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TRAINING MANUAL FOR THE MANAGEMENT OF CARDIOVASCULAR DISEASES

DOCTORS AND PHYSICIAN ASSISTANTS

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TRAINING MANUAL FOR THE MANAGEMENT OF CARDIOVASCULAR DISEASES

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LIST OF ABBREVIATIONS

ABPM	ambulatory blood pressure monitoring
ACE	angiotensin converting enzyme
ACS	acute coronary syndrome
AED	automated external defibrillator
AHA	American Heart Association
Apo A1	apolipoprotein A1
Apo A2	apolipoprotein A2
ARB	angiotensin receptor blocker
ARF	acute rheumatic fever
ASCVD	atherosclerotic cardiovascular disease
BUE	blood urea and electrolyte
CAD	coronary artery disease
CPD	continuous professional development
CRP	c-reactive protein
CVD	cardiovascular disease
DBP	diastolic blood pressure
GAS	group A Streptococcus
FBC	full blood count
FBS	fasting blood sugar
ECG	electrocardiogram
EF	ejection fraction
ESR	erythrocyte sedimentation rate
GHS	Ghana Health Services
HPT	hypertension
HW	health worker
IHD	ischaemic heart disease
ISH	International Society of Hyper tension
LDL-C	low-density lipoprotein
LMICs	lower-middle-income countries
LOE	level of evidence
LVEDV	left ventricular end-diastolic volume
LVESV	left ventricular end-systolic volume
LVH	left ventricular hypertrophy
MI	myocardial infarction
MOH	Ministry Of Health
NCDs	non-communicable diseases
NSTEMI	non-ST elevation myocardial infarction
RBS	random blood sugar
RHD	rheumatic heart disease
SBP	systolic blood pressure
STEMI	ST elevation MI
SV	stroke volume
TIA	transient ischaemic attack
WHO	World Health Organisation

PREFACE

Cardiovascular diseases (CVDs) are a growing public health problem in Ghana and other countries in Sub-Saharan Africa. Non-communicable diseases deaths have increased by 55% from 2000 to 2016. CVDs are one of the top two causes of mortality in Ghana, accounting for more institutional deaths than malaria in 2008.

According to the Global Burden of Disease Study (GBD), ischaemic heart disease was the fourth leading cause of death in Ghana in 2016. According to the Ghana Health Service 2017 Annual Report, the prevalence of hypertension, a major risk factor for CVDs, is increasing rapidly and ranges from 19% to 48% of the adult population. This increase is due to rising life expectancy and change of lifestyle contributing to increased prevalence of predisposing factors for hypertension. Early diagnosis and adequate management of risk factors can prevent the development of CVDs and their fatal consequences.

To improve the risk assessment, prevention and management of CVDs at all levels of care, the Ministry of Health of Ghana has developed *National Guidelines for the Management of Cardiovascular Diseases* with the participation of all relevant stakeholders and reflecting internationally approved management pathways for CVDs. They serve as a practical guide for assessing risks and, preventing and managing the most important CVDs prevalent in Ghana and can be used at all levels of care.

To ensure the effective use of these Guidelines, trainings have to be carried out.
This training manual should guide the facilitators of the trainings and be used hand in hand with the *National Guidelines for the Management of Cardiovascular Diseases*.
This manual includes 12 modules, each with defined objectives and teaching materials.
Different learning methods are suggested for each module to make the training interesting and the learning as easy as possible.

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CONTENT

1 INTRODUCTION

OVERVIEW OF TRAINING COURSE

RATIONALE

This training course has been developed to address an important need in Ghana – to improve the knowledge and practices related to the identification, diagnosis and management of cardiovascular diseases among practicing health workers at all levels within the health system. It is based on the *National Guidelines for the Management of Cardiovascular Diseases* and supports its implementation.

The training course includes a Facilitator's Guide with 12 modules and Training Slides and is designed as a tool for facilitators to help them prepare and deliver the training. It is meant as guidance not as a rule. The training manual should be used hand in hand with the *National Guidelines for the Management of Cardiovascular Diseases* in Ghana.

CVDs account for more than half of all non-communicable diseases (NCDs) deaths in Sub-Saharan Africa, prompting a need for structured capacity building for health workers to identify signs and symptoms, investigate, diagnose and appropriately manage CVDs at their level of service delivery and to promote prevention of CVDs with healthy lifestyles and habits.

MAIN OBJECTIVE OF THE TRAINING COURSE

The main objective of this training course is to improve the capacity of health workers at all levels of care for the prevention and management of patients with CVDs.

SPECIFIC OBJECTIVES

At completion of the training course, the participants will know:

- **The cardiovascular diseases burden in Ghana**
- **The risk factors for CVDs and how to assess them and counsel clients accordingly**
- **How to diagnose, treat and continuously manage patients with CVDs**
- **How to refer patients with CVDs from lower to higher level facilities and how to receive them for further management.**

TARGET AUDIENCE

The participants of the training are supposed to come from the different levels of care which include general practitioners, medical officers, house officers and physician assistants.
The levels presented are:

- **Health facilities without a doctor (Level 1)**
- **Health facilities with a doctor (Level 2)**

OUTLINE OF THE TRAINING MANUAL

The training manual is structured in Modules.

GENERAL MODULES

Module 1: Introduction to Cardiovascular Diseases Training Course
Module 2: Cardiovascular Disease Burden
Module 3: Risk Factors for Cardiovascular Diseases
Module 4: Symptoms and Signs of Cardiovascular Diseases

DISEASE MODULES

Module 5: Hypertension
Module 6: Stroke
Module 7: Chest Pain, Coronary Artery Disease and Myocardial Infarction
Module 8: Heart Failure
Module 9: Venous Thromboembolism
Module 10: Acute Rheumatic Fever, Rheumatic and Valvular Heart Diseases and Infective Endocarditis
Module 11: Cardiac Arrhythmias
Module 12: Cardiac Arrest

STRUCTURE OF THE MODULES

Each training module is structured in the same way to facilitate flow of information and participation. The different sections are:

a. Duration of the module
b. Learning objectives
c. Material needed
d. Trainer's advance preparation
e. Methodologies used
f. Training process

TRAINING COURSE METHODOLOGY

The training methods employed in this course ensure that each participant is actively involved in the training process by contributing and participating in discussions, exercises, group work, role-plays, demonstrations and practical exercises. These different training methods are explained below along with their corresponding pictorial cues used in the facilitator's guide.

CUE METHODOLOGY

Content information, concepts, principles and analyses are delivered in a **Presentation** by the facilitator in lecture form with slides followed by a round of questions and explanatory answers, exercises or discussions.

Brainstorming is a group technique to create new ideas. The group takes a specific problem and creates as many ideas as possible in a limited time. Every group member should feel free to share any idea without receiving criticism. Members are encouraged to use other members' ideas as trigger (input) to create/associate further ideas, and to combine ideas.

Exercise sessions allow each group member to practice a principle or procedure in order to acquire the needed skill. **Case Scenarios** and **Clinical Exercises** are used to provide practice opportunities. Discussions allow every participant to present their view on an issue and to arrive at a consensus.

An **Evaluation** of the answers is done by the facilitator with the class to be sure the correct principles/procedures have been applied to answer the clinical scenario.

Role Play is a way of working through a situation, a clinical scenario, or a problem by assuming roles and practicing what to say and do in a certain setting.
A role-play could take place between two people simulating an issue that could arise in the workplace. This could occur with a group of people split into pairs, or whereby two people role-play in front of the class. It can be effective in connecting theory and practice, but may not be popular with people who do not feel comfortable performing in front of a group of people.

Discussions allow every participant to present his/her view on an issue and to arrive at a consensus.

During **Group Work**, content is further analysed and illustrated by practical exercises. Group work also serves as a space to exchange experiences, discuss controversial issues and build consensus. It facilitates the active participation of all participants.

Review sessions allow for the facilitator and the participants to go over principles that have been taught in an earlier session. The facilitator takes opportunity to clarify any issues that may not have been grasped.

Plenaries will also be used to present the results of group work and discuss these further.

MATERIAL NEEDED

The following material, tools and equipment will be needed during the training course. These include and are not limited to the following:

- **Laptop computer and projector**
- **Flip chart with a flip chart stand**
- **Whiteboard markers**
- **Note pads**
- **A4 sheets**
- **Sticky note paper of different colours**
- **Sheets of large size brown paper**
- **Pens, pencils and erasers**
- **Rulers**
- **Scissors**
- **Masking tape and paper glue**
- **Clinical station with clinical equipment such as sphygmomanometers (automated and manual), thermometers, stethoscopes**
- **Manual and automated external defibrillators (AED)**
- **Mannikins**
- **ECG machines**
- **ECG print outs, laboratory test results**
- **Patient monitors**
- **Case scenario handouts**
- **WHO Risk Assessment Chart**
- **Copies of *National Guidelines for the Management of Cardiovascular Diseases 2019***

COURSE FORMAT

The course targets health workers from different levels of the health system excluding staff working at Community-based Health Planning and Services (CHPS) level.

- **Nurses will receive training on all components of the course with focus on management up to Level 1**
- **All doctors and physician assistants will receive training on all components of the course with focus on management up to Level 2**
- **All course participants will be assigned to groups of 5 persons with each type of cadre represented in each group**

EVALUATION

A pre-test and post-test will be administered to judge the improvement of knowledge of participants gained from the training.

This course will be accredited and certified for Continuous Professional Development (CPD) of doctors and physician assistants by the professional bodies in Ghana regulating the practice of the respective professional groups. Due to the importance of the training course and the expected impact on health care in Ghana, all participants will be awarded a Certificate of Participation and CPD points after the training course if they obtain a pass mark of 60% in the post test. Any course participant, who scores below the pass mark of 60% will have to re-take the whole course.

At the end of each day participants will receive a questionnaire to explore their opinion regarding the course content and applied methodology and allow them to make suggestions. This will help to continuously improve the course. The answers and suggestions will not influence the result of the post-test.

TRAINING AGENDA

DAY 1	TOPIC	FACILITATOR
08:30 – 08:45 am	Welcome	
08:45 – 09:10 am	Pre-test	
09:10 – 10:40 am	Introduction to cardiovascular diseases training course	
10:40 – 11:10 am	Coffee break	
11:10 – 12:10 pm	Cardiovascular disease burden	
12:10 – 01:00 pm	Risk factors for cardiovascular diseases	
01:00 – 02:00 pm	Lunch	
02:00 – 03:35 pm	Risk factors for cardiovascular diseases cont.	
03:35 – 04:00 pm	Coffee break	
04:00 – 04:15 pm	Filling evaluation sheets	
04:15 – 04:30 pm	House keeping	

DAY 2	TOPIC	FACILITATOR
08:00 – 08:15 am	Recap of Day 1	
09:15 – 10:15 am	Symptoms and signs of cardiovascular diseases	
10:15 – 10:45 am	Coffee break	
10:45 – 12:00 pm	Symptoms and signs of cardiovascular diseases cont.	
12:00 – 01:00 pm	Hypertension	
01:00 – 02:00 pm	Lunch	
02:00 – 03:15 pm	Hypertension cont.	
03:15 – 03:30 pm	Coffee break	
03:30 – 04:30 pm	Clinical practice session	

DAY 3	TOPIC	FACILITATOR
08:00 – 08:15 am	Recap of Day 2	
08:15 – 09:40 am	Stroke	
09:40 – 10:40 am	Chest pain, coronary artery disease, myocardial infarction	
10:40 – 11:00 pm	Coffee break	
11:00 – 12:00 pm	Chest pain, coronary artery disease, myocardial infarction cont.	
12:00 – 01:00 pm	Heart failure	
01:00 – 02:00 pm	Lunch	
02:00 – 03:00 pm	Heart failure cont.	
03:00 – 05:00 pm	Clinical practice session	

DAY 4	TOPIC	FACILITATOR
08:15 – 09:15 am	Plenary on clinical practical session	
09:15 – 10:15 am	Venous thromboembolism	
10:15 – 10:45 am	Coffee break	
10:45 – 11:45 pm	Venous thromboembolism cont.	
11:45 – 01:00 pm	Acute rheumatic fever, rheumatic and valvular heart diseases and infective endocarditis	
01:00 – 02:00 pm	Lunch	
02:00 – 04:30 pm	Acute rheumatic fever, rheumatic and valvular heart diseases and infective endocarditis cont.	

DAY 5	TOPIC	FACILITATOR
08:15 – 10:15 pm	Clinical practice session	
10:15 – 10:45 pm	Coffee break	
10:45 – 12:45 pm	Cardiac arrhythmias	
12:45 – 01:45 pm	Lunch	
01:45 – 02:15 pm	Cardiac arrhythmias cont.	
02:15 – 04:15 pm	Cardiac arrest	
04:15 – 04:45 pm	Post test	
04:45 – 05:30 pm	Next steps and mentoring plan	
05:30 – 06:00 pm	Closing	

2 DELIVERING THE TRAINING COURSE

MODULE 1:
INTRODUCTION TO CARDIOVASCULAR DISEASES TRAINING COURSE

RATIONALE

To achieve the learning objectives of this training course, the participants should be able to interact and work freely with each other during the 4-day course. They must, therefore, get to know each other.

This module serves to help the participants to get know to each other as well as the facilitator and to create a cordial environment within which to conduct the training.

DURATION

- **1 hour 30 minutes**

OBJECTIVES OF THE COURSE

The Objectives of this course are:

- To train health care workers for the use of the *National Guidelines for the Management of Cardiovascular Diseases* (CVDs).
- To train health care workers to acquire standardized skills to manage CVDs for their level of practice in the health care system.
- To streamline and correct lapses within the referral system for CVDs between levels of health care delivery.
- **To contribute to the reduction of morbidity and mortality related to CVDs in Ghana.**

MATERIALS NEEDED

- **Power point slides**
- **Name tags**
- **Marker pens**
- **Sticky note pads**

TRAINER'S ADVANCE PREPARATION

- **Prepare blank name tags for all participants and yourself.**
- **Prepare all material and equipment needed for the module**

METHODOLOGIES

- **Introduction**
- **Interaction**
- **Team building**

PRESENTATION (20 MINUTES)

The facilitator should:

- Welcome the participants to the course and introduce himself/herself to the class by mentioning his/her full name, place of work, occupation, one thing s/he expects to get from participating in the training course.
- Mention the name s/he prefers to be called by during the training course.
- Write this preferred name on the name tag using the marker and pin the name tag to his/her chest.
- Ask all participants to go through the same process to introduce themselves, highlighting the following:
  - Full name and preferred name for the training course.
  - Place of work (name of health facility, category of health facility, district, region).
  - Profession and position in the health facility.
- Briefly inform participants of any administrative issues related to the course organisation.

EXERCISES (10 MINUTES)

The facilitator should make the participants conduct the following activities as part of introducing themselves:

- Each participant should write their preferred name to be used during the course on the name tag and stick it to their chest.
- Each participant should explain and write down **one (1)** thing they expect to get out of the course on a sticky note sheet and stick it up on a designated space on one of the walls in the training hall.
- Each participant should identify 4 other persons to form a group of **five (5)** ensuring that each professional group present in the course is represented in their group.
- Each group once formed, should sit together around a table and identify a leader and a secretary.
- Each morning of the course, the participants should form new groups while ensuring to avoid all their group members from the previous days.

PRESENTATION (10 MINUTES)

- The facilitator should present the training course methodology to the participants, explaining the various components of the course.

A. METHODOLOGY OF TEACHING

The teaching methodology and cues used in the course are as follows:

METHODOLOGY	CUE	METHODOLOGY	CUE
Plenary		Discussion	
Brainstorming		Group Work	
Presentation		Exercise	
Role Play		Review	

B. COURSE FORMAT

The facilitator should explain the rationale behind the course format. The course is structured in modules making up a total of 12 independent modules. Each module is structured into:

- **Presentation** of information relevant to the topic
- **Exercises and activities**
- **Plenary and discussion**
- **Key messages** for the participants

During the course, the participants shall be assigned to groups of 5 persons with each type of cadre represented in each group. Membership of each group shall change every morning of the course to allow for team building and collaboration.

