Prothrombin Complex Concentrate (PCC) can be used in severe bleeding cases.

Indications & Uses:

- Stroke Prevention in Atrial Fibrillation (AF) (non-valvular).
- Treatment & Prevention of Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE).

▪ Important Consideration for Stroke Prevention:

- ❖ Not recommended in AF patients with very good kidney function ($CrCl > 95$ mL/min).
- ❖ This is because Edoxaban is cleared too quickly in these patients, reducing its effectiveness.

➤ **Betrixaban**

Mechanism of Action:

- ❖ Betrixaban is a direct Factor Xa inhibitor that selectively blocks Factor Xa in the coagulation cascade⁽⁸³⁾.
- ❖ By inhibiting Factor Xa, it prevents the conversion of prothrombin (Factor II) to thrombin (Factor IIa).
- ❖ This reduces fibrin clot formation,

Adverse Drug Reactions (ADR):

- Bleeding
 - ❖ Increased risk of gastrointestinal (GI) bleeding (similar to other Factor Xa inhibitors).
 - ❖ Lower risk of intracranial haemorrhage (ICH) compared to Warfarin.
- Other ADRs:

- ❖ Nausea, vomiting.
- ❖ Hypersensitivity reactions (rash, pruritus).
- ❖ Liver enzyme elevation (rare).
- Reversal Agent:
 - ❖ No FDA-approved reversal agent.
 - ❖ Prothrombin Complex Concentrate (PCC) can be used in emergencies.
- ❖ Indications & Uses:
 - Extended Thromboprophylaxis for Hospitalized Patients with Acute Medical Illness
 - Unique among DOACs: Betrixaban is mainly used for preventing blood clots in hospitalized patients at risk of venous thromboembolism (VTE).
 - It is not commonly used for stroke prevention in atrial fibrillation (AF) or DVT/PE treatment like other DOACs.

METHODOLOGY

This study was designed as a prospective observational study conducted over a Direct Oral Anti-coagulant (DOACs) in Stroke patients with Atrial Fibrillation (AF) and to assess the impact of patient counselling on medication reconciliation, medication adherence, and quality of life. A total of 78 sample categorized into three groups each group of 26 patients Stroke patients with Atrial Fibrillation, Stroke Patients, Atrial Fibrillation Patients were diagnosed and were included in the study. CHA₂DS₂-VASc Score used to assess stroke risk and analyze the appropriateness of DOAC prescribing patterns. Medication Adherence Assessment Scale (MAAS) administered before and after counselling to evaluate changes in patients' adherence to DOAC therapy. Stroke-Specific Quality of Life (SS-QOL) Scale used to assess the patients' quality of life across various domains at baseline and post-counselling.

4.1 DESIGN OF STUDY

Prospective observational study.

4.2 DURATION OF STUDY

6 Months duration after getting approval of the Institutional Ethics Committee.

4.3 STUDY SETTINGS

The study was conducted in the Department of Neurology, Cosmopolitan Hospital Post Graduate Institute of Health Science and Research, Trivandrum.

4.4 STUDY POPULATION

Those patients admitted in the Neurology department during the period of 6 months and those who satisfy the inclusion and exclusion criteria.

4.5 CRITERIA FOR ELIGIBILITY

4.5.1 INCLUSION CRITERIA

- Age criteria above 18 years.
- Patients with non-valvular atrial fibrillation who were prescribed with Direct Oral Anti-coagulant for stroke prevention.
- Patients with a CHA₂DS₂-VASc score of greater than 2.
- Patients who are willing to participate in the study.

4.5.2 EXCLUSION CRITERIA

- Patients with existing diagnosis of Atrial fibrillation or Atrial fibrillation in the setting of valvular heart disease, Prosthetic heart valve, Rheumatic heart disease, Mitral stenosis.
- Patients who are not willing to participate in the study.

4.6 SAMPLE SIZE

The sample size of the study is calculated by the following formula

$$\text{Sample Size } n = \frac{Z\alpha^2 P(1-P)}{d^2}$$

Where:

Z α – The standard normal variate with $\alpha\%$ level of significance P- Estimated proportion of the cases
d- Precision or margin of errors

The margin of error is assumed to be 25% of the reported proportion and is considered as 11 with a significant level of 5%. The required sample size is estimated as:

Sample Size n=

Group A-Stroke with Atrial Fibrillation(26)

Group B-Stroke Patients(26)

Group C-Atrial Fibrillation Patients (26)

$$\text{Sample Size } n = \frac{1.96^2 \times 44.7 \times 55.3}{11^2} = 78 \text{ samples, i.e maximum of 80 samples}$$

A total of 78 samples are needed for the study.

4.7 STUDY PROCEDURE

This study were designed as a prospective observational study conducted over a Direct Oral Anticoagulants (DOACs) in stroke patients with Atrial Fibrillation (AF) and to assess the impact of patient counselling on medication reconciliation, medication adherence, and quality of life. A total of 78 sample categorized into three groups each group of 26 patients Stroke patients with Atrial Fibrillation, Stroke Patients, Atrial Fibrillation Patients were diagnosed and were included in the study. CHA₂DS₂-VASc Score used to assess stroke risk and analyze the appropriateness of DOAC prescribing patterns. Medication Adherence Assessment Scale

(MAAS) administered before and after counselling to evaluate changes in patients' adherence to DOAC therapy. Stroke-Specific Quality of Life (SS-QOL) Scale used to assess the patients' quality of life across various domains at baseline and post-counselling.

4.8 STATISTICAL ANALYSIS

- Statistical Analysis was performed using Microsoft Excel.
- Paired t-test was used to analyze the improvement in quality of life before and after providing counselling and education.

4.9 DATA COLLECTION TOOLS

- Pre-Designed Data Collection Form
- Informed Consent Form
- Patient Information Sheet
- Medication Adherence Assessment Scale
- CHA₂DS₂-VASc Score
- Stroke Specific Quality of Life Scale
- Patient Information Leaflet

RESULTS

In this study 78 patients were enrolled as per the inclusion and exclusion criteria from the Neurology Department. This provides a detailed analysis of Patient Demographics, Prescribing Patterns of Direct Oral Anti-Coagulants and the Impact of Patient Counselling on Medication Reconciliation among Stroke with Atrial Fibrillation. The study aim was to improve the quality of life and patient Medication Adherence. During the study period 78 patients were followed up.

GROUP A-Stroke with Atrial Fibrillation (26)

GROUP B-Stroke (26)

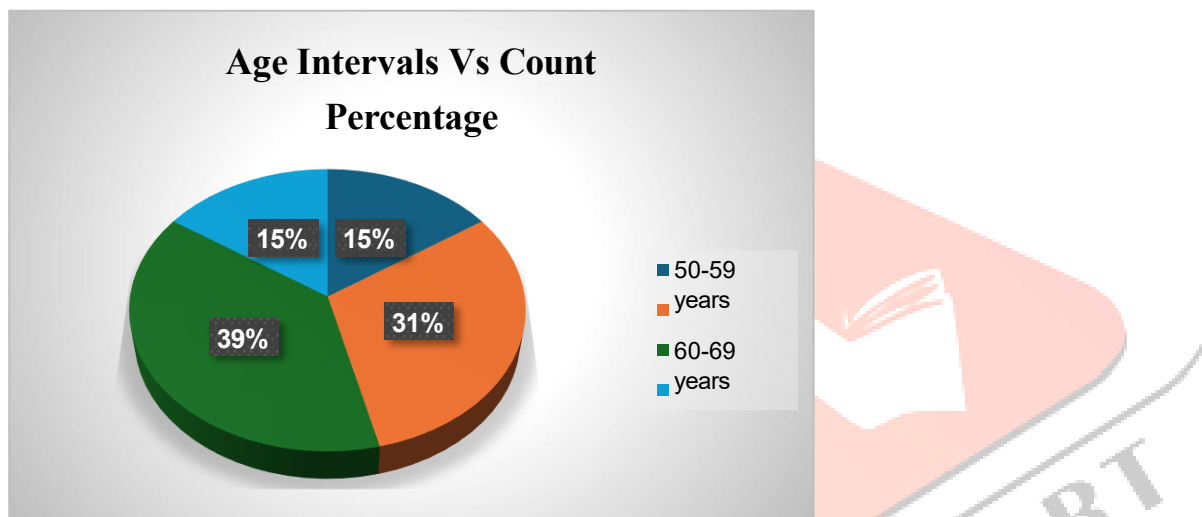
GROUP C-Atrial Fibrillation (26)

5.1 GROUP - A CEREBROVASCULAR ATTACK WITH ATRIAL FIBRILLATION

5.1.1 DISTRIBUTION BASED ON AGE

Table 5.1.1: Distribution based on age

Age wise distribution	Number (n=26)	Percentage (%)
50-59 years	4	15%
60-69 years	8	31%
70-79 years	10	38%
80-89 years	4	15%

**Fig 5.1.1: Distribution based on age**

As per the demographic data of the study, population stroke with atrial fibrillation patients were found to be more in the age group of 70-79 with a percentage of 39%. Followed by which the age group of 60-69 with a percentage of 31%, the age group of 50-59 with a percentage of 15%, the age group of 80-89 with a percentage of 15%.