- **Day 1: General Modules (Module 1–4).** All participants shall be taught with the same focus to build the foundation of CVD management. The participants shall work together in one class. This is mandatory for all participants before continuing to the Disease Modules.
- **Day 2 to 5: Disease Modules (Module 5–12)**. Course participants shall begin this part after they have completed the General Modules.

The Training Course Programme is provided to all participants. The facilitator should go through the detailed programme outline **(Slide 9)** for all to understand the structure of the training.

PRE-TEST (45 MINUTES)

A pre-test will be conducted at this point to objectively test participants' baseline knowledge before going through the course. The facilitator should share the questionnaires for the pre-test and allow 45 minutes for the test.

PLENARY SESSION AND DISCUSSION (10 MINUTES)

After the pre-test, the facilitator should lead a discussion on full participation in the course by all participants while collecting the filled questionnaires. The facilitator should talk about the value of the course in changing the health system for the better and reducing morbidity and mortality associated with CVDs in the country.

Due to the importance of the training course and the expected impact on health care services in Ghana, all participants should have test scores so that they can be awarded a Certificate of Participation and CPD points after the training course. Only participants obtaining a minimum score of 60% in the post-test will be awarded a Certificate of Participation and the corresponding CPD points. Any course participant who scores below the pass mark of 60% will have to re-take the whole course.

The facilitator should provide any further administrative information needed and create a list of Do's and Don'ts for the Training Course to ensure full participation.
Daily attendance should also be checked as part of compliance to the course.

COURSE NORMS

DO'S

Participants should:

- Attend every session fully
- Arrive early each day
- Participate fully in each exercise and group work
- Present at least once on behalf of their group
- Put their phones on silent mode

DON'TS

Participants should NOT:

- Miss any session
- Be late for each day's training
- Refuse to participate in exercises and group work
- Miss an opportunity to make a presentation on behalf of their group
- Receive calls during training course
- Use their laptops during the training course

! **The Training Course is designed to improve medical practices associated with managing patients with cardiovascular diseases in Ghana.**
This Training Course is accredited for CPD points and the pass mark for receiving Certificate of Participation and CPD points is 60% including marks for participation.

MODULE 2:
CARDIOVASCULAR DISEASES BURDEN

RATIONALE

The Module discusses the disease burden and impact of CVDs on the health systems of the world and of Ghana specifically. It also provides the needed information behind the development of the new *National Guidelines for the Management of Cardiovascular Diseases*. The Module closes with prescription writing and referral systems in the Ghana health system.

DURATION

- 1 hour

LEARNING OBJECTIVES

By the end of this module, participants will be able to:

- Understand the epidemiology of CVDs globally and in Ghana.
- Understand the purpose of the CVD guidelines and its structure.
- Identify resources needed for CVD management at various levels of the health system.
- Prescribe correctly.
- Conduct referrals correctly within the Ghana health system.

MATERIALS NEEDED

- Power point slides
- Flip chart
- Marker pens
- Handouts for exercises

TRAINER'S ADVANCE PREPARATION

- Review the power point slides.
- Prepare all material and equipment needed for the module.
- Ensure that other logistics (e.g. projector, laptop, etc.) are available and in working condition.

METHODOLOGIES

- Presentation
- Discussion
- Brainstorming
- Practical exercises

PRESENTATION (30 MINUTES)

The facilitator should:

- **Introduce and describe the burden of cardiovascular diseases globally and in Ghana.**
  - Define cardiovascular diseases.
  - Let participants estimate the global disease burden of cardiovascular diseases.
  - Let participants identify the 4 main types of non-communicable diseases **(Slide 16):**
    - Cardiovascular diseases (CVDs)
    - Cancers
    - Chronic respiratory diseases
    - Diabetes mellitus
- **Describe efforts to address the problem of CVDs in Ghana.**
  - Allow participants to identify what has been done so far to address this problem.
- **Discuss the importance of the CVDs Guidelines.**
  - Standardization of care
  - Level of evidence
- **Present the structure of the CVDs Guidelines (Slide 18).**
  - Review outline and content of the Guidelines
  - Levels of care
  - Resources needed for CVDs management
- **Set up a Skills Area to show the tools and equipment needed for the CVDs management (Slides 19-20).**
  - The facilitator should lead the participants to the Skills Area to review the tools and equipment.
  - The participants should form groups of 5 to identify all the tools and equipment needed for CVDs management according to the level of care.
- **Give important information for managing CVDs.**
  - Prescription writing
  - Referrals
  - Emergency systems

PRESCRIPTION WRITING

A standard prescription should (Slide 21):

- Be written in eligible ink /typed.
- Be dated.
- State the full name and address of the patient.
- Specify the age and weight of the patient (especially for children).
- Include the generic name of the medication and the required dosage.
- Be written completely by the certified prescriber and not left for another person to complete.
- Be signed in ink by the certified prescriber.
- Include the contact details of the prescriber (name & telephone no.). Provide other needed instructions.

The following should be noted when writing a prescription:

- Names of medicines and preparations should be written in full
- Generic names should always be used as advised by these guidelines
- Avoid the use of unnecessary decimal points (e.g. 5mg and not 5.0mg)
- Where decimals are unavoidable, use a zero in front of the decimal point where there is no other figure (0.5ml and not .5ml)
- Quantities of 1 gram or more should be written in grams (e.g. 1g, 4g)
- Quantities less than 1 gram should be written in miligrams (e.g. 500mg, not 0.5g)
- Quantities less than 1mg should be written in micrograms (e.g. 500micrograms, not 0.5mg)
- 'Micrograms' and 'nanograms' should not be abbreviated
- Similarly, 'units' should not be abbreviated
- Use the term millilitre and not cubic centimetre
- State the dose and dosing frequency clearly
- State the quantity to be supplied and/or indicate the number of days of treatment required.
- Clearly state the route of administration; avoid the use of the parenteral route of administration except where there are clear clinical indications for this route; use the oral route whenever possible

REFERRAL PROCESS

Why refer? (Slide 22)

- If the health facility lacks the appropriate resources needed for the diagnosis and management of the patient in the form of:
  - Lack of expertise/qualified health workers.
  - Lack of appropriate diagnostic tools.
  - Lack of appropriate/right medication.
- If a patient and the family request for second opinion or different level of care.

Patients should be referred in accordance with agreed arrangements to facilities where the necessary competence, tools and support exist.

Notification and prior information about the patient should be undertaken to ensure the receiving health facility is adequately prepared for continuity of care.

STEPS IN THE REFERRAL PROCESS (SLIDE 24)

- Identify the facility to receive the patient.
- Notify the facility about the referral.
- Write a referral letter including:
  - Date
  - Name and contact of referring clinician/health worker
  - Name of patient
  - Reason for referral
  - Patient's history, clinical finding, test results and prior treatment

- Provisional diagnosis
- Signature of referring clinician

- **Request for feedback from the receiving clinician/facility including:**
  - Final diagnosis
  - Long term management plan and follow up
  - Name and contact of the receiving physician/health worker

EMERGENCY CONTACTS	**Police: 191/112** **Fire Service: 192/112** **Ambulance: 193/112**

EXERCISES (20 MINUTES)

The facilitator should conduct exercises in prescription writing and referrals. The exercises must be provided to the participants as handouts.

EXERCISE 1:

Thirty-six-year-old Kwei Mensah attends your clinic and receives a prescription for his antihypertensive medicines as listed below:

- **Amlodipine 5mg taken once a day for 30 days**
- **Atorvastatin 10mg taken daily for 30 days**
- **Soluble Aspirin 75mg taken daily for 30 days**

➔ **Write a prescription for him to the pharmacy.**

EXERCISE 2:

Mr. Kwei Mensah has to be referred from Achimota Hospital to Greater Accra Regional Hospital on account of his deteriorating heart failure. He is currently on admission, having been managed for 5 days without improvement. His blood pressure is currently 180/140 mmHg.

➔ **Write a referral letter and provide the right education to the client and his relations.**

The facilitator should divide the participants into their groups and ask them to write the prescription and the referral letter on a flip chart paper (15 min.) After the 15 minutes, the groups must present their writings followed by a discussion.

PLENARY SESSION AND DISCUSSIONS (10 MINUTES)

The facilitator should lead a discussion on the challenges of referrals in the Ghana health system. What is done right and what is done wrong when referring clients? The facilitator should write the responses of the participants on the Do's and Don'ts of patient referrals on a flip chart. Compare this list to the list below. After this, the facilitator should present the correct referral process.

DO'S

When referring a patient to another facility, do the following:

- Call the receiving facility to inform them about the referral and discuss the patient's problem for continuity of care.
- Write a detailed referral letter providing all the needed information.
- A clinician should sign the referral letter.
- Request for feedback and provide contact information.

DON'TS

When referring a patient to another facility, DON'T do the following:

- Send the patient without calling the receiving facility to discuss the patient's condition!
- Send the patient without a detailed referral letter!
- Send a letter without a clinician's signature!
- Send a letter without asking for feedback and providing a contact number!

!

- **Primum non nocere! First, do no harm!**
- **Notification and prior discussion of the patient should be undertaken to ensure that the receiving health facility is adequately prepared for continuity of care.**

MODULE 3:
RISK FACTORS FOR CARDIOVASCULAR DISEASES

DURATION

- 2 hours 20 minutes

LEARNING OBJECTIVES

By the end of this module, participants will be able to:

- Know and understand the risk factors for cardiovascular diseases.
- Undertake risk assessment.
- Counsel patients regarding modification of lifestyle and reduction of risk factors.
- Manage patients with risk factors for CVDs

MATERIALS NEEDED

- Flip chart
- Laminated World Health Organization/International Society of Hypertension (WHO/ISH) Risk Prediction Chart
- Counselling chart
- Power point slides
- Handouts for exercises

TRAINER'S ADVANCE PREPARATION

- Thoroughly review power point presentation.
- Assemble all material and tools needed the night before.
- Ensure that other logistics (e.g. projector, laptop, etc.) are available and in working condition.

METHODOLOGIES

- Presentation
- Exercises
- Role play on counselling for lifestyle modification
- Group discussion

IDENTIFYING RISK FACTORS OF CARDIOVASCULAR DISEASES

PRESENTATIONS (20 MINUTES)

- The facilitator should initiate a general discussion on what risk factors are.
- Use these questions to guide discussion: What, Where, Which, Why, How?
- Identify atherosclerosis as a major risk factor for cardio vascular diseases **(Slide 29)**.
- Make a presentation to summarize discussions **(Slides 28–34)**:
  - Classification of the risk factors – explaining the difference between modifiable and non-modifiable risk factors.
  - Provide information on emerging risk factors.
  - Non atherosclerotic cardiovascular diseases.
  - High levels of individual risk factors and the danger they pose.

STEPS IN RISK ASSESSMENT AND HOW TO USE WHO/ISH PREDICTION CHART

PRESENTATIONS (30 MINUTES)

- List all the risk assessment tools available **(Slide 35)**.
- Focus on WHO/ISH Prediction Charts **(Slide 36)**.
- The facilitator should carefully review steps in atherosclerotic cardiovascular diseases risk assessment **(Slide 38)**.
- The facilitator should distribute handouts of the risk assessment tools.
- Review the Risk Assessment Checklist in table 1 **(Slide 41)**.

Table 1: **Risk Assessment Checklist for Exercises**

No.	Risc factors	Findings
1	Gender	
2	Age	
3	Diabetic Status – Yes/No	
4	Smoking Status – Yes/No	
5	BP Measurement (indicate Level)	
6	Total Blood Cholesterol (from Lab Test)	

EXERCISES (30 MINUTES)

The facilitator should divide the class into groups of 5 participants and lead the class to do the following exercises. The exercises are provided as a handout together with the WHO Risk Assessment Chart and Checklist and read aloud to the participants. They should then be allowed to ask questions to well understand the exercise. Each group receives only one exercise to complete. Answers will be written on a flip chart. The groups present their working results in the plenary.

A) A 65-year-old retired male teacher reported to Kaneshie Polyclinic OPD with complaints of numbness of both feet. He is a known diabetic for the past 5 years and compliant on metformin.

He reported with a total cholesterol level of 5.5 mmol/L.

a) What other information will you like to ask him to assess his cardiovascular risk?

b) What are the risk factors for this patient?

c) How will you assess his risk of CVD using the WHO/ISH risk prediction charts?

Answers

a) Duration of symptoms, severity of symptoms, any associated symptoms such as tingling sensations in the feet, sensation of walking on foam, burning sensation in the feet.

b) Age, sex (male), DM, high cholesterol

c) Step 1: Select the appropriate chart depending on the presence or absence of diabetes.

Step 2: Select male or female tables.

Step 3: Select smoker or non-smoker boxes.

Step 4: Select age group box (e.g. if age is 50–59 years select 50, if 60–69 years select 60 etc.).

Step 5: Within this box or cell, find the nearest cell where the individual's systolic blood pressure (mmHg) and total blood cholesterol level (mmol/l) cross or intercept.

B) A 60-year-old female who sells at the market has reported to the OPD for her usual blood pressure review. After congratulating her for taking her medication regularly, she tells you that she had a stroke (transient weakness of the left side of her body) when she stopped her medication.

a) Will you want to assess her risk?

b) What is the risk level of this patient?

Answers

a) A transient ischaemic attack may be an indication that there is an underlying ASCVD hence, the patient will need to be treated as high risk.

b) This patient is high risk.

C) A 60-year old female, non-smoker, not a known diabetic, her reporting BP is 145/80 mmHg. Her fasting blood sugar was 6.7 mmol/L.

a) **What other information would you like to ask her to help you assess her risk level?**
b) **What is her risk level if her cholesterol level is 8?**
c) **What preventive measures will you advise her to take?**

Answers

a) **Her cholesterol level.**
b) **Intermediate level.**
c) **She should be advised to be compliant with her prescribed medications and follow-up visits. She should be advised on diet and exercise therapy.**

PRESENTATIONS (20 MINUTES)

PLENARY SESSION AND DISCUSSIONS (20 MINUTES)

The facilitator should lead a discussion session on modifiable and non-modifiable risk factors and their importance for developing CVDs. Critically review the role of the following in CVD development **(Slides 43–51)**. The facilitator should carefully explain all the details and components of the following in the management of CVD risk:

- Lifestyle modification
- Behaviour changes
- Eating patterns
- Physical activities
- Sedentary time
- Stress
- Dyslipidaemia

The facilitator should discuss how patients should be best managed in primary health care facilities.

ROLE PLAY (20 MINUTES)

The facilitator should ask the participants to volunteer and conduct a role play on counselling a patient on lifestyle modifications.

For each exercise in risk assessment provided above, selected participants should conduct a counselling session for the patient on modifying the various risk factors identified.

!

- **Most cardiovascular risk factors are modifiable.**
- **Every health care professional should assess the cardiovascular risk of every patient and provide the appropriate intervention.**
- **Counselling must be based on locally appropriate interventions.**
- **Lifestyle modification is a key step.**
- **These cardiovascular risk factors lead to cardiovascular disease after several years, hence the management of CVD risk factors is for life.**

MODULE 4:
SYMPTOMS AND SIGNS OF CARDIOVASCULAR DISEASES

DURATION

- 3 hours 25 minutes

LEARNING OBJECTIVES

By the end of this module, participants will be able to:

- Identify common symptoms and signs associated with CVDs.
- Distinguish between symptoms and signs of CVDs.
- Differentiate and classify symptoms and signs specific for each CVD.
- Perform head to toe physical examination on a CVD patient (inspection/palpation/percussion/auscultation/blood pressure measurement etc.).

MATERIALS NEEDED

- Flipchart
- Marker pens
- Laptop and projector
- Power point slides
- Handouts
- Sphygmomanometer (automated or manual)
- Stethoscopes
- Rulers and tape measure

TRAINER'S ADVANCE PREPARATION

- Thoroughly review power point slides.
- Assemble all material and tools needed.
- Form groups of participants for discussions and practice.
- Prepare clinical practice with the facility management.