5.1.2 :DISTRIBUTION BASED ON GENDER

Table 5.1.2: Distribution based on Gender

Gender	Gender(n=26)	Percentage (%)
Female	16	62%
Male	10	38%

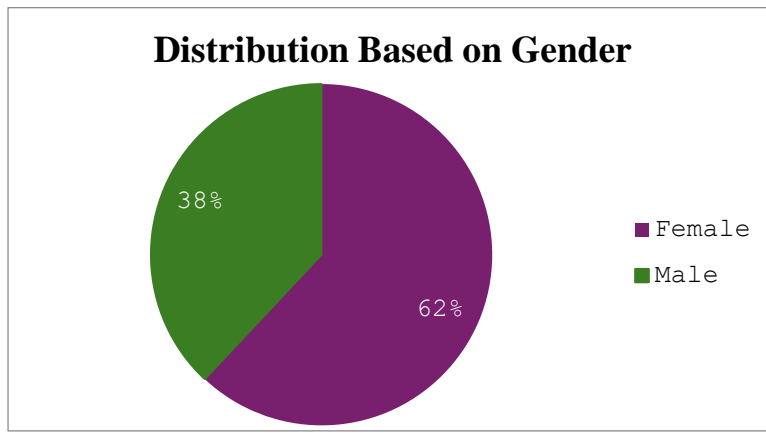


Fig5.1.2:Distribution based on gender

Among the total of 26 Patient included in this study a preponderance of female patients was observed. In this study 16 patients were female (62%) while 10 patients were male (38%).

5.1.3.DISTRIBUTION BASED ON SYMPTOMS

Table 5.1.3: Patients experiencing each symptom

Symptoms	Number (n=26)	Percentage (%)
Weakness	14	54%
Difficulty In Speaking	26	100%
Vision Changes	20	77%
Dizziness	19	73%
Numbness	3	12%
Severe Headache	14	54%
Confusion	20	77%

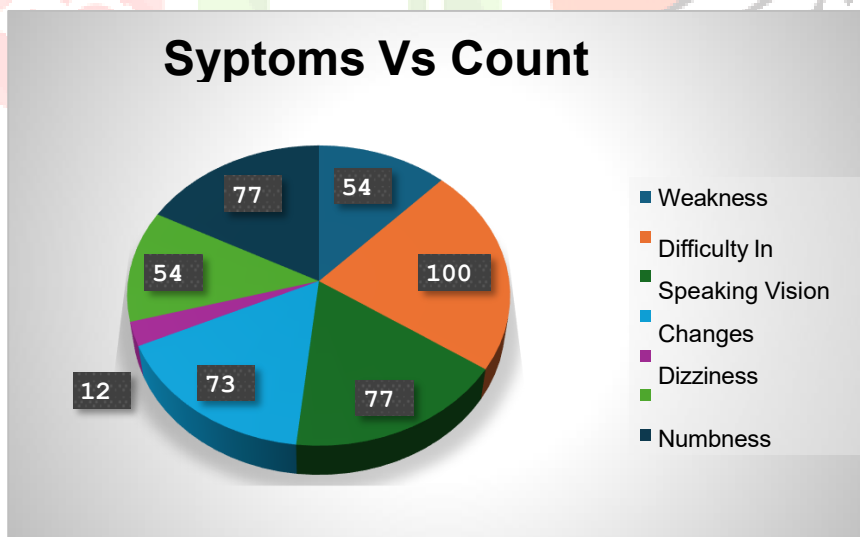


Fig5.1.3:Distribution based on symptoms

It was observed that 54% of patients had weakness,100% patients had difficulty in speaking,77% patients had vision changes,73% patients had dizziness,12% patients had numbness,54% patients had severe headache and 77% patients had confusion.

5.1.4 CORRELATION BETWEEN SYMPTOMS AND AGE GROUP

Table 5.1.4: Showing the correlation between symptoms and age group

Age Group	Weakness	Difficulty In Speaking	Vision Changes	Dizziness	Numbness	Severe Headache	Confusion
50-59	1	4	4	4	0	3	4
60-69	4	8	8	3	0	2	4
70-79	5	10	8	7	3	5	8
80-89	4	4	0	4	0	4	4

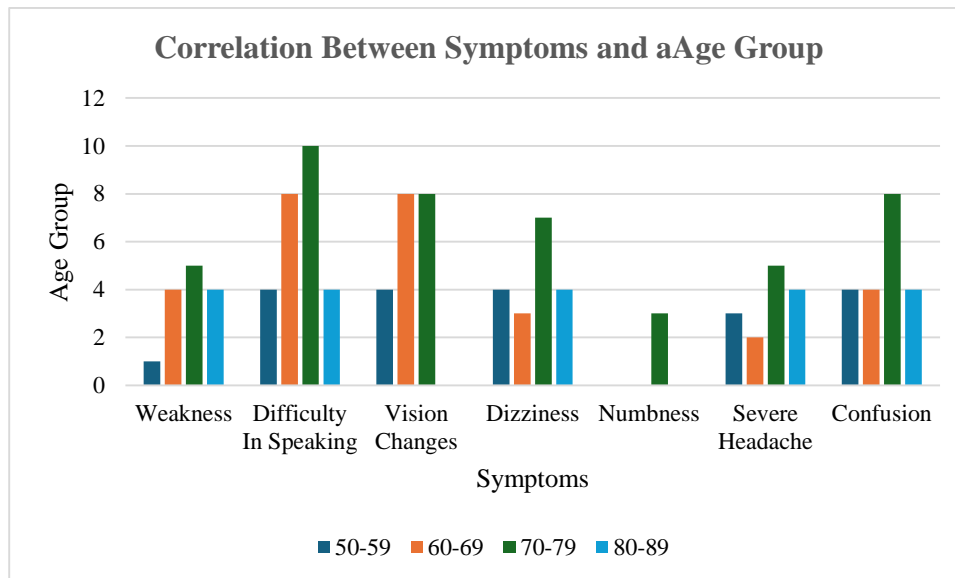


Fig 5.1.4: Correlation between symptoms and age group

As per the demographics Weakness more prevalent in the 60–69 age group, with a moderate presence in the 50–59 and 70–79 groups. Difficulty in Speaking: Most significant in the 70–79 age group, followed by the 60–69 age group. Vision Changes: Equally distributed among the 60–69 and 70–79 age groups, with minimal cases in younger and older groups. 4. Dizziness: Primarily seen in the 70–79 age group, followed by the 60–69 group. Numbness: Limited occurrences, predominantly in the 70–79 age group. Severe Headache: Evenly distributed across age groups, with a slight increase in the 70–79 group. Confusion: Markedly higher in the 70–79 age group, followed by 50–59 and 60–69 groups.

5.1.5 PRESCRIBING PATTERNS OF STROKE WITH ATRIAL FIBRILLATION BASED ON CHA2DS-VASc SCORE

The percentage distribution of drugs based on prescribing pattern is shown in the following

Table 5.1.5: Prescribing pattern based on CHA2DS2VASc Score

Drugs	Number(n=26)	Mean±SD
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Apixaban	19	7.2±1.0
Rivaroxaban	7	4.8±0.7

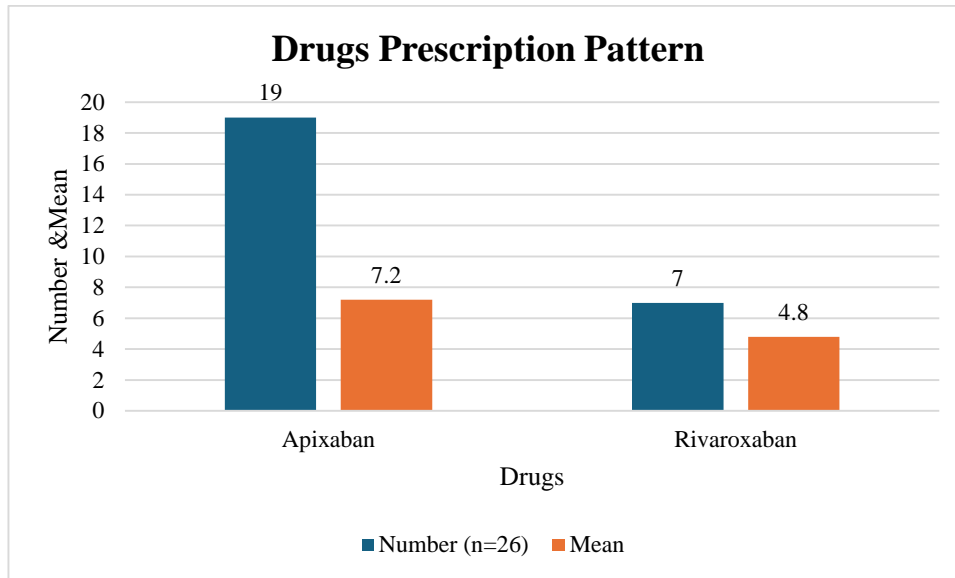


Fig5.1.5: Prescribing pattern based on CHA₂DS₂VASc Score

The table includes two commonly prescribed Direct Oral Anti-Coagulants-Apixaban and Rivaroxaban. Apixaban was prescribed to 19 patients with a mean standard deviation (SD) of 7.2±1.0, while Rivaroxaban was prescribed to 7 patients with a mean standard deviation of 4.8±0.7. The bar graph below the table visually represents the count of prescriptions for each drug, indicating a higher frequency of Apixaban prescriptions compared to Rivaroxaban.

5.1.6 ASSESSMENT OF MEDICATION ADHERENCE BEFORE COUNSELLING

Table5.1.6: Medication adherence score before counselling

MAAS Score	Number (n=26)	Percentage (%)	Mean±SD
03-04	8	31%	3.40±0.35
05-06	13	50%	5.50±0.40
07-08	5	19%	7.20±0.30

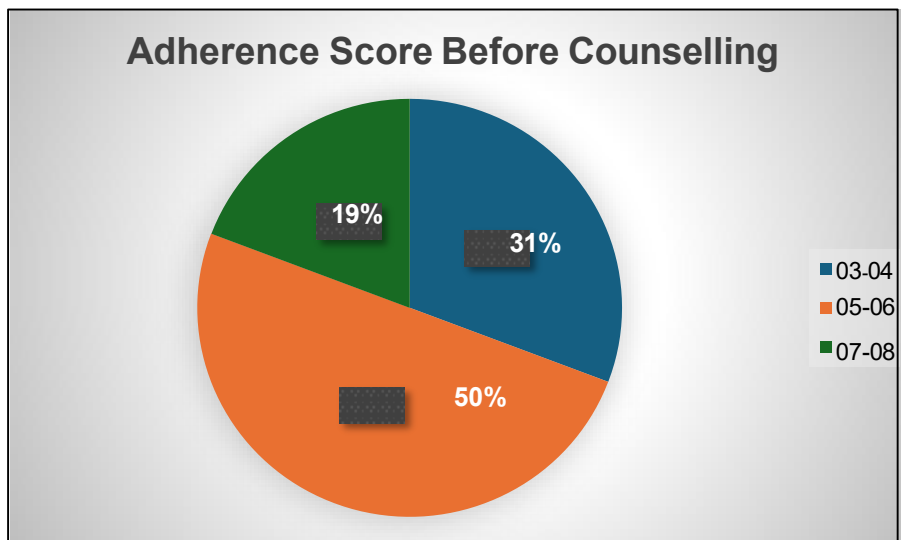


Fig5.1.6: Medication Adherence Score Before Counselling

Among the patients assessed, 19% had a low adherence (07-08), 50% fell into the high adherence range (05-06), and another 31% demonstrated moderate adherence (03-04). These findings indicate that prior to counselling, a significant portion of patients exhibited suboptimal adherence, underscoring the need for targeted interventions such as patient counselling to improve medication reconciliation and therapeutic outcomes.

5.1.7 ASSESSMENT OF MEDICATION ADHERENCE AFTER COUNSELLING

Table5.1.7: Medication Adherence after counselling

MAAS Score	Number (n=26)	Percentage (%)	Mean±SD
06-07	8	31%	6.95±0.20
08-09	18	69%	8.70±0.25

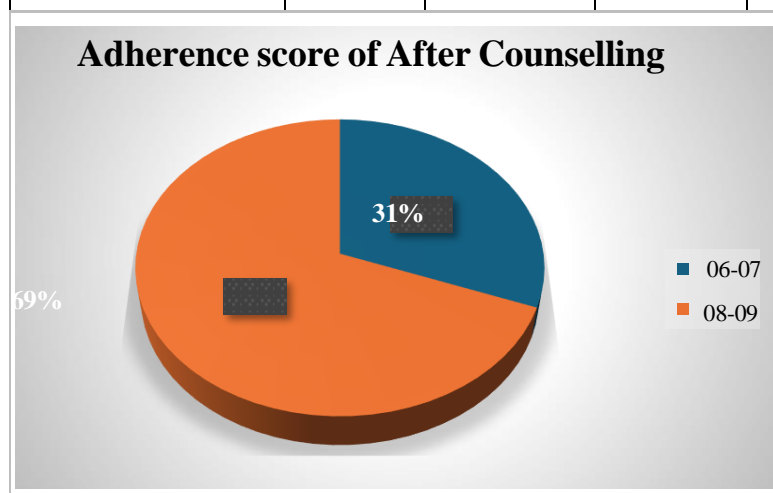


Fig5.1.7: Medication Adherence after counselling

According to the MAAS (medication adherence assessment scale), 69% of patients achieved a score of 08-09, and 31% score between 06-07, reflecting higher level of adherence compared to the pre-counselling phase. The pie chart visually reinforces this shift, emphasizing the positive impact of structured patient counselling on improving medication taking behavior and supporting the goals of better therapeutic outcome in stroke patient with atrial fibrillation.

5.1.8 COMPARISON OF MEDICATION ADHERENCE

Table 5.1.8 Comparison of Medication Adherence

Before Counselling	After Counselling	P-Value
5.18 ± 0.37	8.16 ± 0.24	0.001*(p<0.05)

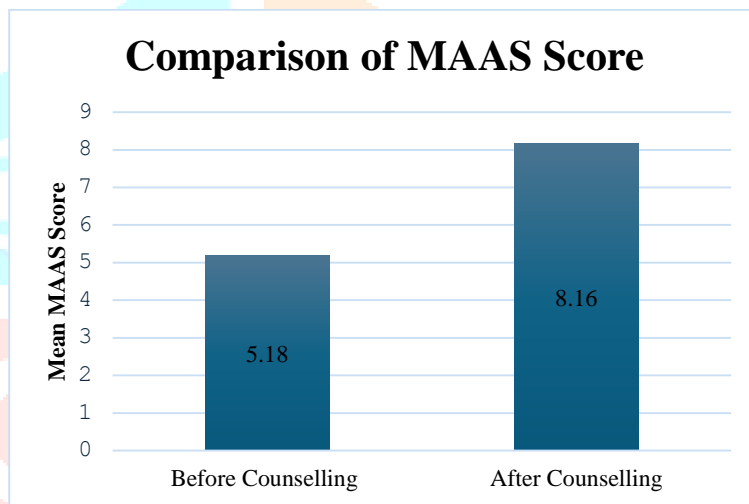


Fig 5.1.8 Comparison of MAAS score

Prior to counselling the mean MAAS score was 5.18±0.37 indicating poor adherence following counseling the mean score increased to 8.16±0.24 this improvement is statistically significant with a p value of <0.001, conforming the effectiveness of patient counseling in enhancing the adherence. The corresponding bar graph visually emphasizes this difference, highlighting the crucial role of patient education and engagement in optimizing medication reconciliation and therapeutic outcome.

5.1.9 GROUP B CEREBROVASCULAR EVENT

5.1.9 DISTRIBUTION BASED ON AGE

Table 5.1.9: Distribution based on Age

Age wise distribution	Number (n=26)	Percentage (%)
51-59 years	2	20%

60-69 years	8	80%
70-79 years	7	70%
80-89 years	9	90%

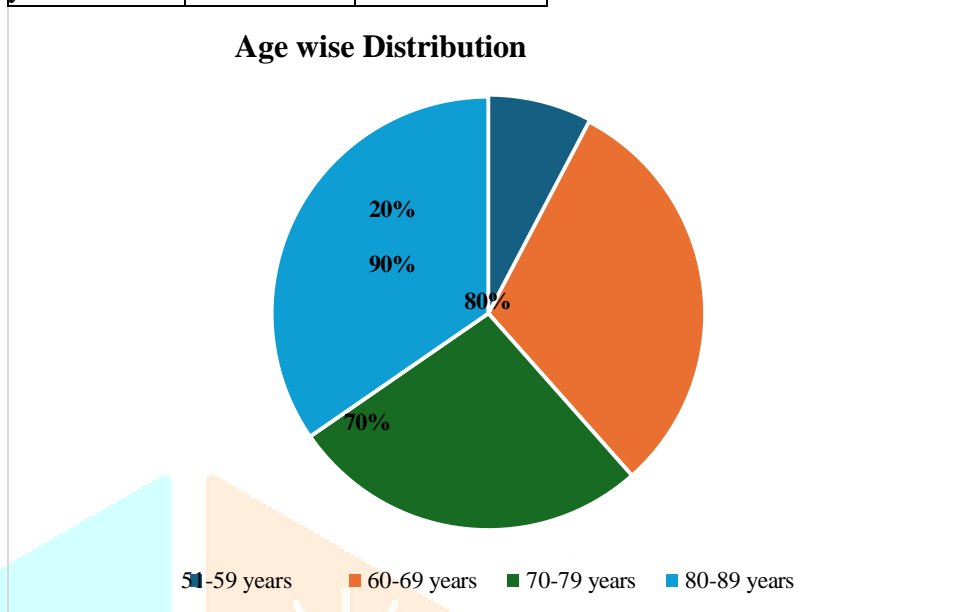


Fig5.1.9: Distribution Based on Age

As per the demographic data of the study, population stroke patients were found to be more in the age group of 80-89 with a percentage of 90%. Followed by which the age group of 70-79 with a percentage of 70%, the age group of 60-69 with a percentage of 80% and 50-59 with a percentage of 20%.

5.1.10 DISTRIBUTION BASED ON GENDER

Table5.1.10: Distribution based on gender

Gender	Number (n=26)	Percentage (%)
Male	11	42%
Female	15	58%

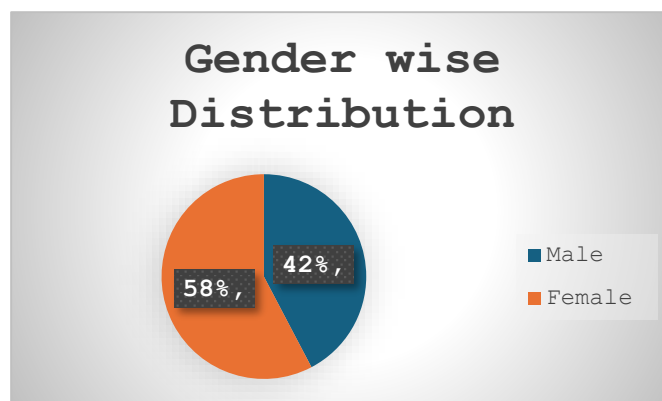


Fig5.1.10: Distribution Based on Gender

Among a total of 26 patients included in this study a preponderance of female patients was observed. In this study 15 patients were female (58%) while 11 patients were male (42%).