METHODOLOGIES

- Presentation
- Group exercises
- Case scenarios
- Role plays
- Clinical/practical sessions

IDENTIFYING SYMPTOMS AND SIGNS OF CARDIOVASCULAR DISEASES

PRESENTATION (10 MINUTES)

The facilitator introduces the session with a case scenario for discussion, states the objective and guides the process of the discussion.

- **Divide the class into 5 groups to identify common symptoms and signs associated with CVDs.**
- **Provide the following instructions:**
  - Read and analyse this case scenario individually. When the others in your group have finished reading it, discuss the question and agree on possible answers. Write the answers on a flip chart. When all groups have finished, we will discuss the case scenario and your answers in the plenary.

CASE SCENARIO 1 (15 MINUTES)

Aba Yaaba, a 64-year-old market woman, who is your neighbour, comes to your house complaining of chest pain, which began about 30 minutes prior to seeing you. She describes the pain as a tightening in the chest. She reports fear of death. She is sweaty and anxious looking.

You measure her blood pressure as 85/60 mmHg; her pulse is weak and is at a rate of 132 beats per minute. The pain becomes increasingly more intense and the patient is weeping. The patient is on homeopathic treatment and does not use any other medicines.

Advise: Identify the symptoms and signs the patient presents with within the story above.

Answers:

Symptoms: chest pain, fear of death, sweatiness, anxiety

Signs: Blood pressure 85/60 mmHg, weak rapid pulse, rate 132 bpm

DYSPNOEA (10 MINUTES)

- Define dyspnoea as in **(Slide 58)**.
- Explain the causes of dyspnoea **(Slide 59)**.
- Explain how to differentiate between cardiac and non-cardiac dyspnoea as in **(Slide 60)**.

Table 2: **Common causes of dyspnoea**

Causes of dyspnoea		
Cardiovascular	**Respiratory**	**Others**
▪ Heart failure ▪ Constrictive pericarditis ▪ Arrhythmias ▪ Pericardial effusion ▪ Pulmonary embolism	▪ Pneumonia ▪ Bronchospasm/asthma ▪ Chronic obstructive pulmonary disease (COPD) ▪ Interstitial fibrosis	▪ Ascites ▪ Anaemia ▪ Hyper viscosity syndrome ▪ Muscular atrophy

Table 3: **Differentiating features of cardiac vs. respiratory dyspnoea**

Differentiating features of cardiac vs. respiratory dyspnoea	
Cardiac	**Respiratory**
▪ Cough is not prominent or begins after onset of dyspnoea ▪ Orthopnoea ▪ Paroxysmal nocturnal dyspnoea (PND) common ▪ Oedema ▪ Raised jugular venous pressure (JVP) ▪ Reduced urine output ▪ Benefit with diuretics	▪ Cough is prominent and precedes dyspnoea ▪ Sputum production ▪ No orthopnoea ▪ Wheezing; no PND; patient may have mid-night awakening with cough and sputum ▪ Normal JVP ▪ Normal urine output ▪ No change with diuretics

CHEST PAIN (10 MINUTES)

- Define chest pain as in **(Slide 61)**.
- Present clinical classification and causes of chest pain **(Slides 62-63)**.

Table 4: **Causes of chest pain**

Causes	
Cardiac	**Non-cardiac**
▪ Myocardial infarction (heart attack) ▪ Unstable angina ▪ Stable angina (chest pain on exertion) ▪ Prinzmetal angina (variant angina) ▪ Pericarditis ▪ Aortic valve stenosis ▪ Mitral valve prolapse ▪ Pericardial effusion ▪ Congenital cardiac anomalies	▪ Pulmonary origin (pneumonia, pulmonary embolism, pleuritis, pneumothorax, asthma, COPD, acute bronchitis, lung abscess) ▪ Musculoskeletal (costochondritis, trauma, muscle pain, referred pain from spine, cancer induced pain) ▪ Mediastinal (aortic dissection, mediastinitis) ▪ Gastrointestinal (oesophagitis, gastritis, peptic ulcer disease (PUD), oesophageal spasm, cholecystitis, pancreatitis) ▪ Others (herpes zoster, post herpetic neuralgia) ▪ Psychogenic (panic attacks, psychiatric disorders, anxious state)

Use the formed groups and introduce **case scenario 2**. Ask them to discuss and write the answers to their agreed questions on a flip chart. After the group work, they should present their work in the plenary. Add, if something is missing.

CASE SCENARIO 2: CLASSIFICATION OF CHEST PAIN (10 MINUTES)

Auntie Ama, a 64-year-old woman, consults me because of her chest pain which began about 30 minutes ago. She describes the type of pain as oppressive and "as if my heart is tightened by a hand". She reports fear of death. Her face is pale and sweaty and very anxious. The physical examination reveals the following: blood pressure 100/60 mmHg, pulse imperceptible, with a heart rate of 110 per minute. The pain becomes increasingly more intense and the patient is weeping. Until today, the patient is under homeopathic treatment and does not use any other medicines.

Classify the patient's chest pain as (i) typical angina (ii) atypical angina or (iii) non-anginal chest pain and explain your classification.

Answers:

i. Typical Angina (definite): Meets all three of the following characteristics:

- Substernal chest discomfort of characteristic quality and duration.
- Provoked by exertion or emotional stress.
- Relieved by rest and/or nitrates within minutes.

ii. Atypical angina (probable): Meets any two of the above characteristics.

iii. Non-anginal/non-cardiac chest pain: Meets one or none of the above characteristics.

OEDEMA (10 MINUTES)

- Define oedema as in **(Slide 65)**.
- Ask participants to write the causes of oedema on sticky papers and fix them on the wall.
- Review the causes of oedema as in **(Slide 66)**.

Table 5: **Common causes of body swelling**

Common causes of body swelling			
Cardiac	▪ Heart failure ▪ Constrictive pericarditis	**Venous**	▪ Venous insufficiency ▪ Deep vein thrombosis
Pulmonary	▪ Pulmonary hypertension	**Renal**	▪ Nephrotic syndrome ▪ Renal failure
Liver	▪ Liver cirrhosis ▪ Liver failure	**Others**	▪ Hypoproteinemic states ▪ Lymphedema ▪ Pregnancy ▪ Malnutrition
Medication	▪ Calcium channel blockers, e.g. Nifedipine ▪ Non steroidal anti inflammatory drugs (NSAIDs)		

CASE SCENARIO 3: OEDEMA PLENARY SESSION (15 MINUTES)

Read the case scenario to the participants, ask the questions and write the answers on a flip chart. Discuss the answers and leave only the correct answers on the flip chart.

A 67-year-old hypertensive and diabetic man had begun to notice mild swelling of the feet over the past month, which has now begun to involve the legs. He admits to drinking 5 'tots' of Akpeteshie (local gin) daily, over the past 20 years. In the last 5 days, he has noticed difficulties in lying flat and also coughs at night. He has been on Nifedipine 5mg and Glibenclamide 5mg bd for the past 7 years.

List the possible causes for the swollen legs?
What investigations would you do to determine the cause of the oedema?

Answers:

- **Causes of oedema:**
  - **Congestive cardiac failure secondary to hypertensive heart disease**
  - **Diabetic nephropathy**
  - **Decompensated alcoholic liver disease**
  - **Medication induced by Nifedipine**

- **Diagnostic investigations:**
  - **Renal function test to assess kidney function**
  - **Urine laboratory tests for urine protein**
  - **Liver function test**
  - **Abdominal ultrasound**
  - **Echocardiogram for structural and functional abnormalities of the heart**

HAEMOPTYSIS (10 MINUTES)

- Define haemoptysis as in **(Slide 68)**.
- The facilitator should ask the class to identify causes of haemoptysis: cardiovascular, pulmonary, infectious, etc. and writes down the mentioned causes on a flip chart for further discussion.

Table 6: **Causes of haemoptysis**

Causes of haemoptysis		
Cardiovascular ▪ Left ventricular failure ▪ Mitral stenosis ▪ AV malformation	**Pulmonary** ▪ Pulmonary embolism/infarction ▪ Bronchiectasis ▪ Cystic fibrosis ▪ Bullous emphysema	**Hematologic** ▪ Disseminate intravascular coagulopathy (DIC) ▪ Bleeding disorder ▪ Thrombocytopenia
Infections ▪ Pulmonary TB ▪ Lung abscess ▪ Pneumonia	**Systemic diseases** ▪ Vasculitis ▪ Goodpasture syndrome ▪ Systemic Lupus Erythematodus (SLE)	**Neoplastic** ▪ Lung cancer ▪ Metastatic cancer
Drugs/toxins ▪ Anticoagulants ▪ Aspirin ▪ Thrombolytics	**Traumatic** ▪ Chest injuries	**Iatrogenic** ▪ Bronchoscopy ▪ Transtracheal aspiration

SYNCOPE (15 MINUTES)

- Define syncope as in **(Slide 71)**.
- Present the causes of syncope **(Slide 72)**, distinguishing between cardiac and non-cardiac causes of syncope.
- Present the features distinguishing syncope from seizure **(Slide 73)**.

Table 7: **Common causes of syncope**

Non-cardiac causes	Cardiac causes
▪ Reflex/neurogenic: Vasovagal 20-33% of all cases of syncope ▪ Carotid sinus hypersensitivity ▪ Situational (e.g. micturition, defecation, cough, swallowing) ▪ Orthostatic hypotension (volume depletion, medicine, autonomic dysfunction) ▪ Vertebrobasilar disease (very rare severe bilateral carotid disease)	▪ Arrhythmias: tachyarrhythmias and bradyarrhythmias ▪ Acute coronary syndrome ▪ Structural: aortic stenosis, hypertrophic obstructive cardiomyopathy ▪ Pulmonary embolism ▪ Cardiac tamponade ▪ Atrial myxoma

Table 8: **Features distinguishing syncope from seizures**

Favours syncope	Favours seizure
▪ Pre-syncope ▪ Loss of consciousness with prolonged standing or sitting ▪ Sweating before a spell ▪ Short duration with spontaneous recovery	▪ Waking with tongue bite ▪ Post-ictal confusion or sleep ▪ Prodromal déjà vu or jamais vu

Read aloud to the participants **case scenario 4** and discuss the answers in the plenary.

CASE SCENARIO 4: SYNCOPE (10 MINUTES)

During a military parade, a 28 year old military man suddenly falls to the ground and is rushed to your clinic. he has no known medical condition and has no complains prior to the episode.

What could be the cause for his fall?
List 3 possible causes of syncope.

Answers:

- **Syncopal attack.**
- **Myocardial infarction, PE, prolonged standing.**

PALPITATIONS (10 MINUTES)

- Define palpitations and its causes as in **(Slide 75)**.

Table 9: **Common causes of palpitation**

Cardiac causes	Non-cardiac causes
▪ Atrial fibrillation/flutter ▪ Atrial premature contractions ▪ Atrioventricular re-entry ▪ Multifocal atrial tachycardia ▪ Sick sinus syndrome ▪ Ventricular premature contractions ▪ Supraventricular tachycardia ▪ Atrial myxoma ▪ Valvular heart disease ▪ Ventricular tachycardia ▪ Cardiomyopathy	▪ Anaemia ▪ Alcohol ▪ Anxiety/stress ▪ Coffeine ▪ Cocaine ▪ Exercise ▪ Fever ▪ Hypoglycemia ▪ Nicotine ▪ Paget's disease of the bone ▪ Phaeochromocytoma ▪ Pregnancy ▪ Hyperthyroidism ▪ Withdrawal of medications e.g. Beta-blockers

Use the formed groups and introduce **case scenario 5**. Ask the participants to discuss and write the agreed answers to their questions on a flip chart. After the group work, they should present their work in the plenary followed by further discussion.

CASE SCENARIO 5: PALPITATIONS (15 MINUTES)

A 69-year-old hypertensive patient currently on amlodipine 5mg and losartan 50mg has noticed persistent palpitations that she describes as persistent but regular. On examination, her doctor found her to have a pulse rate of 120 bpm and totally irregular. She was also found to have a small swelling on her anterior neck.

What is the most likely reason for palpitation?
What condition may have caused it?
What investigations will be relevant for this patient?

Answers:

- **Fast heart rate**
- **Caused by:**
  - **Thyrotoxicosis**
  - **Hypertensive heart disease**
- **Relevant examinations for this patient:**
  - **Full blood count**
  - **Electrocardiogram (ECG)**
  - **Echocardiogram (Echo)**
  - **Thyroid function test**
  - **Neck ultrasound**

ASSESSING FOR SIGNS OF CARDIOVASCULAR DISEASES

CASE SCENARIO 6: ASSESSING SIGNS OF CVDS (10 MINUTES)

Aba Yaaba, a 64-year old market woman, comes to you complaining of leg swelling and difficulty in breathing. You checked her BP at the emergency room and it was 84/50 and a pulse of 162 bpm.

- The facilitator should ask the participants to read over **case scenario 6**.
- The facilitator should ask the participants to list signs identified in the case scenario within their groups and ask one member to present in the plenary.

What signs and symptoms did you find in the above patient?

Answer:

- Signs: low bp, high pulse, pedal edema
- Symptoms: difficulty breathing(dyspnoea), leg swelling

PERFORMING PHYSICAL EXAMINATION OF A PATIENT (SUSPECTED OF SUFFERING FROM A CVD)

PRESENTATION (20 MINUTES)

- The facilitator presents a detailed procedure of examining a patient with a CVD using pictures and videos to support the presentation **(Slides 78-86)**.
- The facilitator should ask all participants to identify a partner to perform physical examination as a practice of clinical skills whilst supervising the procedure for examination.
- The participants should go through the following steps:
  - Observation/inspection
  - Palpation
  - Percussion
  - Auscultation
  - Measurements
- Move the class into a clinical ward to practice patient examination and identification of signs of cardiovascular diseases.
- After the clinical session the class should converge to go through a plenary session.

PLENARY SESSION AND DISCUSSIONS (45 MINUTES)

- The facilitator should ask the participants to share their experiences whilst on the ward.

! Identifying symptoms and signs are critical for diagnosing CVDs.

- Look out for symptoms:
  Dyspnoea, oedema, syncope, chest pain, haemoptysis, palpitations.
- Look out for signs:
  Sweating, cold clammy skin, cyanosis, anxiety & restlessness, pallor, clubbing, abnormal pulse, abnormal blood pressure, apex beat, thrills, parasternal heaves (LIFT) and heart sounds, body swelling.

MODULE 5: HYPERTENSION

DURATION

- 2 hours 15 minutes

LEARNING OBJECTIVES

By the end of this module, participants will be able to:

- Define and appropriately classify hypertension.
- Understand the aetiology of hypertension.
- Measure blood pressure correctly.
- Diagnose hypertension correctly.
- Improve knowledge in managing hypertension.
- Understand the importance of home blood pressure monitoring.
- Detect early, the complications of hypertension.

MATERIALS NEEDED

- Flip charts and marker pens
- Projector
- Laptop
- Handouts for case scenario
- Sphygmomanometer (automated and manual)
- Stethoscope

TRAINER'S ADVANCE PREPARATION

- Thoroughly review power point presentation.
- Assemble all material and tools needed the night before.
- Ensure that other logistics (e.g. projector, laptop, etc.) are available and in working condition.
- Prepare the flip chart for activity to list the discussion points on the definition of hypertension.

METHODOLOGIES

- Presentation
- Group exercises
- Case scenarios
- Role plays
- Clinical/practical sessions

DEFINITION OF HYPERTENSION (10 MINUTES)

- Ask the participants to define hypertension.
- List their key definitions on the flip chart.
- Read aloud the definition on **(Slide 90)**.
- Check to see if this definition matches the participants' views of hypertension.
- Acknowledge appropriate additions to the definition.
- Summarise the key points in the definition for the participants.

EPIDEMIOLOGY, AETIOLOGY & CLASSIFICATION (15 MINUTES)

- Present **(Slide 91)** on the epidemiology of hypertension to emphasise the importance of the disease.
- Ask the participants how hypertension can be classified.
- Take the participants through the classification and aetiology of hypertension **(Slides 92–97)**.
- The facilitator should ask the participants about the 5 most common causes of hypertension and list them on the flip chart. Compare responses to the list on **(Slide 96)**.
- Present the predisposing factors for essential hypertension **(Slide 98)**.

CLINICAL PRESENTATION (10 MINUTES)

- Ask the participants to describe the clinical presentation of hypertension. How will you identify a patient with hypertension? Write suggestions on a flip chart.
- Take the participants through the power point slides on the clinical presentation of hypertension **(Slides 99–100)**.

DIAGNOSIS OF HYPERTENSION (30 MINUTES)

- Show power point presentation on diagnosis of hypertension **(Slides 101–102)**.
- Demonstration and practice on how to take BP measurements in the facility using video presentation **(Slides 103–107)**.
- Divide the participants into their pre-assigned groups for group work.
- Distribute handout of clinical **case scenario 7**.
- Ask the participants to read the case scenario and answer the questions.
- The participants will present their group responses in a plenary session after 10 minutes.
- Ask for any reactions to the presentations after all groups have presented.
- Give feedback to the teams emphasizing the key criteria for the diagnosis of hypertension.

CASE SCENARIO 7 / GROUP WORK: HYPERTENSION

Akua Mansa is 38 years old. She is attending the clinic for a routine appointment about her contraception, for which she uses a diaphragm.

Medical history

From her records, you notice that, Akua's blood pressure has increased since her last check-up, twelve months ago. However, Akua insists that whenever she takes her blood pressure at home, it is never above 130/80 mmHg. She does not smoke; she drinks 10-12 units of alcohol a week and has no notable medical history.

Examination

Akua's first clinic blood pressure measurement is 158/94 mmHg. Her heart rate is 72 beats per minute and regular.

Is Akua hypertensive? What would you do next?

Answer:

Akua should be advised to do a 24hr Holter BP monitoring or home BP monitoring if she cannot afford the Holter BP monitoring

What would you do next?

Answer:

Akua should be counselled on lifestyle changes such as healthy diet including cutting down on salt intake, regular exercise and cutting down on alcohol intake. In addition, ask Akua to monitor her BP at home and to show the readings at the next review.

What assessments and investigations would you request for Akua Mansa?

Answer:

- **You carry out a formal assessment for the presence of other cardiovascular risk factors such as obesity, diabetes mellitus, dyslipidaemia, hyperuricemia etc. (Refer to *Risk Assessment in the Guideline Section 2.2*).**
- **Additionally, you would also ascertain information about lifestyle in areas such as diet, exercise, alcohol, smoking and caffeine consumption, dietary sodium intake and offer appropriate lifestyle advice.**
- **You would carry out investigations to determine the presence of target organ damage (such as left ventricular hypertrophy, chronic kidney disease and hypertensive retinopathy). You would:**
  - **Test for the presence of protein in the urine by sending a urine sample to test for proteinuria and haematuria.**
  - **Take a blood sample to measure plasma glucose, electrolytes, creatinine, estimate the glomerular filtration rate (eGFR), serum total cholesterol and HDL cholesterol.**
  - **Examine the fundi for the presence of hypertensive retinopathy,**
  - **Arrange for a 12-lead electrocardiograph to be performed.**
- **Record the results of all investigations and assessment in Mary's notes.**
- **Use these results to assess Mary's total cardiovascular risk.**

If Akua Mansa had been eligible to receive antihypertensive drug treatment, what should you consider when prescribing antihypertensive medication for a woman of child-bearing age?

Answer:

There is an increased risk of congenital abnormalities if women take angiotensin-converting enzyme (ACE) inhibitors or angiotensin III receptor blockers (ARBs) during pregnancy, and it is important that women of childbearing age know this. If the woman is planning a pregnancy, she should discuss this with you. If a woman taking ACE inhibitors or ARBs becomes pregnant, this antihypertensive medication should be stopped and alternatives offered.

Relevant recommendations for the facilitator to highlight:

- **Since automated devices may not measure blood pressure accurately if the pulse is irregular (for example, in atrial fibrillation), palpate the radial or brachial pulse before measuring blood pressure. If pulse is irregular, measure blood pressure manually using direct auscultatory method.**
- **If the blood pressure measured in the clinic is ≥ 140/90 mmHg, take a second measurement during the consultation. If the second measurement is substantially different from the first, take a third measurement. Record the average of the last two measurements as the clinic blood pressure.**
- **If BP remains high (≥ 140/90 mmHg) manage patient as hypertensive.**

MANAGEMENT OF HYPERTENSION (30 MINUTES)

- Take the participants through the presentation on the principles of hypertension management **(Slide 111)**.
- The participants work again in their groups continuing with **case scenario 8**. Ask them to answer questions 8.3 and 8.4. Allow groups to work for 10 minutes.
- Have the participants present their work in a plenary session.
- Guide the participants to the appropriate responses as outlined in the answers above.
- Review the diagnostic and treatment option identified on **(Slides 119-122)** for Level 2 facilities.
- Single pill (combination) therapy is the treatment of choice.
- The facilitator should highlight the need for the staff at Level 2 to be ready to receive referred patients and to appropriately manage them.
- It is important to stress that using more than 1 tablet does not necessarily mean that the patient has a very bad hypertension.
- The facilitator should highlight the need for the health worker at Level 1 to rapidly identify warning signs for referral and to appropriately refer to the next facility.

Relevant recommendations for the facilitator to highlight:

- **Tell women who take angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARBs):**
- **That there is an increased risk of congenital abnormalities if these drugs are taken during pregnancy.**
- **To discuss other antihypertensive treatment with the healthcare professional responsible for managing their hypertension, if they are planning pregnancy.**
- **Stop antihypertensive treatment in women taking ACE inhibitors or ARBs if they become pregnant (preferably within 2 working days of notification of pregnancy) and offer alternatives.**

COMPLICATIONS OF HYPERTENSION (10 MINUTES)

- Let the participants brainstorm on the various complications that can arise from hypertension. Write suggestions on a flip chart.
- Take the participants through the presentation on the complications of hypertension **(Slides 125-126)**.

PREVENTION OF HYPERTENSION (15 MINUTES)

- Let the participants brainstorm on the various ways of preventing hypertension and delaying the onset of complications in hypertensive patients.
- Write the responses on the Flip chart.
- Take the participants through the presentation highlighting areas missed out during the brainstorming session
- Lead the discussion as the participants answer the **question 5** of **case scenario 7**. (Refer the participants to non-pharmacological management of hypertension for lifestyle modifications that can help).

You identify her dietary sodium intake is greater than recommended levels. Additionally, Akua Mansa's exercise patterns are not in line with the recommended guidelines. What advice would you offer?

Answer:

You would advise that healthy diet and regular exercise can reduce blood pressure. You would also encourage her to keep her dietary sodium intake low as this can reduce blood pressure.

Relevant recommendations for the facilitator to highlight:

- Ascertain people's diet and exercise patterns because a healthy diet and regular exercise can reduce blood pressure.
- Offer appropriate guidance and written or audiovisual materials to promote lifestyle changes.
- Encourage people to keep their dietary sodium intake low, either by reducing or substituting sodium salt, as this can reduce blood pressure.

PLENARY SESSION AND DISCUSSIONS (25 MINUTES)

The facilitator guides a discussion session to consolidate learning in managing hypertension **(Slides 130–133).**

- Hypertension is a chronic medical condition and the leading cause of CVD deaths Africa.
- Hypertension is largely asymptomatic and undiscovered. Every encounter with adult patients is an opportunity for screening.
- A diagnosis of hypertension should be confirmed by:
- Repeated clinic blood pressure (BP) measurements over a number of visits
or
- Out of clinic BP measurements using home BP monitoring or ambulatory BP monitoring.
- Hypertension is not curable but it requires lifelong pharmacological and non-pharmacological treatment.
- Adequate treatment prevents CVD and CVD related deaths.
- Strict compliance with medication and regular follow ups are necessary to prevent these complications.
- Fixed dose combination therapy is preferred.

MODULE 6: STROKE

DURATION

- 1 hours 25 minutes

LEARNING OBJECTIVES

By the end of this module, participants will be able to:

- Define and appropriately classify stroke.
- Understand the aetiology of stroke.
- Diagnose stroke according to service delivery level.
- Manage stroke according to service delivery level.
- Detect early complications of stroke and appropriately manage them.

MATERIALS NEEDED

- Flip chart and marker pens
- Laptop computer and projector
- Samples of imaging films (Echo, CT scans, chest X-ray)
- Samples of ECG strips
- Diagram of the anatomy of the brain and cerebral vessels
- ABCD's for TIA's chart
- ROSIER charts
- Presentation slides
- Patella hammer
- Handouts with case scenarios and questions

TRAINER'S ADVANCE PREPARATION

- Review power point presentation slides.
- Prepare the flip chart for activities to determine the aetiology and classification of strokes.
- Assemble all teaching materials before start of course.

METHODOLOGIES

- Presentation
- Group exercises
- Case scenarios
- Role plays
- Training videos for neurological assessment
- Clinical/practical sessions

DEFINITION OF STROKE (10 MINUTES)

- The facilitator should ask the participants to define stroke.
- List their key definitions on the flip chart.
- The facilitator should select a participant to read aloud the definition of stroke on **(Slide 136)**.
- Check to see if this definition matches the participants' views of stroke.
- The facilitator should acknowledge the appropriate additions to the definition.
- Summarise the Key Points in the definition for emphasis.

AETIOLOGY AND CLASSIFICATION OF STROKE (15 MINUTES)

- The facilitator should ask the participants how stroke can be classified.
- Take the participants through the presentation on the classification of strokes **(Slides 138–143)**.
- **Picture Quiz:** Differentiate between the two types of strokes presented in the CT scans of the head on **(Slide 144)**.
  - A: Infarctive stroke
  - B: Hemorrhagic stroke
- Emphasise criteria for the classification of strokes and mention Transient Ischaemic Attack (TIA) because it is a precursor to a stroke **(Slide 145)**.
- Differentiate between ASCOD and SMASHU as aetiology of stroke on **(Slide 146)**.
- Discuss the risk factors of stroke in **(Slide 148)**.

CLINICAL PRESENTATION OF STROKES (20 MINUTES)

- Ask the participants to describe the clinical presentation of strokes.
- How will you identify a patient with a stroke? Ask them to answer as you write these on a flip chart.
- Take the participants through **(Slides 149–150)** on the clinical presentation of stroke.
- Refer to the *Rosier Scale for Stroke Assessment (Table 41)* in the *Guidelines* **(Slide 151)**.
- The facilitator should divide the class into 5 groups to work on the **case scenario 8**.
- Ask the participants to read out the instructions and the questions.

- The participants will present their group responses in a plenary session after 10 minutes.
- Ask for any reactions to the presentations after all groups have presented.
- Give feedback to the teams, emphasising the key criteria for the clinical presentation and diagnosis of stroke.

CASE SCENARIO 8 / GROUP WORK: STROKE

A 65-year-old man with a history of hypertension was brought to the emergency room with a history of weakness on the right half of the body of 1-day duration.

1) What symptoms or signs does the patient have that suggest a diagnosis of stroke?
2) What other important assessment will you do for this patient?

Answers:

1) Unilateral weakness on the right half of the body, facial deviation.
2) Swallowing test, blood pressure, temperature, random blood sugar.

Demonstrate how you would examine this patient.

MANAGEMENT OF STROKES (20 MINUTES)

- Continue with **case scenario 8**. The participants should answer questions 3 to 5. Allow groups to work for 10 minutes. Each group should work only on one question.
- Let the participants present their work in a plenary session.
- Guide the participants through the appropriate responses.

What investigation would you carry out?

Answer:

Investigations will depend on the level of the facility where management is occurring. Basic investigations to be conducted are:

- **Full blood cell count**
- **Blood sugar**
- **Urine routine examination**
- **Non contrast head CT scan**

How would you manage this patient if it is an ischaemic stroke or if it is haemorrhagic?

Answer:

Management of ischaemic stroke is different from that of haemorrhagic stroke. Management also differs by the level of the facility.

MANAGEMENT CONTINUED

The facilitator should review the management option identified on **(Slide 156)** for Level 2 facilities. Management is similar to Level 1 facility management.

- The patient's survival and reduction of further morbidity is critical in the management of strokes.
  - Assess ABC (airway, breathing and circulation).
  - Perform swallowing test.
  - Carefully move patient whenever needed to avoid injuries especially in affected side of body.
  - Elevate the head of the patient at 20-30 degrees.
  - Check vital signs (BP, pulse rate, respiratory rate, temperature, random blood sugar).
  - Manage any fever with Paracetamol suppositories.
- Request all the basic lab investigations: FBC, blood sugar, urine RE, lipid profile, BUE and creatinine.
- If no CT Scan is available but there are signs of increased intra cranial pressure i.e. Cushing's Triad (High BP, low pulse & irregular respiration), dilated pupils, increasing somnolence or decreasing level of consciousness, start management below:
  - iv Mannitol 20% concentrated, 0.5-2.0g/kg body weight over thirty minutes, 6-8 hourly for 48 hours **or**
  - iv Furosemide 40mg daily
- Monitor for seizures and manage appropriately **(Slide 157)**.
- iv or rectal Diazepam.

➔ **Refer the patient as soon as possible to a facility with a physician specialist for further management.**

What complications are likely to occur?

Answer:

Early Complications:

- **Malignant cerebral oedema**
- **Haemorrhagic transformation of ischaemic brain tissue**
- **Infection**
  - **aspiration pneumonia/lobar pneumonia**
  - **urinary tract infection (UTI)**
- **Dysphagia**
- **Venous thrombo-embolism**
- **Bedsores**
- **Seizures**
- **Shoulder pain (weak arm, hanging and pulling on the shoulder)**

Late Complications:

- **Seizures/epilepsy**
- **Depression**
- **Sleep-disordered breathing**
- **Falls and injuries**
- **Limb contractures**

COMPLICATIONS (10 MINUTES)

- Let the participants brainstorm on the various complications that can arise from stroke.
- Guide the participants through the presentation on the complications of stroke **(Slides 167–169)**.

PLENARY SESSION AND DISCUSSIONS (10 MINUTES)

- The facilitator guides a discussion session to consolidate learning and ends with Key Messages.

!

- **Prevention of strokes is more important than treatment.**
- **Number 1 risk factor for strokes is hypertension.**
- **All stroke cases should be referred to a facility with a physician specialist.**
- **Stroke management is a multidisciplinary approach requiring good nursing care to avoid complications.**

MODULE 7:
CHEST PAIN, CORONARY ARTERY DISEASE AND MYOCARDIAL INFARCTION

DURATION

- 2 hours

LEARNING OBJECTIVES

By the end of this module, participants will be able to:

- Understand the concept of stable coronary artery disease (CAD) and acute coronary syndrome (ACS).
- Understand the clinical presentation of angina and angina equivalent conditions.
- Understand the essence of time in acute coronary syndrome.
- Understand the treatment modalities of stable coronary artery disease and acute coronary syndrome.
- Understand the complications of stable CAD and ACS.

MATERIALS NEEDED

- Flip chart and marker pens
- Samples of imaging films (Echo, CT scans, chest X-ray)
- Samples of ECG strips
- Diagram of the anatomy of the heart and coronary arteries
- Presentation slides
- Handouts with case scenarios and exercises

TRAINER'S ADVANCE PREPARATION

- Review the Power point presentation slides.
- Prepare the flip chart for activities.
- Assemble all teaching materials and tools the night before.
- Review exercises and check if material for role plays are assembled.
- Prepare the clinical practise with the facility management.

METHODOLOGIES

- Presentation
- Group exercises
- Case scenarios
- Role plays
- Clinical/practical sessions

DEFINITION OF CORONARY ARTERY DISEASE (10 MINUTES)

- Ask the participants to define coronary artery disease, angina and myocardial infarction.
- List the key definitions on the flip chart in 3 columns.
- The facilitator should review definition on **(Slide 174)**.

AETIOLOGY AND PATHOPHYSIOLOGY (20 MINUTES)

- Review the causes and pathophysiology of coronary artery disease, angina and myocardial infarction on **(Slides 175–178).**
- Differentiate between coronary artery disease, angina and myocardial infarction **(Slides 181–182)**.
- Use the chest pain algorithm below to explain how to diagnose and manage these cardiac conditions **(Slides 183–184)**.