5.1.11 DISTRIBUTION BASED ON SYMPTOMS

Table5.1.11: Distribution based on symptoms

Symptoms	Number (n=26)	Percentage (%)
Weakness	13	50%
Difficulty In Speaking	26	100%
Vision Changes	25	96%
Dizziness	21	81%
Numbness	9	35%
Severe Headache	12	46%
Confusion	20	77%

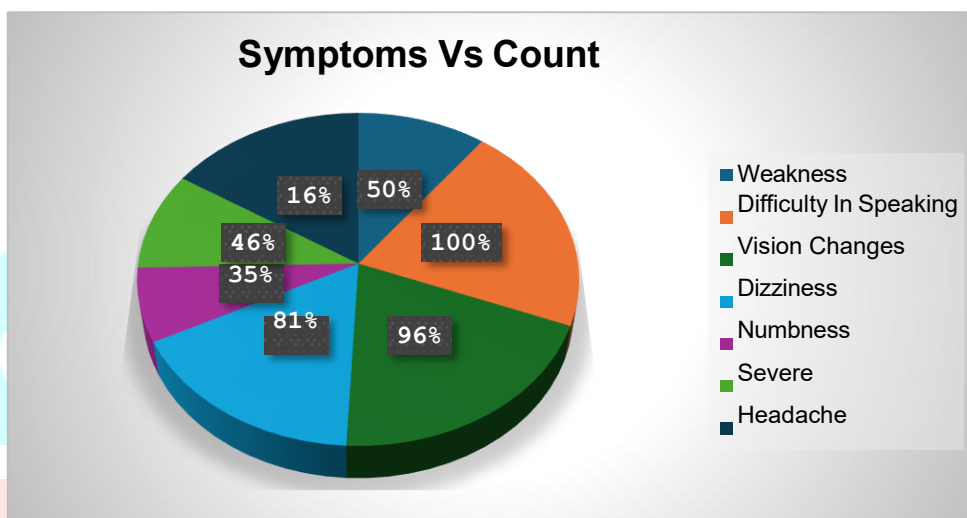


Fig5.1.11:

Distribution based on symptoms

It was observed that 50% of patients had weakness, 100% of patients had difficulty in speaking, 96% of patients had vision changes, 81% of patients had dizziness, 35% patients had numbness, 46% of patients had severe headache and 16% of patients had confusion.

5.1.12. CORRELATION BETWEEN SYMPTOMS AND AGE GROUP

Table5.1.12: Showing the correlation between symptoms and age group

Age group	Weakness	Difficult speaking	Vision changes	Dizziness	Numbness	Severe Headache	Confusion
50-59	0	2	2	2	2	0	2
60-69	2	8	8	5	3	5	3
70-79	5	7	6	5	0	0	6
80-89	6	9	9	9	4	7	9

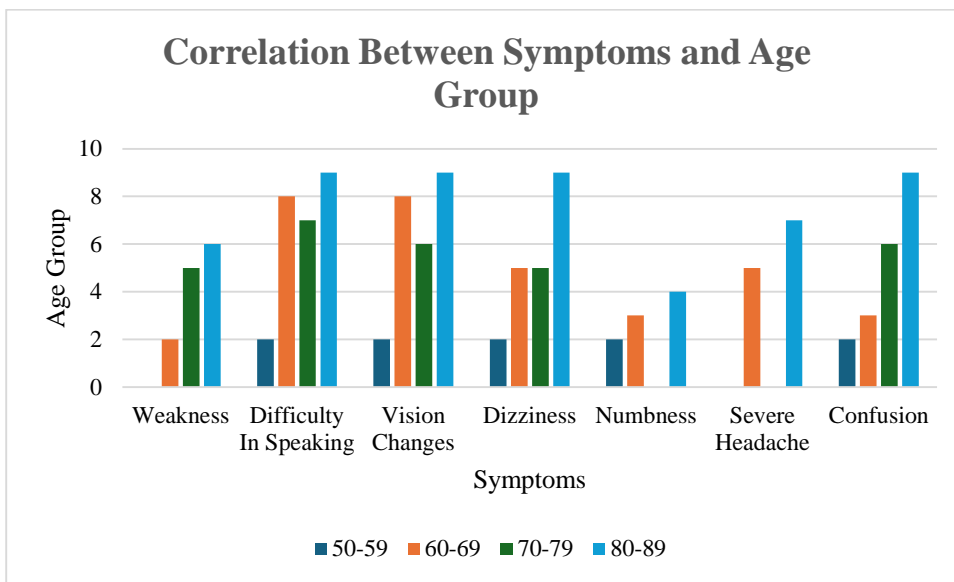


Fig5.1.12: Correlation between symptoms and age group

The age group 80-89 exhibits the highest frequency or severity across most symptoms, with notable peaks in "Difficulty in Speaking, Dizziness, Numbness, and Confusion. The symptom Difficulty in Speaking" shows a significant increase in frequency or severity as age progresses, with the highest value observed in the 80-89 age group. Vision Changes and Severe Headache display relatively high frequencies or severities across multiple age groups, although the pattern is not strictly age-related. Weakness and Confusion also show notable frequencies .

5.1.13 ASSESSMENT OF MEDICATION ADHERENCE BEFORE COUNSELLING

Table5.1.13: Medication Adherence before Counselling

MAAS Score	No:(n=26)	Percentage(%)	Mean±SD
03-04	10	38%	3.1±0.3
05-06	10	38%	5.5±0.3
07-08	6	24%	7.2±0.2

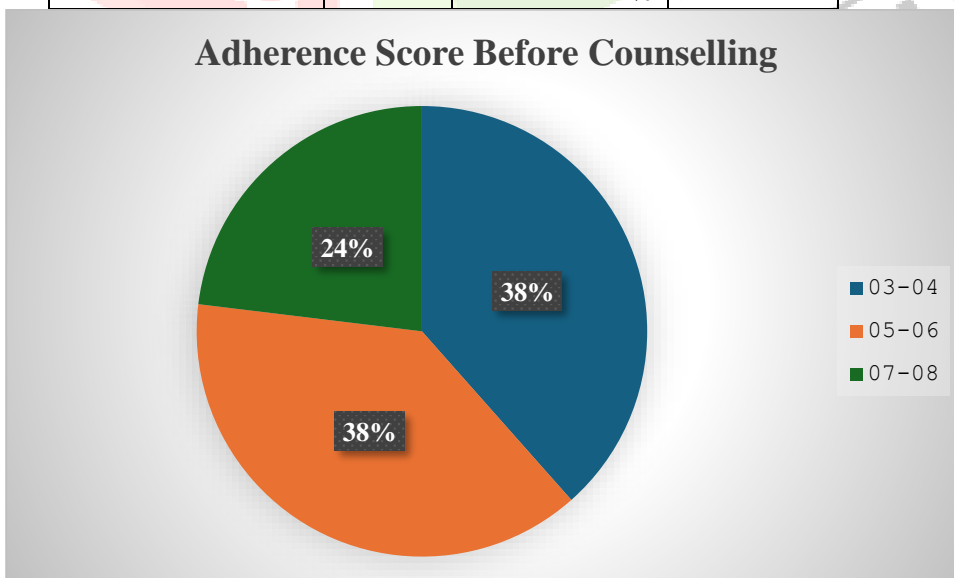


Fig5.1.13: Medication Adherence Before counselling

Among the patients assessed, 38% had a moderate adherence (03-04), and another 38% demonstrated moderate adherence (05-06)and 24% had low adherence (07-08). These

findings indicate that prior to counselling, a significant portion of patients exhibited suboptimal adherence, underscoring the need for targeted interventions such as patient counselling to improve medication reconciliation and therapeutic outcomes.

5.1.14 ASSESSMENT OF MEDICATION ADHERENCE AFTER COUNSELLING

Table 5.1.14: Medication Adherence After Counselling

MAAS Score	Number n=26	Percentage(%)	Mean±SD
06-07	8	31%	6.8±0.2
08-09	18	69%	6.3±0.2

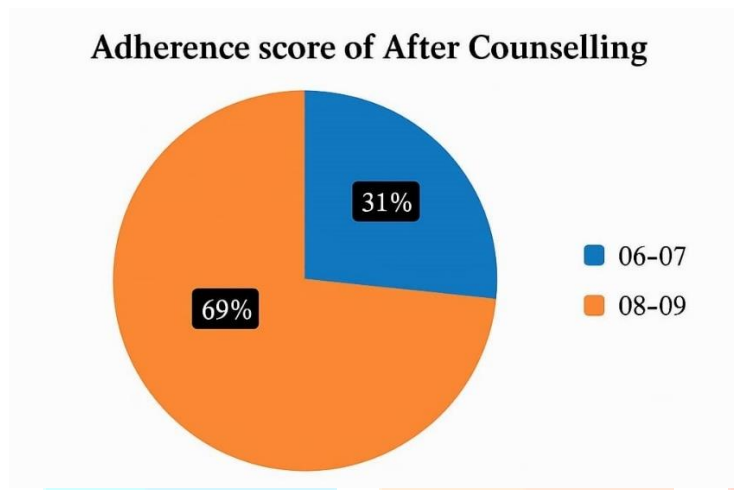


Fig 5.1.14: Medication Adherence After counselling

Among the patients assessed, 69% had a good adherence (08-09), and another 31% demonstrated moderate adherence (06-07). These findings indicate that prior to counselling, a significant portion of patients exhibited suboptimal adherence, underscoring the need for targeted interventions such as patient counselling to improve medication reconciliation and therapeutic outcomes.