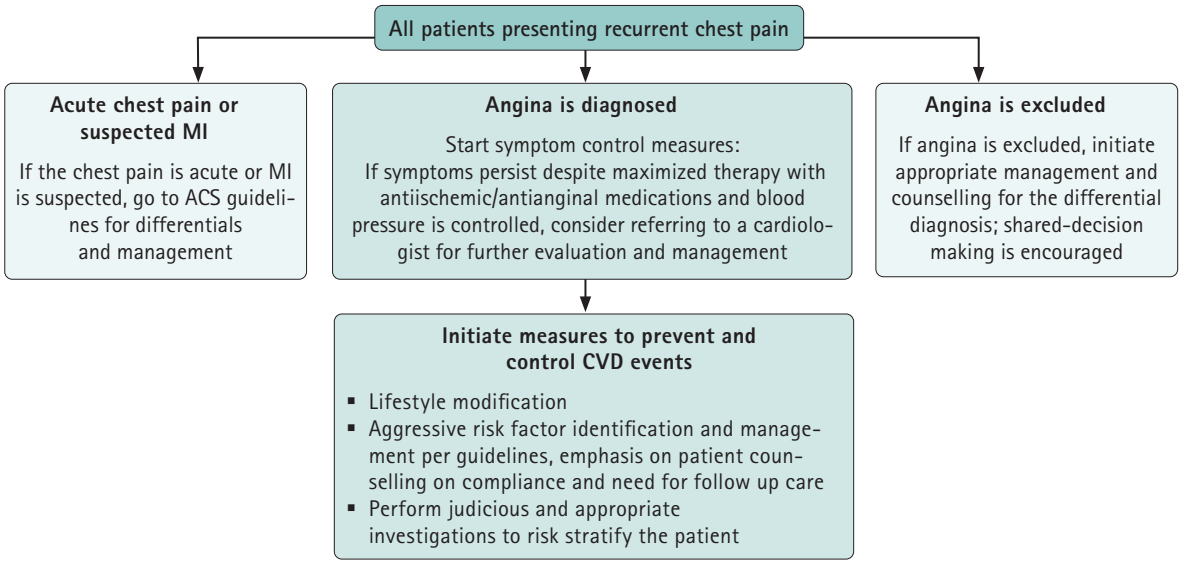


Figure 1: Chest pain algorithm & summary of management of stable CAD

MANAGEMENT (30 MINUTES)

STABLE CORONARY ARTERY DISEASE

Management of stable coronary artery disease aims at the following objectives **(Slide 185):**

- Relieve chest pain and any other symptoms.
- Improve quality of life.
- Prevent complications of CAD such as acute myocardial infarction or heart failure.
- Identify and manage modifiable risk factors.
- Prevent cardiovascular related death.

MANAGEMENT CONTINUED

The facilitator should discuss management at Level 2 facilities focusing on both pharmacological and non-pharmacological management **(Slides 194–198)**.

- Laboratory investigations:
  - Full blood count, sickling test, blood sugar, lipid profile, BUE and creatinine.
- Non laboratory investigations:
  - Assess the patient's blood pressure and oxygen saturation level.
  - Chest X-ray and ECG
- Healthy lifestyle modifications: weight control, lipid management, compliance with BP control, smoking cessation and avoidance of second-hand smoke.

RISK FACTOR MANAGEMENT

The facilitator should teach how to identify and manage risk factors such as hypertension, diabetes and hyperlipidaemias.

Pharmacological:

The facilitator should differentiate the different therapies available. Target of pharmacological management is to:

- Relieve chest pain:
  - Anti-ischaemic therapy
  - Anti-platelet therapy
  - Reduce risk factors

The facilitator reads the exercise to the participants and asks if the exercise is clear. The participants are to build groups of 5 and discuss the exercise questions. They are given 15 minutes for the exercise. The answers to the questions are presented and discussed in the plenary.

EXERCISES (15 MINUTES)

EXERCISE 1: A 60-year-old hypertensive patient was seen at the emergency complaining of worsening exertional chest pain. The pain is relieved by rest and by the GTN spray. Two years earlier, the pain was mild on moderate exertion but currently, he could not go for his normal jogging because of the pain.

1. What is your diagnosis?
2. What investigations will you carry out to confirm your diagnosis?
3. How will you manage this patient?

Answers:

1. Stable angina or stable coronary artery disease
2. ECG, cardiac enzymes and troponins, echocardiogram, exercise stress test
3. Reassure the patient:
- **Glyceryl Dinitrate spray.**
- **Aspirin 75mg daily**

- Initiate Beta-blocker (e.g. Bisoprolol, oral 2.5-10mg daily, depending on BP and response). To check for contraindications first (e.g. low BPs, bronchial asthma, fulminant heart failure, bradycardia).
- Ensure BP is well controlled.
- Statin (e.g. Atorvastatin 40-80mg daily)

EXERCISE 2: A 60-year-old man was seen at the O.P.D with the complaints of chest pain whiles jogging. The patient claims that he normally gets this chest pain during exercise but it is relieved by rest. Unfortunately, this chest pain was not relieved by rest and it has been present for the past 30 minutes. He also had one episode of vomiting.
His ECG was normal.

1. What is your diagnosis?
2. What other investigations will you carry out?
3. How will you manage this patient?

Answers:

1. Unstable angina or NSTEMI
2. Cardiac enzymes and troponins, ECG, echocardiogram
3. Management plan
   - Admit
   - Give oxygen if oxygen saturation is < 95%.
   - Glyceryl trinitrate, sublingual 500mcg stat, then as required for the relief of chest pain; instruct the patient to rest if pain not resolving.
   - Aspirin, oral 300mg stat to chew, then 75mg daily
   - Clopidogrel, oral 300-600mg stat, then 75mg daily
   - Initiate Beta-blocker (e.g. Bisoprolol, oral 2.5-10mg daily depending on BP and response). To check for contraindications first (e.g. low BPs, bronchial asthma, fulminant heart failure, bradycardia).
   - Unfractionated Heparin 4,500 to 5,000 units iv bolus or 60-80 units per kg iv bolus followed by 18 units per kg per hour infusion for 72 hours OR sc Enoxaparin Sodium 1m/kg twice daily.

- The importance of medication adherence for managing symptoms and retarding disease progression.
- How to recognize worsening cardiovascular symptoms and the need to rush to a medical facility once such symptoms occur.
- Adherence to a diet that is low in saturated fat, cholesterol, and trans-fat; high in fresh fruits, whole grains, and vegetables.
- Importance of healthy lifestyle modification.
- Stable CAD is prevented by the modification of its risk factors.

DEFINITION OF ACUTE CORONARY SYNDROMES (10 MINUTES)

- The facilitator should define acute coronary syndromes **(Slide 202)**.
- Acute coronary syndrome (ACS) is caused by acute to subacute coronary artery obstruction due to thrombus formation and/or spasms. Three clinical entities make up ACS based on pathophysiology and ECG features:
  - Unstable angina (UA)
  - Non-ST Segment Elevation Myocardial Infarction (NSTEMI)
  - ST Segment Elevation Myocardial Infarction (STEMI)

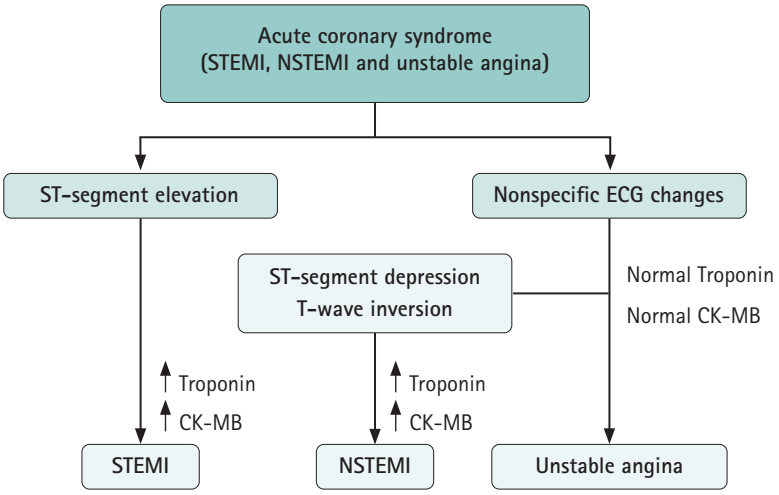


Figure 2: Algorithm for differentiating Acute Coronary Syndromes

AETIOLOGY AND PATHOPHYSIOLOGY

- The facilitator should review aetiology and pathophysiology of ACS **(Slide 204)**.

CLINICAL PRESENTATION (15 MINUTES)

- The facilitator should review clinical presentation of ACS in **(Slides 205-207)**.
- List all symptoms: Chest pain, shortness of breath, nausea, vomiting, palpitations, diaphoresis, syncope, etc.
- The facilitator should highlight the need for listing differential diagnoses in ACS. The mnemonic OPQRST is used to differentiate the aetiology of acute chest pain **(Slide 207)**.
- The facilitator should go through the clinical characteristics of ACS compared with other causes of chest pain using OPQRST mnemonic **(Slides 209-210)**.

Table 10: **How to use the mnemonic "OPQRST"**

Historical aspects of chest pain: The OPQRST approach	
Onset	What the patient was doing when it started (active, inactive, stressed), whether the patient believes that activity prompted the pain, and whether the onset was sudden, gradual or part of an ongoing chronic problem?
Provocation & **P**alliation	What provoked the pain or what relieved the pain?
Quality	What is the quality of the pain: burning, aching, squeezing, or stabbing?
Region & **R**adiation	Where is the pain located? Is there any radiation of the pain; does it go to the neck, jaw, arm, or back?
Severity	How severe is the pain? On a scale of 1 to 10, **with 10 being** the worst pain in one's life, what is the pain now, and how has it changed?
Timing	What are the temporal aspects of the pain? How long has it been present? Has it occurred before? When?

Table 11: **Clinical characteristics of acute coronary syndrome compared with other causes of acute chest pain using the mnemonic "OPQRST"**

Chest pain Aetiology	**O** Onset	**P** Provocation and Palliation	**Q** Quality	**R** Region and Radiation	**S** Severity	**T** Timing
Acute coronary syndrome	Rapid over a few minutes, escalating or recurring	Usually spontaneous; not relieved by rest or nitrates	Crushing, tight, heavy or band-like	Central anterior chest; radiates to throat, jaw, arms or no radiation	Usually severe	Minutes to few hours, may resolve after completion of infarct
Thoracic aortic dissection	Sudden, severe	Maybe worse with straining	Tearing, sharp, lancinating	Central; radiates to the back	Severe	Minutes to hours
Tension Pneumothorax	Sudden, severe	Relieved by sitting still and breath holding or hypopnoea	Lancinating, tearing, sharp	Unilateral on the side of the pneumothorax	Severe	Minutes to few hours
Pulmonary Embolism	Sudden or gradual	Pleuritic, if pulmonary infarction	Pleuritic, if pulmonary infarction	Unilateral on the side of the PE	Dull ache or sharp pleuritic	Hours to days
Acute Pericarditis with/ without effusion	Gradual onset may follow a febrile illness	Worse lying supine; better sitting forward	Sharp, "pleuritic-like"	Central anterior; usually no radiation	Severe	Hours to days
Musculoskeletal pain eg: intercostal muscle spasm	Sudden (e.g. intercostal muscle spasm) or gradual (e.g. costochondritis)	Worse with movement or activity involving the muscle group or joint, reproducible by palption; relieved by restriction of movement	Sharp, restricting or dull	Anywhere on chest wall; radiates to arms, around the chest to the back	Variable intensity: mild to severe	Hours to days, usually chronic, recurrent and reproducible
Ruptured/ perforated Oesophagus	Sudden, following retching and or vomiting	Worse with swallowing	Sharp, tearing	Central	Severe	Minutes to hours
Oesophageal spasm	Sudden, recurrent	Lying flat may provoke pain; sometimes relieved by nitrates but not by rest	Burning, gripping	Central anterior or epigastric; radiates often to the back	Usually mild but can mimic MI	Night-time common, variable duration

MANAGEMENT (20 MINUTES)

- The facilitator should review management of ACS in **(Slides 210–212)**.
- The facilitator should stress on the value of time in STEMI: TIME is MUSCLE.
- The facilitator should stress on treatment objectives to be achieved using the 5 modalities of treatment:

Treatment Objectives

- Relief of pain, shortness of breath and anxiety
- Prevent myocardial cell death
- Prevent complications
- Improve prognosis
- Improve quality of life

Modalities of treatment

1. Anti-ischaemic therapy (e.g. oxygen, nitrates, Beta-blockers)
2. Anti-platelet therapy (e.g. Aspirin, Clopidogrel)
3. Anti-coagulation therapy (e.g. Heparin, Enoxaparin)
4. Disease modification therapy (e.g. statins, ACEi)
5. Revascularisation (reserved for specialized centres, depending on capacity of trained cardiologists).

(SLIDES 215–223)

- **Investigations:**
  In addition to those performed at a Level 1 facility:
  - 12-lead ECG
  - Cardiac enzymes and troponin
  - Echocardiogram if readily available but should not delay the referral.
- **Pharmacological Management:**
  - Anti-ischaemic therapy
  - Anti-platelet therapy
  - Anti-coagulation therapy
- **Complications and Risk Stratifications:**
  - The facilitator should review complications and risk stratification **(Slides 224–225)**.

PRINCIPLES OF MANAGEMENT OF MYOCARDIAL INFARCTION

- The facilitator should present the principles of management of myocardial infaction **(Slide 226)**.

PLENARY SESSION AND DISCUSSIONS (10 MINUTES)

- The facilitator guides a discussion session to consolidate learning and ends with Key Messages.

!

- **Time is muscle – Time is of essence in the management of myocardial infarction.**
- **Prompt referral to a higher level facility with expertise is important to save the patient's life.**

MODULE 8: HEART FAILURE

DURATION

- 2 hours

LEARNING OBJECTIVES

By the end of this module, participants will be able to:

- Define heart failure.
- Identify the causes of heart failure.
- Identify predisposing factors for heart failure.
- Assess and investigate patients leading to a diagnosis.
- Apply the current evidence for management.

MATERIALS NEEDED

- Flip charts and marker pens
- Projector
- Laptop
- Handout with case scenarios
- Laminated New York Classification of heart failure
- Pulse oximeter
- Weighing scale
- Stethoscope
- Sphygmomanometer (automated and manual)

TRAINER'S ADVANCE PREPARATION

- Review the power point presentation slides.
- Prepare the flip chart for activities.
- Assemble all teaching materials and tools the night before.
- Review exercises.

METHODOLOGIES

- Presentation
- Group exercises
- Case scenarios
- Role plays
- Clinical/practical sessions

DEFINITION OF HEART FAILURE (15 MINUTES)

- Ask the participants to define heart failure (HF).
- List their key definitions on the flip chart.
- Define heart failure as shown on the **(Slides 229-231)**.
- Check to see if this definition matches the participants' views of heart failure.
- Emphasize key aspects of the definition.
- Summarise the key points in the definition for the participants.

Key Points to note in the definition (Slides 231-233):

- **HF is a clinical syndrome, not a disease. Always look for the underlying disease causing it.**
- **It is characterised by inadequate cardiac output to meet tissue metabolism**
- **Cardiac Output = Stroke Volume * Heart Rate**
- **Left Ventricular End Diastolic Volume (LVEDV) = The amount of blood in the ventricle after complete ventricular filling.**
- **Stroke Volume (SV) = Amount of blood pumped out of the left ventricle.**
- **Left ventricular end systolic volume (LVESV) = Amount of blood left in the left ventricle after ejection of blood.**
- **Ejection Fraction (EF)= Stroke volume/end diastolic volume * 100%**

The facilitator should present the **Quick Quiz Questions** and have the participants answer them.

QUICK QUIZ 1

Calculate the stroke volume of Mr. Anim given as the following:

- LVEDV = 100mls
- LVESV = 30mls

What is Mr. Anims's Left Ventricular Ejection Fraction?