5.1.15 COMPARISON OF MAAS SCORE

Table 5.1.15: Comparison of MAAS Score

Before Counselling	After Counselling	P-value
5.2±1.6	8.2±0.7	0.001*(<0.05)

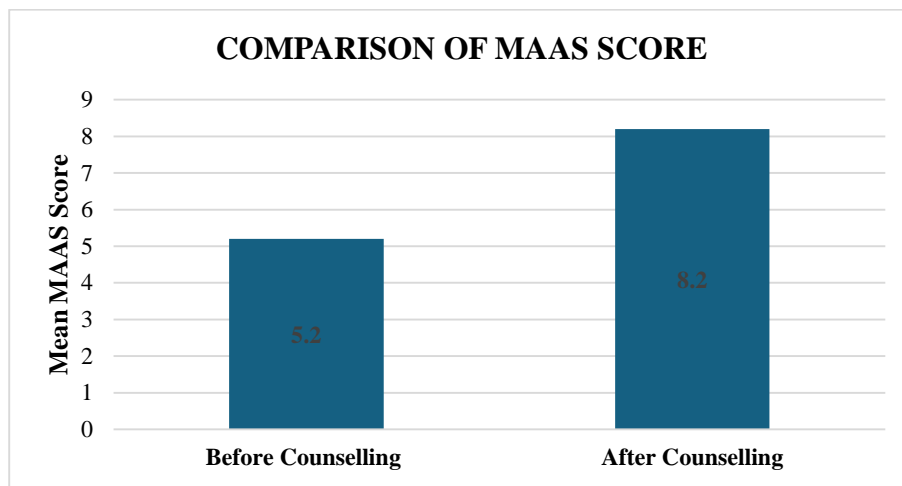


Fig 5.1.15: Comparison of MAAS Score

It presents a comparative analysis of the Medication Adherence Assessment Scale (MAAS) before and after patient counseling. The mean score before counselling was 5.2 ± 1.6 , while after counseling it improved to 8.2 ± 0.7 indicating a positive change. The P-value < 0.001 suggests this difference is statistically significant, highlighting the effectiveness of patient counseling in enhancing medication reconciliation practices among atrial fibrillation patients.

5.1.16 DISTRIBUTION BASED ON PRESCRIPTION PATTERN

Table 5.1.16: Distribution based on drugs prescribed

Drugs	Number (n=26)	Mean±SD	P-Value
Clopidogrel	9	4.8 ± 0.5	0.001*
Aspirin	17	6.8 ± 1.2	< 0.05

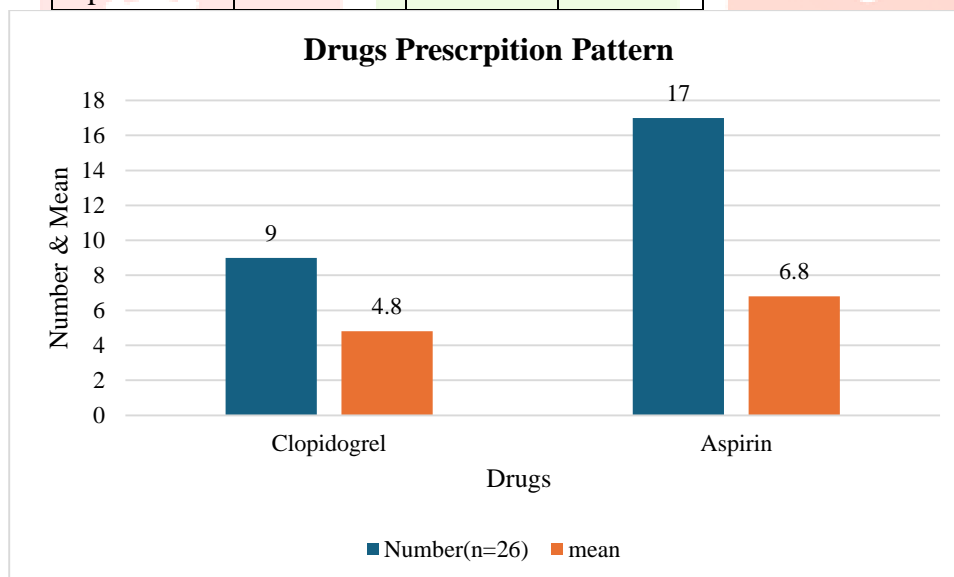


Fig5.1.16: Distribution based on Drugs Prescribed

The bar graph illustrates the prescribing patterns of two commonly used anti-platelet agents, Clopidogrel and Aspirin. Clopidogrel were prescribed to 9 patients, with a mean±SD of 4.8 ± 0.5 , while Aspirin were prescribed to 17 with patients with a mean and standard deviation 6.8 ± 1.2 . Aspirin demonstrated a slightly higher mean usage compared to Clopidogrel, reflecting its frequent inclusion in stroke prevention strategies. These findings highlight the variability in antiplatelet therapy selection and underscore the importance of

assessing prescribing patterns for optimizing patient outcomes.

GROUP- C ATRIAL FIBRILLATION

5.1.17 DISTRIBUTION BASED ON AGE

Age wise distribution	Number(n=26)	Percentage(%)
50-59 years	7	27%
60-69 years	5	19%
70-79 years	11	42%
80-89 years	3	12%

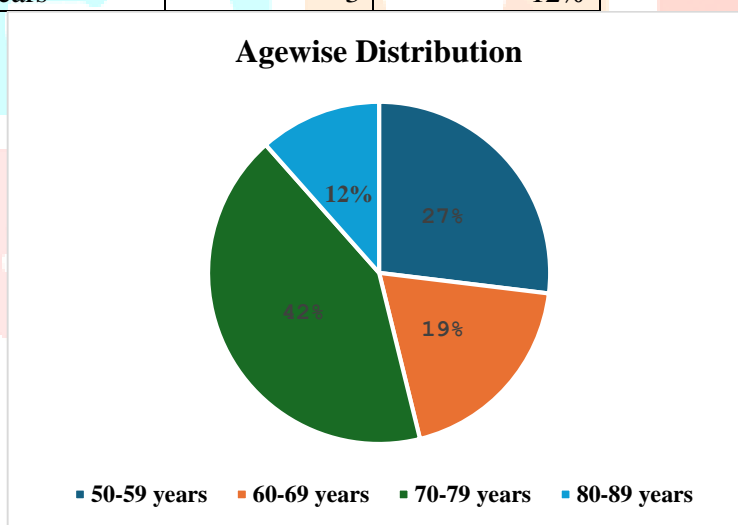


Fig5.1.17: Distribution Based Age

As per the demographic data of the study, population atrial fibrillation patients were found to be more in the age group of 70-79 with a percentage of 42%. Followed by which the age group of 60-69 with a percentage of 19%, the age group of 50-59 with a percentage of 27% and 12% of patients were in the age group of 80-89.

5.1.17 DISTRIBUTION BASED ON GENDER

Table 5.1.18: Distribution Based on Gender

Gender	Gender(n=26)	Percentage (%)
Female	14	54%
Male	12	46%

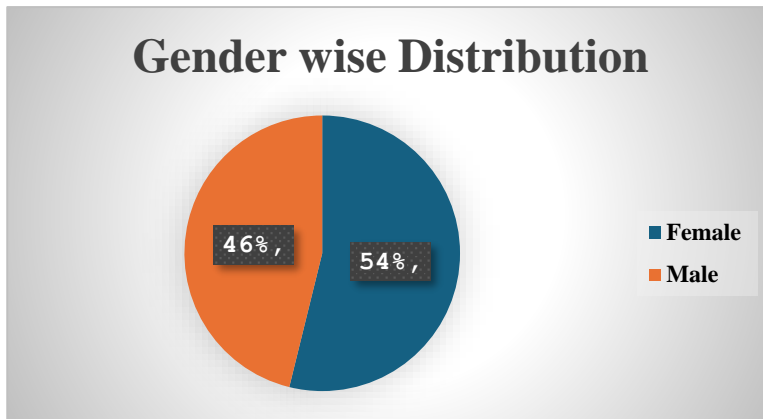


Fig5.1.18: Distribution Based on Gender

Among a total of 26 patients included in this study a preponderance of female patients was observed. In this study 14 patients were female (54%) while 12 patients were male (46%).

5.1.18 DISTRIBUTION BASED ON SYMPTOMS

Table5.1.19: Distribution Based on symptoms

Symptoms	Number(n=26)	Percentage(%)
Weakness	24	92%
Difficulty In Speaking	24	92%
Vision Changes	22	85%
Dizziness	20	77%
Numbness	14	54%
Severe Headache	26	100%
Confusion	17	65%

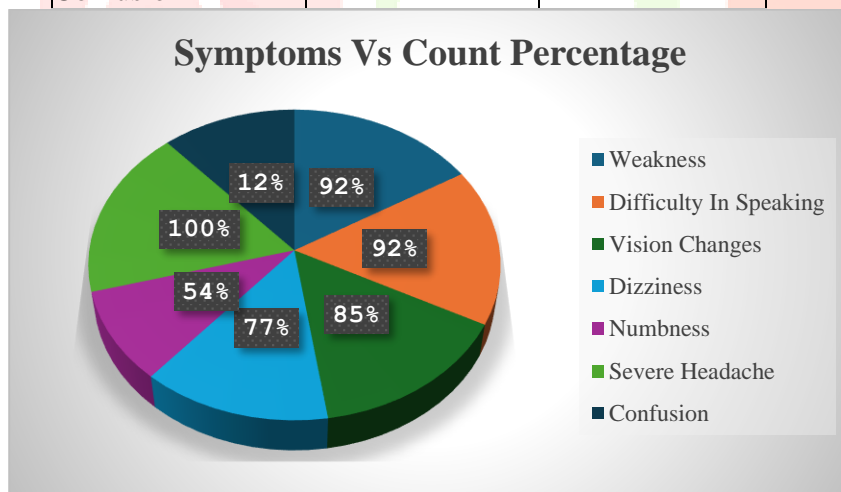


Fig5.1.19: Distribution Based on Symptoms

It was observed that 92% of patients had weakness, 92% of patients had difficulty in speaking, 85% of patients had vision changes, 77% of patients had dizziness, 54% of patients had numbness, 100% of patients had severe headache and 12% of patients had Confusion.