➔Answer:

Stroke volume: LVEDV – LVESV= 100mls – 30mls = 70mls

EF= 70mls/100mls x 100% = 70%

QUICK QUIZ 2

Calculate the stroke volume of Mrs. Baiden given as the following:

- LVEDV = 100mls
- LVESV = 70mls

What is Mrs. Baiden's Left Ventricular Ejection Fraction?

What type of heart failure does Mrs. Baiden have?

➔Answers:

SV=30mls, EF= 30%

Heart failure with reduced ejection fraction.

QUICK QUIZ 3

Calculate the stroke volume of Adwoa Addo given as the following:

- LVEDV = 50mls
- LVESV = 20mls

What is Adwoa Addo's Left Ventricular Ejection Fraction?
What type of heart failure does Adwoa Addo have?

➔ Answers:
SV=30mls, EF= 60%
Heart failure with preserved ejection fraction.

AETIOLOGY AND CLASSIFICATION OF HEART FAILURE (10 MINUTES)

- Ask the participants about causes and classification of heart failure.
- Take the participants through the presentation of the causes and classification of heart failure **(Slides 235-236)**.

NEW YORK HEART ASSOCIATION (NYHA) FUNCTIONAL CLASSIFICATION

- **Class I: No symptoms and no limitation of ordinary physical activity.**
- **Class II: No symptoms at rest but slight limitation of ordinary activity.**
- **Class III: No symptoms at rest but marked limitation of ordinary physical activity.**
- **Class IV: Symptoms at rest and during any physical activity.**

PRESENTATION (15 MINUTES)

- Ask the participants to describe the clinical presentation of heart failure. How will you identify a patient with heart failure? Ask them to answer as you write these on a flip chart.
- Guide the participants through the power point session on the clinical presentation of heart failure **(Slides 237-238)**.
- Emphasize the typical and atypical symptoms of heart failure.
- Have the participants discuss and answer the Knowledge Check Questions on the NYHA classification. This should happen in groups, answers written down on a flip chart and presented in the plenary.

KNOWLEDGE CHECK 1: CLASSIFICATION OF HEART FAILURE

Mr. Attuam is a farmer who has been walking for 2 km to the farm for the past three years. He noticed two months ago that he is unable to walk to the farm without stopping to rest several times due to breathlessness. At rest, he is not breathless but the breathlessness occurs when he tries to do minimal physical activity such as bathing and eating.

What NYHA STAGE is he at?
➔ Answer: NHYA Stage 3

KNOWLEDGE CHECK 2: CLASSIFICATION OF HEART FAILURE

Mrs. Kusi has been experiencing spells of breathlessness. She is currently breathless at the least exertion. She is even breathless at rest.

What NYHA STAGE is she at?
➔Answer: NHYA Stage 4

DIAGNOSIS OF HEART FAILURE (10 MINUTES)

- Show the PowerPoint presentation on diagnosis of heart failure **(Slide 240)**.
- Emphasize the criteria for diagnosing heart failure with reduced ejection fraction (HfrEF) and heart failure with preserved ejection fraction (HFpEF). Show videos of normal heart and those with HFpEF and HFrEF.

Diagnosis of HFrEF

- Typical symptoms of HF
- Typical signs of HF
- LVEF below 50%

Diagnosis of HFpEF

- Typical symptoms of HF
- Typical signs of HF
- LVEF ≥50%
- Presence of structural heart disease and/or diastolic dysfunction

MANAGEMENT OF HEART FAILURE (20 MINUTES)

- Ask the participants to write down on sticky notes how they would manage the patients with heart failure.
- Collect their responses and redistribute it around the class.
- Ask them to read out the responses they have written in turns.
- Take the participants through the power point presentation on the management of heart failure **(Slides 241–260)**. Highlight the key aspects that were not discussed in the brainstorming session.

ACUTE HEART FAILURE:

Basic laboratory investigations and imaging

- Full blood cell count
- Fasting blood sugar
- Others: chest X-ray, ECG

Non-pharmacologic treatment

- Admit the patient and prop him/her up in bed.
- Give him/her oxygen in case of hypoxia.

CHRONIC HEART FAILURE

Pharmacologic treatment

- Diureticso
- Digoxin
- Neurohormonal blockers

➔ **Atrial Fibrillation: Refer to a facility with a physician specialist.**

PREDISPOSING FACTORS FOR HEART FAILURE IN A STABLE PATIENT

- Non-compliance to treatment (failure to take medication and diet/fluid restrictions).
- Medications (e.g. NSAIDS)
- Infection (respiratory and urinary tract infections, malaria, etc.).
- Arrhythmias (e.g. atrial fibrillation)
- Acute coronary syndrome
- Renal failure

COMPLICATIONS

- The facilitator should lead the class to list out complications of heart failure **(Slide 261)**.

PREVENTION

- For every complication, the facilitator should lead the class to identify measures needed to prevent their development **(Slide 262)**.

EXERCISES (30 MINUTES)

Group Work: Case Study

- Let the participants break into groups of five.
- Each group will be assigned with a clinical case study on heart failure to be managed.
- Each group will outline their management on A2 sheets to be presented by a group representative during the plenary session.
- Allow the participants and other facilitators to give feedback to the various team presentations.

CASE SCENARIO 9: HEART FAILURE

64-year-old Mr. Ato Forson is a known hypertensive patient with dyslipidaemia on Amlodipine 10mg, Bendrofluazide 2.5mg and Atorvastatin 10mg. He presents with a 3-days history of severe palpitation and a day's history of dyspnoea and cough.

What other important things would you like to know about his history?

Answers:

- **His compliance to treatment.**
- **Chest pain, orthopnoea and paroxysmal nocturnal dyspnoea.**
- **Evidence of infection from RTI, urinary tract infection, malaria.**
- **Fluid intake.**
- **Family history – hypertension, diabetes, sudden cardiac death.**
- **Concurrent medication – steroids and NSAIDS.**

On examination, he is found to be dyspnoeic at rest, tachycardia of 124 bpm with irregularly irregular pulse. He had a blood pressure of 90/60 mmHg, a respiratory rate of 38 cpm with pedal oedema up to the mid-shin of both legs. Chest findings revealed bi-basal crepitations.

1. **What would you expect the apical rate to be?**
2. **What would you expect the pulse deficit to be if the apical rate is 150 bpm?**
3. **What is Mr Forson's diagnosis?**
4. **How will you manage this patient at presentation?**
5. **What important investigations will you carry out?**
6. **Will you need to alter his current medication – Yes or No?**
7. **What medication would you like to give him after he is stabilised?**

Answers:

1. **The apical rate is expected to beat faster than the radial rate and also be irregularly irregular.**
2. **Pulse deficit of 26b pm (i.e. 150–124).**
3. **Acute heart failure secondary to hypertensive heart disease precipitated by atrial fibrillation.**
4. **Prop patient up in bed.**
   - **Check the SPO_2**
   - **Give oxygen if indicated**
   - **Medication (Loop and Thiazide diuretics)**
   - **Start tablet Digoxin 250 microgram twice a day for the first day and 125 to 250 micrograms daily.**
5. **ECG, chest X ray, basic laboratory investigations (FBC, LFT, RFT), echocardiogram.**
6. **Yes. Stop or change amlodipine.**
7. **ACE inhibitor or ARB, diuretic, Beta-blockers, spironolactone which will be guided by the renal function.**

PLENARY SESSION AND DISCUSSIONS (20 MINUTES)

The facilitator guides a discussion session to consolidate learning and ends with Key Messages. **In summary:**

1. Patient management

- The patients should be propped up.
- SPO_2 should be monitored with a pulse oximeter.
- Urine output should also be monitored.
- Fluid intake should be restricted (Refer to *Section 4.4.4.1 in National Guidelines*).

2. Use of Beta-blockers

- The use of Beta-blockers in heart failure should be limited to the following bisoprolol, carvedilol and metoprolol succinate (CR/XR).
- Start at low dose and titrate upwards slowly (Refer to *Section 4.4.5.3.2, Table 56 in National Guidelines*).

3. Beta-blockers should not be initiated in:

- Patients with NYHA Class IV
- Hypotension
- Bradycardia
- Patients with bronchial asthma

During patient Follow Up

- Check patient's weight
- Reassess New York Heart Association Functional Classification.
- Check blood pressure
- Check pulse rate
- Assess for compliance to treatment.

!

- **Prevent heart failure by proper management of hypertension.**
- **Look for predisposing factors for heart failure in someone who has been stable on heart failure medications.**
- **Patient education on lifestyle modification, fluid and salt restriction, and adherence to treatment is very important as well as daily weighing.**
- **Family members should be involved in the heart failure management at home.**

MODULE 9:
VENOUS THROMBOEMBOLISM

DURATION

- 2 hours

LEARNING OBJECTIVES

By the end of this module, the participants will be able to:

- Define DVT and PE.
- Identify the risk factors associated with DVT and PE.
- Describe the signs and symptoms associated with DVT and PE.
- Manage DVT and PE.
- Understand the complications of DVT and PE.

MATERIALS NEEDED

- Flip chart and marker pens
- Projector
- Laptop
- Handout with case studies
- Sticky notes
- Laminated copies of the Modified Wells Score

TRAINER'S ADVANCE PREPARATION

- Review the power point presentation slides.
- Prepare the flip chart for activities.
- Assemble all teaching materials and tools the night before.
- Review exercises.

METHODOLOGIES

- Brain storming
- Plenary discussion
- Case scenarios

DEFINITION OF VENOUS THROMBOEMBOLISM (10 MINUTES)

- The facilitator should ask the participants to brainstorm on what DVT and PE is.
- The facilitator should summarise the collective thoughts and use the power point presentation as a guide to take the participants through the definition of DVT and PE **(Slides 269–271)**.

RISK FACTORS OF DEEP VEIN THROMBOSIS (DVT) (10 MINUTES)

- Ask the participants to write down the possible risk factors of DVT on sticky notes. The facilitator should then collect the answers and paste them on a central board.
- Ask the participants to discuss the risk factors and causative factors they noted down and how they increase an individual's risk for deep vein thrombosis **(Slides 272–273)**.

CLINICAL PRESENTATION (15 MINUTES)

- Ask the participants to describe the common signs and symptoms of deep vein thrombosis. The facilitator should take the participants through the power point presentation on the signs and symptoms of deep vein thrombosis **(Slide 274)**.
- The facilitator should then explain how the Modified Well's Score is used to diagnose deep vein thrombosis **(Slides 275–276)**.

KNOWLEDGE CHECK: DVT (15 MINUTES)

- Ask the participants to answer the following knowledge check individually on sticky notes using the laminated Modified Well's score charts. Subsequently, ask one participant to demonstrate how he/she got the answer.
- Discuss further to ensure that all other participants understand how to calculate the score.

A 55-year-old man, Kwadwo Adongo, who was recently diagnosed of a prostate cancer, presents with a two-day history of a left leg swelling. On examination, the left leg was found to be swollen, tender with pitting oedema. The left leg was 4 cm larger than the right leg.

1. What will be the Modified Well's score for Kwadwo Adongo?
2. Is DVT likely or unlikely in this patient?
3. What imaging investigation would you request to confirm the diagnosis of deep vein thrombosis?

➔ Answers:

1. 4
2. DVT is likely because the Well's score is greater than 2.
3. Compression venous ultrasonography (CUS).

MANAGEMENT (SLIDES 278-281 / 15 MINUTES)

Lead the participants through **(Slides 278-282)** for management on Level 1 and 2.

- Assess the patient and score as per DVT Algorithm.
- Laboratory investigations: D-dimer test.
- Compression venous ultrasound.
- Elevate the affected leg.

PHARMACOLOGIC TREATMENT

- If DVT is confirmed, start parenteral therapeutic anticoagulation (Sc Heparin or LMWH e.g. Enoxaparin or Dalteparin).

➔ **Refer the patient to a specialist for continuation of treatment.**

KNOWLEDGE CHECK: PE

Mr. Adongo was sent to the radiology department for compression ultrasound. On his way to the ward, he complained of sudden onset of chest pain and dyspnoea.

1. What is the most likely explanation for this dyspnoea?
2. How would you manage this case?

The facilitator should harvest various responses from the participants and write them out on a flip chart to be referred to after the session on management.

➔ **Answers:**

1. Acute pulmonary embolism
2. Admit the patient:
Prop him up in bed.
Administer supplemental O_2, if SpO_2 < 94%
Check vitals: RR, BP, PR and continue close monitoring thereafter.
The patients with persistent hypotension may be considered for thrombolysis.
Initiate anticoagulation: iv UFH an initial bolus of 80 U/kg or 5000 U followed by an infusion of 18 U/kg/h or 1300 U/h OR sc Enoxaparin 1mg/kg twice daily or 1.5mg/kg daily. Once stable, arrange for CT pulmonary angiogram to confirm the diagnosis.

PULMONARY EMBOLISM (PE) (15 MINUTES)

- The facilitator should ask the participants to recall from the beginning session what the definition of pulmonary embolism is.
- The facilitator should take the participants through the presentation on the clinical signs and symptoms of pulmonary embolism. The facilitator should put emphasis on the Simplified Well's score used in assessing the likelihood of occurrence of pulmonary embolism **(Slides 286-287)**.

DIAGNOSIS OF PULMONARY EMBOLISM (10 MINUTES)

- The facilitator should differentiate between non-massive and massive PE.
- Review the algorithm for diagnosis of non-massive PE **(Slides 288-289).**

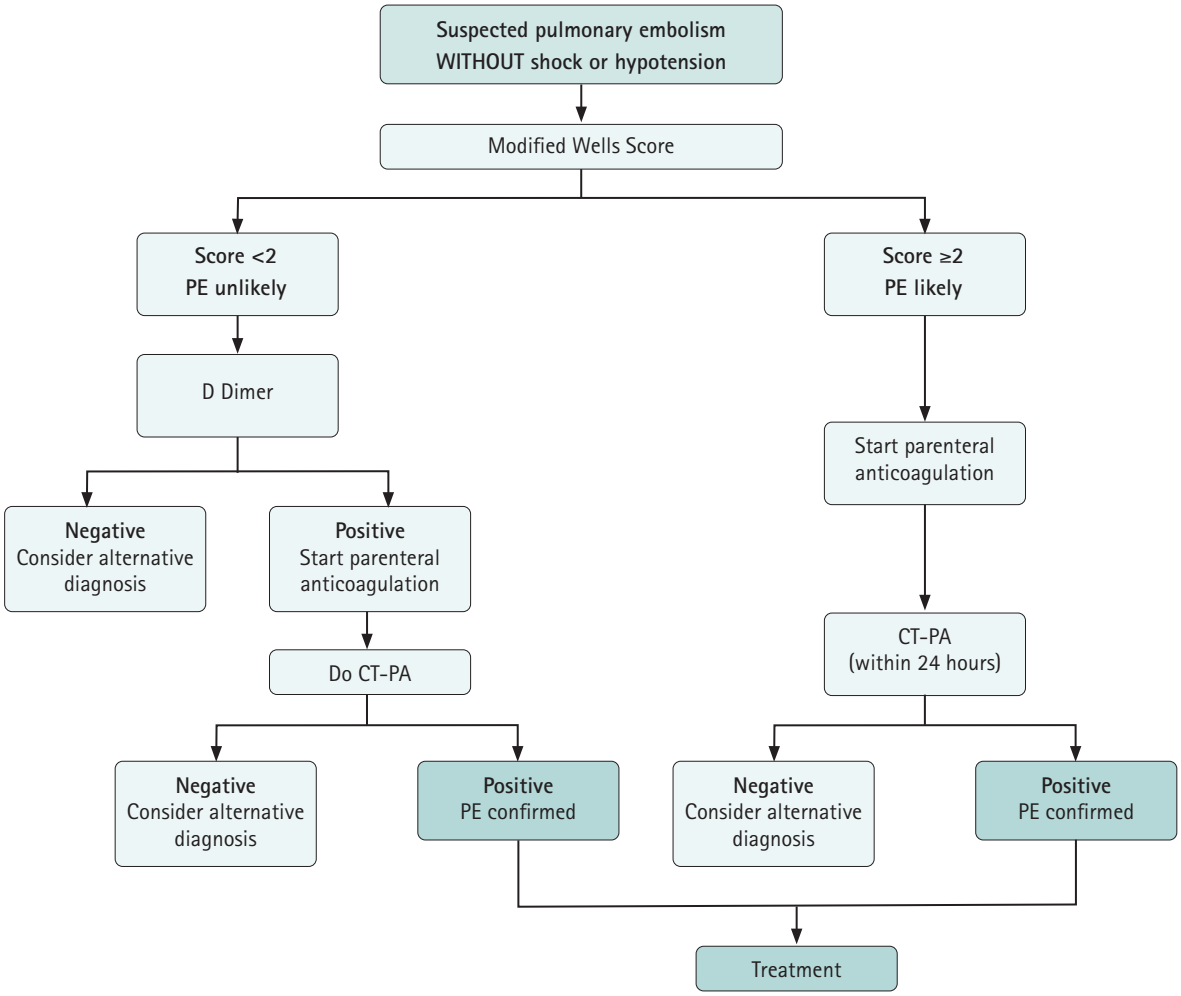


Figure 3: Diagnostic algorithm for pulmonary embolism without shock or hypotension

MANAGEMENT OF PULMONARY EMBOLISM (15 MINUTES)

- Ask the participants to brainstorm on the possible management of pulmonary embolism.
- Take the participants through the presentation on the management of pulmonary embolism **(Slides 290-295)**.
- Assess on Well's score for PE and follow algorithm.
- If score is less than 2 (PE unlikely), request D-dimer test and follow as per algorithm:

➔ **If D-dimer test not available refer to a facility with a specialist.**

➔ **If score >2 (PE likely), administer stat dose of LMWH and follow algorithm.**

➔ **If score >2 (PE likely) with shock, follow algorithm.**

LABORATORY INVESTIGATIONS

- Full blood cell count
- D-dimer
- Clotting profiles
- Doppler ultrasound of lower limb and pelvis if indicated.