5.1.20 CORRELATION BETWEEN SYMPTOMS AND AGE GROUP

Table 5.1.20: Correlation between symptoms and age group

Age Group	Weakness	Difficulty In Speaking	Vision Changes	Dizziness	Numbness	Severe Headache	Confusion
50-59	5	7	5	5	4	7	4
60-69	5	5	5	3	2	5	2
70-79	11	9	9	9	7	11	7
80-89	3	3	3	3	1	3	3

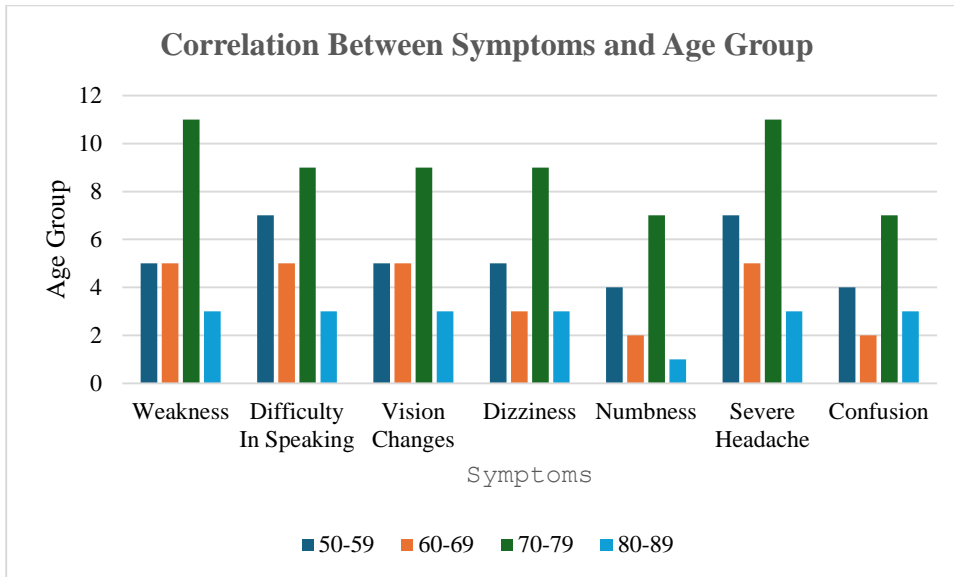


Fig5.1.20: Correlation between symptoms and age group

The age group 70-79 exhibits the highest frequency or severity across most symptoms, with notable peaks in "Difficulty in Speaking, Dizziness, Numbness, and Confusion. The symptom severe Headache " shows a significant increase in frequency or severity as age progresses, with the highest value observed in the 50-59 age group. Vision Changes and Severe Headache display relatively high frequencies or severities across multiple age groups, although the pattern is not strictly age-related. Weakness and Confusion also show notable frequencies or severities, particularly in the older age groups

5.1.21 ASSESSMENT OF MEDICATION ADHERENCE BEFORE COUNSELLING

Table5.1.21: Medication Adherence Before Counselling

MAAS Score	Number(n=26)	Percentage(%)	Mean±SD
01-03	10	38%	2±0.5
04-06	12	46%	5±0.6
07-09	4	15%	8±0.4

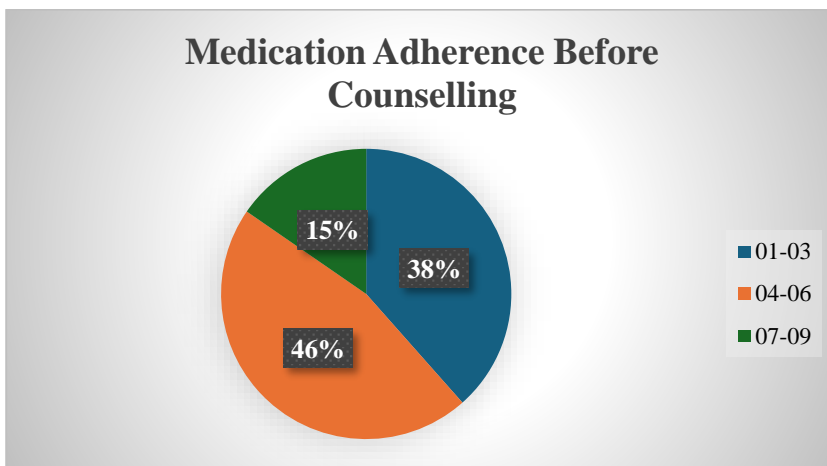


Fig5.1.21: Medication Adherence Before Counselling

Among the patients assessed, 38% scored between (01–03), 46% between (04– 06), and another 15% between (07–09). The results indicate that a significant portion of patients had improvement in adherence, underlining the importance of counselling interventions.

5.1.22 ASSESSMENT OF MEDICATION ADHERENCE AFTER COUNSELLING

Table 5.1.22: Medication Adherence score after counselling

MAAS Score	Number(n=26)	Percentage(%)	Mean±SD
01-03	2	8%	2±0.5
04-06	8	31%	5±0.5
07-09	16	61%	8±0.6

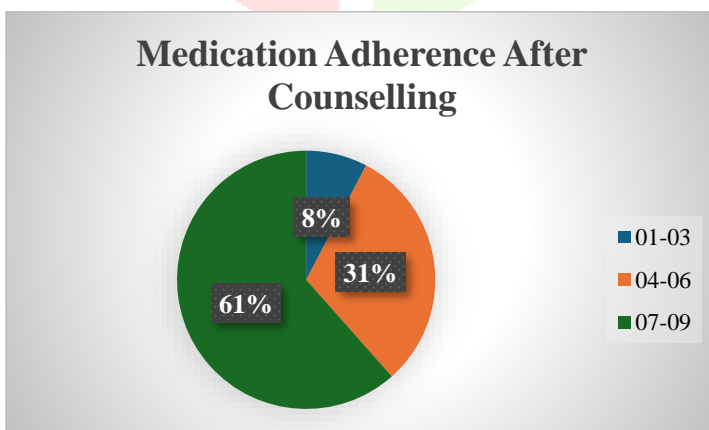


Fig5.1.22: Medication Adherence After Counselling

Among the patients assessed, 8% scored between 01–03 (low adherence), 31% between 04–06 (moderate adherence), and another 61% between 07–09 (good adherence). The results indicate that a significant portion of patients had room for improvement in adherence, underlining the importance of counseling interventions.

5.1.23 COMPARISON OF MAAS SCORE

Table 5.1.23: Comparison of MAAS Score

Before Counselling	After Counselling	P-Value
4.31±2.16	6.62±1.98	0.001*(<0.05)

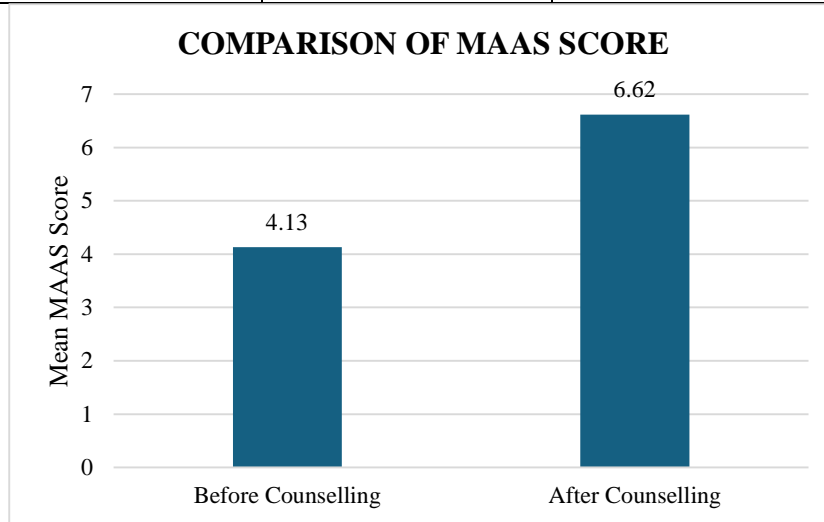


Fig5.1.23: Comparison of MAAS score

It presents a comparative analysis of the Medication Appropriateness and Safety Score (MAAS) before and after patient counseling. The mean score before counseling was 4.31±2.16, while after counseling it improved to 6.62±1.98, indicating a positive change. The P-value < 0.001 suggests this difference is statistically significant, highlighting the effectiveness of patient counseling in enhancing medication reconciliation practices among atrial fibrillation patients.

5.1.24 PRESCRIBING PATTERNS OF ATRIAL FIBRILLATION BASED ON CHA₂DS₂-VASc SCORE

Table5.1.24: Distribution based on Prescription Pattern

Drugs	Number(n=26)	Mean±SD
Amiodarone	19	7.5±1.2
Digoxin	7	5.0±1.1

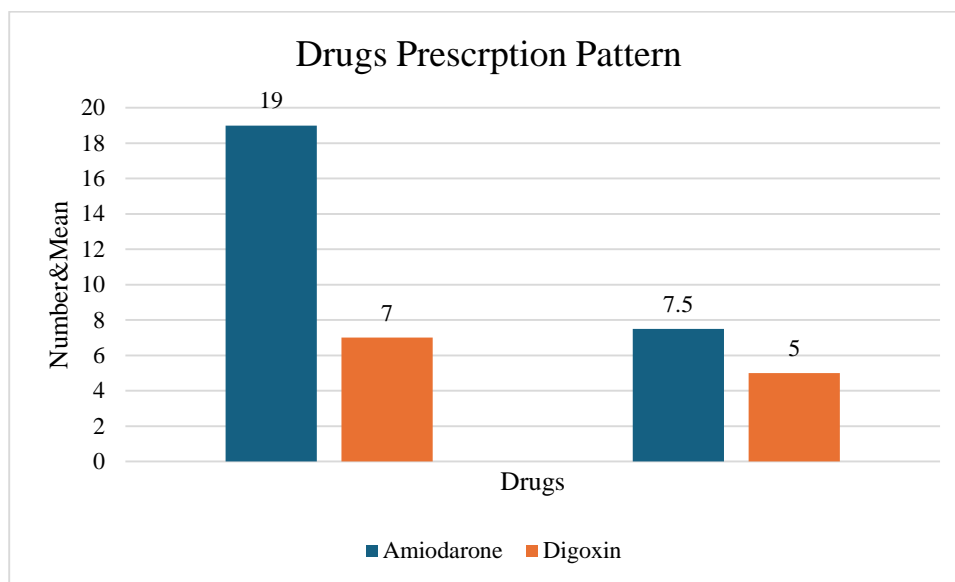


Fig5.1.24:Distribution Based on Prescription Pattern

The data in the table indicates that Amiodarone was prescribed 19 times with a mean of 7.5 and a standard deviation of 1.2. Digoxin was prescribed 7 times with a mean of 5.0 and a standard deviation of 1.1. The bar graph below the table visually represents the count of prescriptions for each drug, indicating a higher frequency of Amiodarone prescriptions compared to Digoxin.

5.1.25 ASSESSMENT OF QUALITY OF LIFE USING OF STROKE SPECIFIC QUALITY OF LIFE SCALE(SS-QOL)

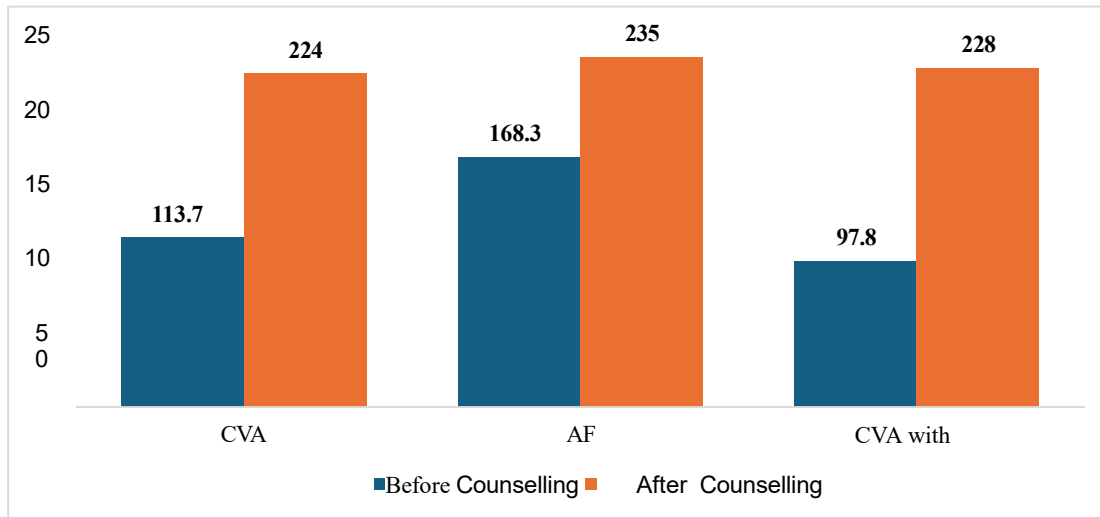
The comparison of each group's quality of life have noted before and after counselling and treatment are shown in the following table.

Table5.1.25:Assessment of Quality of life using (SSQOL Scale)

Groups	No. Of Patient	Baseline SS-QOL (Mean)	First Follow-up SS-QOL (Mean)	Standard Deviation Before	Standard Deviation After	P-Value
CVA	26	113.73	224	23.23	18.24	0.001*
AF	26	168.34	235	24.28	15.45	0.001*
CVA with AF	26	97.80	228	25.23	16.14	0.001*

Fig5.1.25: Assessment of Quality of Life using (SS-QOLScale)

The figure illustrates the impact of patient counselling on Stroke-Specific Quality of Life



(SS- QOL) scores across three patient groups: those with Cerebrovascular Accident (CVA) only, Atrial Fibrillation (AF) only, and those with both CVA and AF. At baseline, the mean SS-QOL scores were recorded as 113.73 for the CVA group, 168.34 for the AF group, and 97.8 for the CVA with AF group. Following patient counselling, substantial improvements were observed in all three groups, with the CVA group increasing to 224, the AF group to 235, and the CVA with AF group to 228. The differences were statistically significant across all categories, with p-values less than 0.001, indicating that the enhancements were not due to chance. Notably, the CVA with AF group exhibited the most pronounced relative improvement, highlighting the critical role of patient counselling in addressing the compounded challenges faced by individuals with both stroke and atrial fibrillation. These findings suggest that structured patient counselling significantly enhances stroke-specific quality of life, underscoring its value in clinical practice for optimizing patient outcomes in this population.

5.1.26 COMPARISON OF QUALITY OF LIFE SCALE USING (SS-QOL)

Table 5.1.26: Comparison of Quality of life scale using (SS-QOL)

GROUP	TOTAL SCORE BEFORE COUNSELLING	TOTAL SCORE AFTER COUNSELLING	SCORE IMPROVEMENT
CVA	2,957	6,240	+3,283
AF	4,377	6,370	+1,993
CVA WITH AF	2,543	6,318	+3,775

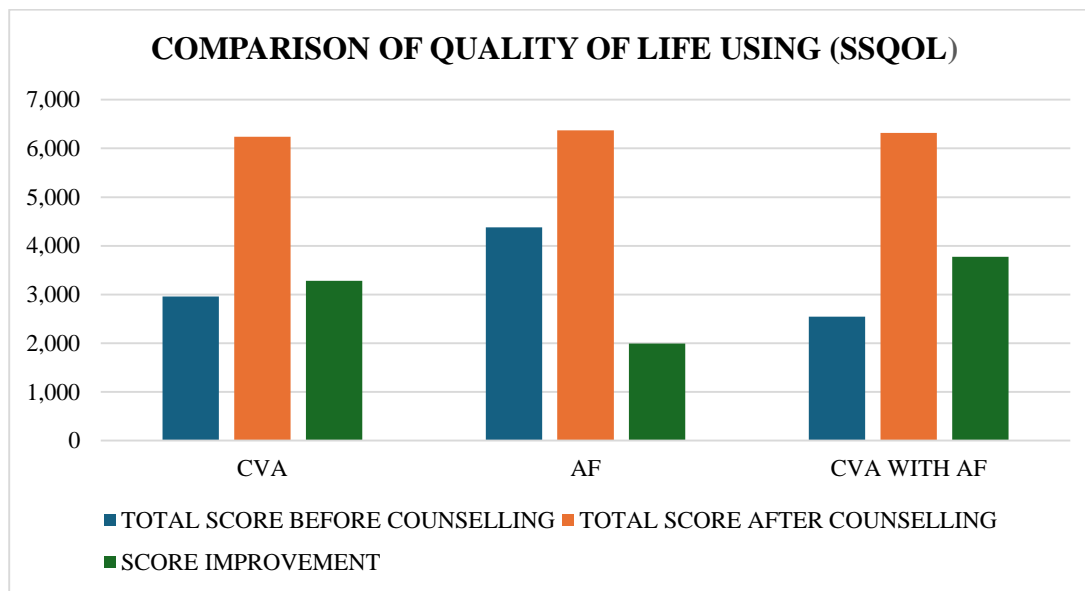


Fig5.1.26: Comparison of Quality of life scale using (SS-QOL)

All three groups showed a substantial improvement in quality of life after counselling. Stroke with Atrial Fibrillation group showed one of the largest relative gains post counselling these improvement emphasizes the effectiveness of counselling .

DISCUSSION

The results of this study reaffirm the increasing preference for Direct Oral Anti-Coagulants(DOAC) in clinical practice, particularly in patients with atrial fibrillation who are at elevated risk for stroke. DOACs such as Apixaban and Rivaroxaban offer more predictable pharmacokinetics and fewer drug-food interactions, which enhances their practicality in routine care. Our findings were consistent with international trends and guidelines that recommend DOACs as first-line agents for stroke prevention in eligible patients.

Despite general adherence to clinical guidelines, there were occasional deviations observed in prescribing patterns, particularly in patients with borderline CHA₂DS₂-VASc scores or complex comorbidities. These deviations likely reflect individual physician discretion, challenges in drug availability, or cost-related issues. Such variability underscores the need for more standardized protocols and periodic training for prescribers to ensure optimal therapy selection in real-world settings.

Importantly, the counselling component of this study highlighted the significant benefits of structured patient education. Counselling led to measurable improvements in medication adherence and enhanced multiple domains of quality of life, particularly emotional stability, mobility, and communication. This confirms the value of incorporating clinical pharmacists and patient educators into multidisciplinary teams to bridge the knowledge gap, ensure medication safety, and empower patients in managing their health.

This prospective observational study analyzed the prescribing patterns of direct oral anticoagulants (DOACs) in stroke patients with atrial fibrillation (AF) and evaluated the impact of patient counselling on medication adherence. The study findings highlight the

importance of DOACs in stroke prevention and the effectiveness of counselling in improving adherence rates.

The most commonly prescribed DOACs in patients with Stroke and Atrial fibrillation were Apixaban, Rivaroxaban, and Dabigatran. These medications have been shown to be effective in reducing the risk of stroke by inhibiting clot formation, particularly in patients with a CHA₂DS₂-VASc score greater than 2. Compared to traditional vitamin K antagonists like warfarin, DOACs offer fewer drug interactions, no requirement for frequent monitoring, and a lower risk of intracranial hemorrhage.