NON-LABORATORY INVESTIGATIONS

- Chest X-ray (when the patient is stable) for Hamptons hump or Westermarck sign
- ECG
- CT Scan (pulmonary angiogram) when the patient is stable.

PHARMACOLOGIC TREATMENT

- Initiate anticoagulation: iv UFH an initial bolus of 80 U/kg or 5000 U followed by an infusion of 18 U/kg/h or 1300 U/h OR SC Enoxaparin 1mg/kg twice daily or 1.5mg/kg daily.
- Adequate hydration with saline.

➔ **Refer to a centre with a physician specialist for advance treatment when the patient is in shock:**

- Thrombolysis: iv Streptokinase* 250,000 IU as loading dose over 30 minutes followed by 100,000 IU/hour over 12-24 hours.
  - Persistent hypotension or shock (i.e., a systolic blood pressure <90 mmHg or a decrease in the systolic blood pressure by ≥40 mmHg from baseline) due to acute PE is the only widely accepted indication for systemic thrombolysis.
  - Thrombolysis should be performed in a setting where interventions can be made to offset any adverse events that can occur after administration of iv Streptokinase.

* *= drugs not on the EML*

PREVENTION (10 MINUTES)

The rationale for use of thromboprophylaxis is based on solid principles and scientific evidence. Almost all hospitalised patients have at least one risk factor for VTE, and approximately 40% have three or more risk factors.
Without thromboprophylaxis, the incidence of objectively confirmed hospital-acquired DVT is approximately 10 to 40% among medical or general surgical patients and 40 to 60% following major orthopaedic surgery.
The mortality, acute and long-term morbidities and resource utilisation related to unprevented VTE, strongly support effective preventive strategies at least for moderate-risk and high-risk patients. **(Slides 294–296)**

PLENARY SESSION AND DISCUSSIONS (10 MINUTES)

The facilitator guides a discussion session to consolidate learning and ends with Key Messages.

!

- **Early mobilization of the patient after medical or surgical procedure or admission.**
- **The risk of DVT and PE in chronically immobilized patients is the same in hospital as well as out of hospital (home).**

MODULE 10:
ACUTE RHEUMATIC FEVER, RHEUMATIC HEART DISEASES AND INFECTIVE ENDOCARDITIS

DURATION

- 2 hours

LEARNING OBJECTIVES

By the end of this module, the participants will be able to:

- Define and appropriately classify acute rheumatic fever, rheumatic heart disease and infective endocarditis.
- Understand the aetiology of acute rheumatic fever, rheumatic heart disease and infective endocarditis.
- Correctly diagnose acute rheumatic fever, rheumatic heart disease and infective endocarditis.
- Correctly manage acute rheumatic fever, rheumatic heart disease and infective endocarditis.
- Detect early complications of acute rheumatic fever, rheumatic heart disease and infective endocarditis.

MATERIALS NEEDED

- Flip chart and marker pens
- Projector
- Laptop
- Handout with case scenarios
- Videos on rheumatic heart diseases and endocarditis

TRAINER'S ADVANCE PREPARATION

- Review the power point presentation slides.
- Review the videos.
- Prepare the flip chart for activities.
- Assemble all teaching materials and tools the night before.
- Review exercises.

METHODOLOGIES

- Presentation
- Lecture
- Brainstorming

DEFINITION OF ACUTE RHEUMATIC FEVER (20 MINUTES)

- Ask the participants to define acute rheumatic fever.
- List their key definition on the flip chart.
- Read aloud the definition on the slide.
- Summarise the key points in the definition for the participants **(Slide 301)**.
- Present epidemiology and aetiology of the disease **(Slides 302-303)**.

CLINICAL PRESENTATION

- Ask the participants to describe the clinical presentation of acute rheumatic fever. How will you identify a patient with acute rheumatic fever?
- Write the answers on a flip chart.
- Take the participants through the power point presentation on the clinical presentation of acute rheumatic fever **(Slide 304)**.

Key Points:

- **If young patients of 5-15 years present with sore throat they should be investigated for a possible B-haemolytic streptococcal pharyngitis.**
- **If you are not sure, give them antibiotics.**

MANAGEMENT

- Guide the participants through the presentation on the management of ARF **(Slides 306-311)**.

LABORATORY INVESTIGATIONS

- Full blood cell count
- Blood cultures
- Erythrocyte sedimentation rate (ESR)
- C-reactive protein (CRP)

PHARMACOLOGIC TREATMENT

Intramuscular (im) Benzathine Penicillin G (LOE A):

- Adults: 1,200,000 U as a single shot
- Children less than 20 kg: 600,000 U as a single shot

or

Oral Penicillin V (LOE A):

- Adults: 500mg twice daily for 10 days
- Children: 250mg twice daily for 10 days

➔ Patients with a known allergy to Penicillin: oral Erythromycin (LOE B).

Arthritis and fever

- Aspirin starting at a dose of 50–60mg/kg/day, titrated up to 80–100mg/kg/day (4–8 g/day in adults) and administered in divided doses; the dose may be increased to 125mg/kg/day at which time signs of toxicity must be looked for (LOE A).
- Naproxen (10–20mg/kg/day) or Ibuprofen are suitable alternatives given twice-daily (LOE B)
- If the diagnosis is uncertain, Paracetamol or Codeine may be administered for pain relief (LOE C)

➔ **Note: If clinical signs do not resolve within 3 days of start of medications, look for an alternative diagnosis.**

➔ **Anti-inflammatory medication may be given for 1–2 weeks; however, it may be continued for as long as 6 weeks depending on how drastically the clinical symptoms and inflammatory markers improve.**

Carditis/heart failure:

- Bed rest with mobilization.
- Gradual ambulation, especially in patients with heart failure.

➔ **Refer the patient to a health facility with a physician specialist when there is severe carditis with persistent heart failure or poor resolution of symptoms despite optimal treatment.**

DEFINITION OF RHEUMATIC HEART DISEASE (30 MINUTES)

- Ask the participants to share their thoughts on what rheumatic heart disease is.
- Summarise the key responses and write them on a flip chart.
- Read aloud the definition on **(Slide 313)** to conclude.

Key Points to note:

- **Rheumatic Heart Disease is a chronic condition caused by repeated inflammatory damage to the valves leading to fibrosis and scaring of the valves.**
- **Mitral valves are usually the first to be affected, then the aortic, tricuspid and very rarely the pulmonic valve.**

CLINICAL PRESENTATION

- Ask the participants to describe the clinical presentation of rheumatic heart disease. The discussion should focus on the signs and symptoms of rheumatic heart disease from the participants' point of view **(Slides 314-315)**.
- Lead the participants through the power point session on the clinical presentation of rheumatic heart disease.
- Discuss findings at the bed side such as signs of heart failure, abnormal pulse, increased precordial activity, heaves, thrills, displaced apex and murmurs.

MANAGEMENT

- Discuss with the participants, the options for managing RHD according to the level of care **(Slides 316-322)**.

LABORATORY INVESTIGATIONS

- Full blood cell count
- Erythrocyte sedimentation rate (ESR)
- C-reactive protein (CRP)
- Blood urea electrolytes and creatinine
- Liver function test
- BUE/creatinine

PHARMACOLOGIC TREATMENT

Provide symptomatic relief with medical treatment when the patient has symptoms and signs of heart failure.

Furosemide:

- Adults: 20-80mg orally once daily; may be increased by 20-40mg 6-8 hourly, not to exceed 600mg/day.
- Alternative: 20-40mg iv/im once, may be increased by 20mg 2 hourly; individual dose is not to exceed 200mg/dose.
- Infants and children: 1-2mg/kg iv/im/orally once initially, may be increased by 1-2mg/kg q6-8hrs (orally) or 1mg/kg q2hrs (iv/im); individual dose not to exceed 6mg/kg.

➔ Refractory chronic heart failure may necessitate larger doses.

➔ Additional medication can be discussed with a specialist before initiation (please note precautions!).

➔ Refer the patient to a health facility with a physician specialist.

Key Points to note:

- Medical Management: Requires that you manage the underlying condition or complications i.e. heart failure, atrial fibrillation, arrhythmias.
- Surgical management/percutaneous valvular interventions:
  - Percutaneous Balloon Mitral Valvulotomy
  - Surgical management such open valve repair or replacement.

Ask the participants to answer the following knowledge check individually, write the answers on sticky notes and put them on the wall. Discuss the answers and exclude the wrong ones.

KNOWLEDGE CHECK: EXERCISE ON AUSCULTATION

Amina Amadu, 15 years later, begins to develop progressively worsening dyspnoea with pedal oedema and nocturnal symptoms such as cough, insomnia and orthopnoea.

1. What is the most likely complication that has developed?
2. What important tests would you like to run?
3. How could this have been prevented?

➔ Answers:

1. Heart failure possibly due to rheumatic heart disease.
2. Laboratory tests and imaging:
   a. Full blood cell count
   b. Erythrocyte sedimentation rate (ESR)
   c. C-reactive protein (CRP)
   d. Blood urea electrolytes and creatinine
   e. Liver function test
   f. BUE/creatinine
   g. Chest X-ray
   h. ECG
   i. Echocardiogram
3. The patient may have had an antecedent sore throat which should have been investigated for a possible Beta-haemolytic streptococcal pharyngitis and treated appropriately.

PREVENTION OF ARF AND RHD

- The facilitator should ask the participants to explain the difference between primary and secondary prevention for ARF.
- The facilitator should define primary and secondary prevention using **(Slides 324-329)**.

Key Points to note on Secondary Prevention

- **All confirmed cases of ARF should be put on secondary prevention (***Refer Section 4.6.4 in National Guidelines***).**
- **This is to prevent recurrence. Most of the recurrent ARF are subclinical and will eventually lead to scarring of the heart valves resulting in rheumatic heart disease.**
- **Secondary prevention has been shown to reduce the incidence of Rheumatic Heart Disease following ARF.**

DEFINITION OF INFECTIVE ENDOCARDITIS (30 MINUTES)

- The facilitator should take the participants through the definition of infective endocarditis in **(Slide 331)**.

CLASSIFICATION OF INFECTIVE ENDOCARDITIS

- Take the participants through **(Slide 332)** on the classification of infective endocarditis.
- Ask the participants to write down possible risk factors of infective endocarditis on sticky notes. The facilitator should then collect and paste them on a central board.
- Ask the participants to discuss the risk factors and causative factors they noted down and how they could influence the infective endocarditis using **(Slide 333)** as a guide.

CLINICAL PRESENTATION

- Ask the participants to describe the common signs and symptoms of infective endocarditis.
- The facilitator should lead the participants through the power point presentation on the signs and symptoms of infective endocarditis **(Slides 334-337)**.
- The facilitator should then explain how the Dukes Criteria is used to diagnose infective endocarditis.

*Table 12: M*odified Duke's criteria for infective endocarditis

Modified Duke's criteria for infective endocarditis	
Clinical diagnostic status	**Criteria**
Definite endocarditis	One of the following: ▪ 2 major criteria ▪ 1 major and 3 minor ▪ 5 minor
Possible endocarditis	One of the following: ▪ 1 major and 1 minor ▪ 3 minor
Endocarditis rejected	One of the following: ▪ Firm alternative diagnosis explaining the findings of infective endocarditis ▪ Resolution of symptoms and signs after < 4 days of antimicrobial therapy ▪ No pathologic evidence of infective endocarditis found during surgery or autopsy ▪ Failure to meet the clinical criteria for possible endocarditis

MANAGEMENT

- Ask the participants to brainstorm on the possible management of infective endocarditis. Guide the participants through the presentation on the management of infective endocarditis **(Slides 338-342)**.

LABORATORY INVESTIGATIONS

- Full blood cell count
- Erythrocyte sedimentation rate (ESR)
- C-reactive protein (CRP)
- Blood urea electrolytes and creatinine
- Liver function test
- BUE/creatinine

PHARMACOLOGIC TREATMENT

Patients with non-complicated native valve endocarditis (NVE) with normal renal function:

- Adults: iv Penicillin G 12-18 million U/day in 4-6 daily doses (or continuous infusion) for 2 weeks.
- Children: 200,000 U/kg/day in 4-6 doses for 2 weeks.

or

- Adults: iv/im Ceftriaxone 2g/day in 1 dose for 2 weeks.
- Children: 100mg/kg/day in 1 dose for 2 weeks.

with

- Adults: iv/im Gentamycin 3mg/kg/day in 1 dose for 2 weeks.
- Children: 3mg/kg/day in 1 dose or 3 equally divided doses for 2 weeks.

Beta-Lactam allergic patients:

- Adults: Vancomycin 30mg/kg/day in 2 doses for 4 weeks.
- Children: 40mg/kg/day in 2 or 3 equally divided doses for 4 weeks.
- NB: A 6-week therapy is recommended for patients with PVE.

➔ Refer all cases of complicated infective endocarditis to a centre with cardio-thoracic surgical facilities.

COMPLICATIONS

- The facilitator should review **(Slide 344)** on complications of infective endocarditis.

CASE SCENARIO 10: INFECTIVE ENDOCARDITIS (20 MINUTES)

Ask the participants to divide into groups of 5 and discuss the following clinical case scenario. Answers should be written on a flip chart and presented and further discussed in the plenary.

A 21-year girl, known to have unrepaired ASD, develops severe tonsillitis for which she undergoes a successful tonsillectomy. Two weeks later, she de velops a fever with associated easy fatigability. She is found on examination to have a heart rate of 120 bpm with dark linear marks on her nail bed and a mass in her left hypochondriac area.

1. **What is the most likely diagnosis?**
2. **What is the major risk factor for her developing this condition?**
3. **What will you do next?**
4. **What measures could have been put in place to prevent this?**

Answers:

1. **Septicaemia, infective endocarditis, malaria, typhoid.**
2. **Previous ASD, tonsillectomy procedure.**
3. **Investigate to determine cause: FBC, malaria, blood culture, ESR.**
4. **Early initiation of antibiotic therapy before the tonsillectomy procedure.**

PREVENTION

- The facilitator should present on prevention of infective endocarditis **(Slides 346-349)**.

PLENARY SESSION AND DISCUSSIONS

The facilitator guides a discussion session to consolidate learning and ends with Key Messages.