This study about 78 patients were taken ,26 stroke with atrial fibrillation patients ,26 stroke patients and 26 atrial fibrillation patients. Statistical analyses were performed using paired-test and a detailed analysis was performed.

The main of our study is to evaluate and analyze the prescribing pattern and quality of life in stroke patients with atrial fibrillation using Stroke Specific Scale (SS-QOL) and Medication Adherence using Medication Adherence Assessment Scale (MAAS).

The observation of our study was similar to the result of the study conducted by **Katoor et.al.** In their study “**Prescription Patterns and Outcomes of Patients With Atrial Fibrillation Treated With Direct Oral Anticoagulants and Warfarin**” the study was to analyze the current drug prescribing trends in stroke patients with non-valvular atrial fibrillation. . This study was conducted in 2362 patients who were on Direct Oral Anti-Coagulants. Among the Direct Oral Anti-Coagulant group apixaban were more prescribed 51% followed by rivaroxaban 28.7% and dabigatran 20.3% respectively.

The observation of our study was similar to to the result of the study conducted by **Krishna et al (2019).**In their study “**Evaluation of Impact of Medication Reconciliation in Stroke Patients in a Tertiary Care Hospital** “ the aim was to assess the impact of medication reconciliation and patient counselling in stroke patients along with identification of drug related problems and conducting patient counselling with the aid of Patient Information Leaflet card.

Medication adherence is crucial for optimizing treatment outcomes, and the Medication Adherence Assessment Scale (MAAS) was used to evaluate adherence levels before and after counseling. Before counseling, adherence was suboptimal, with a significant proportion of patients scoring between 3–6 on the MAAS scale. However, after structured patient counseling, adherence improved markedly, with most patients scoring between 6–9, indicating a positive impact of educational interventions. Quality of life (QoL) assessments using the Stroke-Specific Quality of Life (SS-QOL) scale revealed notable improvements after treatment and counseling. Patients with combined stroke and AF had the most significant improvement in QoL scores, followed by those with isolated AF and stroke. These findings reinforce the role of comprehensive patient education and counseling in enhancing adherence and overall patient well-being.

Demographic analysis revealed that stroke with atrial fibrillation was most common in the 71–80 age group, with a predominance of female patients. Symptom analysis indicated that difficulty in speaking, dizziness, and vision changes were the most commonly reported issues among stroke and AF patients. These observations align with existing literature emphasizing the high burden of neurological and cardiovascular complications in elderly populations.

SUMMARY

This prospective observational study aimed to evaluate the prescribing patterns of Direct Oral Anticoagulants (DOACs) in stroke patients with atrial fibrillation (AF) and assess the impact of patient counselling on medication adherence and quality of life. A total of 78 patients were included over a period of six months and categorized into three groups—Stroke patients, Atrial Fibrillation patients and Stroke with Atrial Fibrillation Patients. Prescriptions were analyzed in relation to CHA₂DS₂-VASc scores, and patient outcomes were measured using validated tools such as the Medication Adherence Assessment Scale (MAAS) and the Stroke-Specific Quality of Life (SS-QOL) Scale.

The most commonly prescribed Direct Oral Anti-Coagulants were Apixaban, Rivaroxaban, and Dabigatran. These medications were chosen based on risk stratification, renal function, and clinical judgment. The study also introduced patient counselling interventions to a subset of patients in all groups to enhance their understanding of the importance of anticoagulation therapy, adherence to medication schedules, and awareness of stroke symptoms. The counselling was conducted through one-on-one sessions and included the distribution of patient information leaflets (PILs).

A total of 78 patients among them 26 satisfied inclusion criteria majority of the patients were aged >60 with a slight female

- predominance in Group A.
- It was observed that 54% of patients had weakness, 100% patients had difficulty in speaking, 77% patients had vision changes, 73% patients had dizziness, 12% patients had numbness, 54% patients had severe headache and 77% patients had confusion.
- Among the patients assessed, 19% had a low adherence (07-08), 50% fell into the high adherence range (05-06), and another 31% demonstrated moderate adherence (03-04) before counselling.

And 69% of patients achieved a score of 08-09, and 31% score between 06-07, reflecting higher level of adherence compared to the pre-counselling phase.

- Apixaban was prescribed to 19 patients with a mean standard deviation (SD) of 7.2 ± 1.0 , while Rivaroxaban was prescribed to 7 patients with a mean standard deviation of 4.8 ± 0.7 . It represents the count of prescriptions for each drug, indicating a higher frequency of Apixaban prescriptions compared to Rivaroxaban.

- Among the 26 patients in Group B majority of the patients were >70 with female

predominance.

- It was observed 50% of patients had weakness, 100% of patients had difficulty in speaking, 96% of patients had vision changes, 81% of patients had dizziness, 35% patients had numbness, 46% of patients had severe headache and 16% of patients had confusion.

Among the patients assessed, 38% had a moderate adherence (03-04), and another 38% demonstrated moderate adherence (05-06) and 24% had low adherence (07-08) before counselling. After counselling 69% had a good adherence (08-09), and another 31% demonstrated moderate adherence (06-07).

- Clopidogrel were prescribed to 9 patients, with a mean±SD of 4.8 ± 0.5 , while Aspirin were prescribed to 17 with patients with a mean and standard deviation 6.8 ± 1.2 . Aspirin demonstrated a slightly higher mean usage compared to Clopidogrel, reflecting its frequent inclusion in stroke prevention strategies.

- Group C with 26 patients majority were >70 of age and female predominance.

- It was observed 92% of patients had weakness, 92% of patients had difficulty in speaking, 85% of patients had vision changes, 77% of patients had dizziness, 54% of patients had numbness, 100% of patients had severe headache and 12% of patients had Confusion.

- Among the patients assessed, 38% scored between (01–03), 46% between (04– 06), and another 15% between (07–09) before counselling. After counselling 8% scored between 01– 03 (low adherence), 31% between 04– 06 (moderate adherence), and another 61% between 07–09 (good adherence).

- Amiodarone was prescribed 19 times with a mean of 7.5 and a standard deviation of 1.2. Digoxin was prescribed 7 times with a mean of 5.0 and a standard deviation of 1.1 and it represents the count of prescriptions for each drug, indicating a higher frequency of Amiodarone prescriptions compared to Digoxin.

- The comparison of each group's quality of life have noted before and after counselling and treatment are noted using SS-QOL. All three groups showed a substantial improvement in quality of life after counselling. Stroke with Atrial Fibrillation group showed one of the largest relative gains post counselling this improvement emphasizes the effectiveness of counselling. The impact of patient counselling on Stroke-Specific Quality of Life (SS- QOL) scores across three patient groups: those with Cerebrovascular Accident (CVA) only, Atrial Fibrillation

(AF) only, and those with both CVA and AF. At baseline, the mean SS-QOL scores were recorded as 113.73 for the CVA group, 168.34 for the AF group, and 97.8 for the CVA with AF group. Following patient counselling, substantial improvements were observed in all three groups, with the CVA group increasing to 224, the AF group to 235, and the CVA with AF group to 228. The differences were statistically significant across all categories, with p-values less than 0.001, indicating that the enhancements were not due to chance. Notably, the CVA with AF group exhibited the most pronounced relative improvement, highlighting the critical role of patient counselling in addressing the compounded challenges faced by individuals with both Stroke and Atrial fibrillation. These findings suggest that structured patient counselling significantly enhances stroke-specific quality of life, underscoring its value in clinical practice for optimizing patient outcomes in this population.

Following the counselling sessions, a notable improvement was observed in medication adherence and quality of life scores. Patients demonstrated better understanding of their therapy and showed reduced incidence of missed doses. The intervention had a positive impact not only on clinical outcomes but also on patients' confidence and emotional well-being. The findings emphasize the critical role of pharmacist-led counselling in chronic disease management, especially in high-risk populations like those with AF and stroke.

CONCLUSION

A stroke happens when a portion of the brain's blood flow is cut off or disrupted, depriving the brain's tissue of oxygen and nutrients. Stroke is a medical emergency that needs to be treated right away because brain cells start to die within minutes. Atrial Fibrillation (AFib), a common heart rhythm problem marked by rapid and irregular pounding of the atria (upper chambers of the heart), is a major risk factor for stroke. Blood may collect and clot in the atria as a result of the erratic heartbeat in Atrial Fibrillation. An ischemic stroke, which makes up around 85% of all strokes, can occur when a clot blocks an artery and goes to the brain.

A single Centered Prospective observational study was conducted in Neurology Department of Cosmopolitan Hospital Post Graduate Institute and Health Sciences, Thiruvananthapuram. Based on the inclusion and exclusion criteria 78 patients were enrolled in this study. A significant proportion of the study participants were aged between 70- 80 years. The analysis also covered age distribution, gender distribution, symptoms and comorbidities.

The study provided valuable insights into the current prescribing trends of Direct Oral Anti-coagulants in stroke patients with AF and highlighted areas where real-world practices diverge from recommended guidelines. While the selection of Direct Oral Anti-Coagulants was largely appropriate, inconsistencies in prescription patterns point toward the need for greater awareness and evidence-based decision-making among prescribers. The CHA₂DS₂-VASc scoring system continues to be a reliable tool for assessing stroke risk and guiding anticoagulation therapy.

The incorporation of patient counselling proved to be a critical intervention that not only

improved medication adherence but also contributed significantly to enhancing the quality of life. Patients who received targeted education about their condition and medications demonstrated better understanding, fewer adherence errors, and higher satisfaction with their care. This suggests that patient-centered strategies should be integral to all stages of stroke and Atrial Fibrillation management.

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