! Antibiotic prophylaxis should routinely be prescribed for:

- Patients undergoing simple dental procedures.
- Patients undergoing non-dental procedures at the following sites:
  - Gastrointestinal tract
  - Genitourinary tract (including urological, gynaecological and obstetric procedures and childbirth)
  - Respiratory tract (including ear, nose and throat procedures and bronchoscopy).

MODULE 11: CARDIAC ARRHYTHMIAS

DURATION

- 3 hours 30 minutes

LEARNING OBJECTIVES

By the end of this module, participants will be able to:

- Understand common symptoms and signs of arrhythmias.
- Identify the common causes of arrhythmias.
- Measure the heart rate using ECG.
- Identify brady and tachyarrhythmias.
- Manage dangerous (life threatening) arrhythmias.
- Manage complications of cardiac arrhythmias.
- Prevent cardiac arrhythmias.

MATERIALS NEEDED

- Power point presentation
- Laptop
- Flipchart and marker pens
- Mannequins
- ECG strips
- Automated External Defibrillator (AED) and manual defibrillators
- Hand out of exercises and answer sheets

TRAINER'S ADVANCE PREPARATION

- Thoroughly review the power point presentation to understand course material.
- Assemble all materials and tools the night before.
- Put AED on charge all night.
- Practice how to use AED machine.

METHODOLOGIES

- Presentation/lecture
- Case studies
- Exercises
- Group discussion
- Brainstorming

PRESENTATION (60 MINUTES)

DEFINITION OF ARRHYTHMIA

- Ask the participants to define arrhythmias and write the definition on a flip chart.
- Present the definition on **(Slide 352)**.
- The facilitator should go through classification of arrhythmias **(Slides 353–356)**.
- The facilitator should ask and write on the flip chart the causes of arrhythmias **(Slide 357)**.

CLINICAL PRESENTATION AND DIAGNOSIS

- Ask the participants to differentiate among the symptoms and signs of arrhythmias.
- The facilitator should present **(Slide 358)**.
- The facilitator should ensure that the participants are able to read, measure and understand ECG print outs presented on the slides **(Slides 360–369)**.

MANAGEMENT OF ARRHYTHMIAS

- The facilitator should take the participants through the presentation on the management of arrhythmias (**Slides 373–380**).
- Review specifically, algorithms on bradycardia and tachycardia

LABORATORY INVESTIGATIONS

- 12-lead ECG
- Serum electrolytes (BUE), calcium, magnesium assay
- Chest X-ray
- Thyroid function test
- Cardiac enzymes
- Arterial blood gases

COMPLICATIONS

- The facilitator should review **(Slide 381)** on complications of arrhythmias.

PREVENTION

- The facilitator should review **(Slides 382–383)** on prevention of arrhythmias and patient education.

CASE SCENARIOS (90 MINUTES)

- The facilitator should ask the participants to sit in groups of 5. The facilitator should distribute handouts of the case scenarios with the ECG strips. Each group works on two scenarios. The results are presented and discussed in the plenary.

CASE SCENARIO 11: ECG READING

A 25-year-old lady presented to the polyclinic with significant weight loss, palpitation and easy fatigue. On examination, the patient looks anxious, with starry eyes. She has fine hand tremors and sweaty palms when you shook her hand. Her pulse was 144 bpm regular and BP of 130/60. Using the ECG strip provided **(Slide 385)**:

1. **What further examination and investigations will you do?**
2. **What is the heart rate?**
3. **What is the rhythm?**
4. **Is the QRS complex broad or narrow?**
5. **What is your diagnosis?**
6. **How will you manage her?**

Answers:

1. **Examine further for an anterior neck swelling, exophthalmos, chemosis, lid retraction and lid lag. Also check for presence of fine hair, hair loss, pretibial myxedema, proximal muscle weakness.**
2. **Heart rate is 150 bpm**
3. **Sinus rhythm**
4. **QRS is narrow complex.**
5. **Sinus tachycardia from thyrotoxicosis.**
6. **Treat the thyrotoxicosis and put her on Propranolol 40mg 2-3 times/day.**

CASE SCENARIO 12: ECG READING

A 66-year-old hypertensive and diabetic presented to the out-patient department for his regular reviews. The BP checked was 150/100 mmHg. The nurse informs you that, his pulse was 112 bpm, but very irregular. You checked her pulse over a minute and it was 124 bpm, irregularly irregular. Using the ECG strip provided **(Slide 387)**:

1. **What investigations will you ask for?**
2. **How will you assess his risk of complication using the risk assessment score? (CHADS2VaSc)**
3. **How will you manage this patient?**

Answers:

1. **Investigations: Thyroid function test, Echocardiogram, chest-Xray, HBA1c, FBS, FBC, lipid levels, BUE/Cr, LFT, urine RE to assess other risk CVD risk factors, target organ damage and the cause of the atrial fibrillation.**

2. Risk assessment using CHADS2VaSc Score:
Age: 1 score, Hypertension: 1 score, Diabetes: 1 score. Total score is 3
3. Management: Full history and examination. Investigate as (1) above. Optimize blood pressure control. Because he has no symptoms, I may want to consider rate control as opposed to rhythm control of the atrial fibrillation. I will add a Beta-blocker to his treatment to reduce the ventricular rate to below 100 bpm. I will anti-coagulate with Warfarin or NOAC depending on his finances.

CASE SCENARIO 13: ECG READING

Mr. Musa, 82-year-old with no past cardiovascular medical history, comes to the emergency with a complaint of shortness of breath and lower extremity oedema for 1 month. He is afebrile with a pulse rate of 160 beats per minute irregularly irregular, respirations 32 per minute, blood pressure 140/90 mmHg and oxygen saturation 92% on room air.
His jugular venous pressure is markedly elevated. Lung examination reveals bi-basal fine crepitations. There is 3+ pitting oedema up to his knees.

What other investigations would you do?
BUE, Cr, lipid profile, LFTs, TFTs, urine RE, CXR, echocardiogram

Answer questions on his ECG (rate, rhythm): (Slide 389)

How would you manage this patient?

- Admit
- Prop up in bed
- Administer supplemental O_2
- iv diuretics (Furosemide 40mg 6-8hrly)
- Monitor urine output
- Daily weighing
- Prophylactic anticoagulation (SC Clexane* 40mg dly)
- Initiate ACE-I at low dose and titrate upwards gradually (e.g. Tb Lisinopril 2.5mg dly)
- Low dose Beta-blocker on consultation with specialist physician
- Assess the need for anticoagulation using the CHA2DS2-VASc (congestive heart failure, hypertension, age ≥75 years [doubled], diabetes mellitus, prior stroke or transient ischaemic attack or thromboembolism [doubled], vascular disease, age 65-74 years, sex category) score. If 2 or greater in men or 3 or greater in women, oral anticoagulants are recommended (Warfarin or NOACs). This patient's CHA2DS2-VASc score is 4 and hence he will require anticoagulation
- Calculate HAS-BLED score:

* = *drugs not on the EML*

Table 13: **The HAS-BLED bleeding risk score**

	Condition	Score
H	Hypertension (uncontrolled, >160 mmHg systolic)	1
A	Abnormal renal function: Dialysis, transplant, Cr >2.26 mg/dL or >200 µmol/L Abnormal liver function: Cirrhosis or Bilirubin >2x Normal or AST/ALT/AP >3x normal	1 1
S	Stroke: Prior history of stroke	1
B	Bleeding: Prior Major Bleeding or Predisposition to Bleeding	1
L	Labile INR: (Unstable/high INR), Time in Therapeutic Range < 60%	1
E	Elderl: Age > 65 years	1
D	Prior Alcohol or Drug Usage History (≥ 8 drinks/week) Medication Usage Predisposing to Bleeding: (Antiplatelet agents, NSAIDs)	1

Score ≥3 indicates that caution is warranted when prescribing anticoagulants. Identified modifiable risk factors should be addressed.

CASE SCENARIO 14: ECG READING

A 65-year-old female with a history of hypertension but otherwise healthy presents for evaluation for palpitations. Her vital signs are normal and a 12-lead electrocardiogram is normal.

What next steps would you take?
Order a 24hr Holter ECG (Slide 392)

An ambulatory ECG monitor confirms that her palpitations correlated with paroxysmal atrial fibrillation, with heart rates of 140 beats per minute.

How would you manage this patient?
I would initiate rate control with a Beta-blocker (e.g. Bisoprolol 2.5 -10mg dly, to be titrated against the patient's BP). If the patient has absolute contraindications for a Beta-blocker, consider non-dihydropyridine calcium channel blockers or digoxin in consultation with a specialist physician/cardiologist.
Assess the need for anticoagulation using the CHA2DS2-VASc score. This patient's CHA2DS2-VASc score is 2. She may not require anticoagulation at this time.

CASE SCENARIO 15: ECG READING

A 58 year lady presented with palpitation and dyspnoea. She is not a known hypertensive. Her BP is 162/100 mmHg with a pulse rate of 142 bpm regular.
The ECG done is shown on the next slide **(Slide 394)**.

What is the heart rate, rhythm and diagnosis?
➔ Heart rate is 87 bpm. Rhythm and diagnosis is atrial flutter.
How will you assess the risk of complication using the CHADS2VaSc?
➔ Gender risk 1, hypertension 1, CHADS2VaSc score of 2
How would you manage this patient?
➔ I would anti coagulate using Warfarin of NOAC. Because of age, I will aim at rhythm: cardiovert to sinus either with antiarrhythmic medication or electrical cardioversion.

CASE SCENARIO 16: ECG READING

A 65 year old hypertensive was rushed to the emergency after complaining of sudden severe central chest pain. The patient is noticed to be anxious and sweating profusely. His vitals checked showed pulse of 150 bpm regular with a BP of 90/60 mmHg, SpO_2 recorded was 96%.

What does the ECG Show (Slide 396)?

➔ ST-segment elevation in the anterolateral leads.

What is your diagnosis?

➔ STEMI involving the anterior segments with reciprocal ST-depression in inferior leads.

Your attention was drawn by the nurse to the situation that the patient was unresponsive and the pulse wasn't palpable.

What does the ECG show (Slide 397)?

➔ Ventricular tachycardia.

What is the heart rate and rhythm?

➔ Ventricular tachycardia at a rate of 160 bpm.

Is it a broad or narrow QRS complex?

➔ QRS is broad (160ms).

What is your diagnosis and how will manage this patient?

➔ Diagnosis is ventricular tachycardia.
I will start CPR and electrical cardioversion using the external/manual defibrillator because he was unstable. I will quickly arrange to send to cardiologist for thrombolysis or coronary intervention.

CASE SCENARIO 17: ECG READING

A taxi driver rushed in an 18 year old boy who was unresponsive. He had gone quiet just as they entered the clinic premises about a minute ago. The mother claims he had a febrile illness with dark coloured urine 3 days ago but has currently not produced urine for past 24 hours.

Upon examination, you realized the patient was unresponsive with no pulse and not breathing.

What will you do?

➔ Begin CPR immediately. Call for help. If AED is available, analyse rhythm as soon as it is connected. Set up iv line for drugs. Continue effective CPR and give appropriate medications as per algorithm. Investigate for inciting factors and treat appropriately. Send to HDU/ICU once the patient achieves ROSC.

What does the ECG show (Slide 399)?

➔ Ventricular fibrillation.

PLENARY SESSION AND DISCUSSIONS (60 MINUTES)

- The facilitator guides a discussion session to consolidate learning and ends with Key Messages.
- The facilitator should show the video on the use of an automated external defibrillator (AED). The participants should practice how to use AED and do CPR.

!

- **Arrhythmias are common and a common presentation of systemic as well as cardiovascular diseases.**
- **Identification of the arrhythmia is an important step in the management.**
- **Unstable arrhythmias are life-threatening and need urgent intervention including CPR.**

MODULE 12: CARDIAC ARREST

DURATION

- 2 hours

LEARNING OBJECTIVES

By the end of this module, participants will be able to:

- Identify cardiac arrest.
- Understand common symptoms of cardiac arrest.
- Understand the common causes of cardiac arrest.
- Know the phases of cardiac arrest.
- Manage cardiac arrest.
- Prevent cardiac arrest.

MATERIALS NEEDED

- Power point presentation
- Flip chart
- BLS algorithm charts
- ACLS algorithm charts
- Demonstration mannequins
- Automated External Defibrillator (AED) and manual external defibrillator
- Case studies and exercises

TRAINER'S ADVANCE PREPARATION

- Thoroughly review the power point presentation to understand course material.
- Assemble all materials and tools the night before.
- Put defibrillator on charge all night.
- Practice how to use AED machine.
- Review exercises and practical sessions.

METHODOLOGIES

- Presentations
- Case studies
- Exercises
- Practical sessions

PRESENTATION (30 MINUTES)

DEFINITION OF CARDIAC ARREST AND SUDDEN CARDIAC DEATH

- Ask the participants to define cardiac arrest and sudden cardiac death.
- List their key definitions on a flip chart.
- Define cardiac arrest as shown on **(Slide 408)**.
- Compare the definition on the slide to the answers given by the participants.
- Emphasize on key aspects of the definition.

Key points in definition

- **Cardiac arrest is an abrupt cessation of the heart due to an electrical disturbance of the heart, which results in failure of the heart to effectively pump blood to the brain and other parts of the body.**
- **Cardiac arrest is not the same as a heart attack, heart failure and cardiogenic shock.**
- **Hypertension is the main cause of cardiac arrest.**

AETIOLOGY AND CLASSIFICATION

- Ask the participants of the various causes of cardiac arrest.
- Take the participants through the reversible causes of cardiac arrest as in the **(Slides 409-412)**.
- Highlight the various classifications of cardiac arrest (shockable and non-shockable rhythms).
- With illustrations from the slide, discuss the shockable and non-shockable rhythms of cardiac arrest.

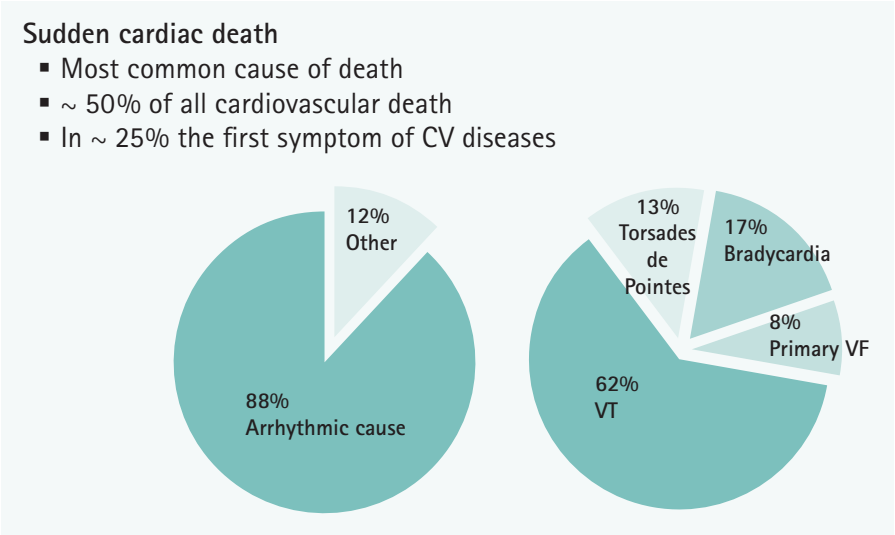


Figure 4: Causes of cardiac arrest and sudden cardiac death

CLINICAL PRESENTATION

- Ask the participants how a patient with cardiac arrest would present. Write these answers on the flip chart.
- Take the participants through the clinical presentation of cardiac arrest and causes as discussed in the **(Slides 415-416)**.

➔ **Key Note: Persons in cardiac arrest may be unconscious and may not have a palpable pulse.**

- The facilitator should emphasize on the urgency of initiating cardiopulmonary resuscitation (CPR) in patients with cardiac arrest.
- Ask the participants if any of them has been trained on the BLS/ACLS protocol.
- Ask the participants to share their experiences on the use of CPR to resuscitate patients and demonstrate how they went about it on the mannequins.
- Go through the CPR and defibrillation steps in the presentation **(Slides 417-426)**, as ACLS charts are distributed to the participants.

MANAGEMENT

LABORATORY INVESTIGATIONS

- Random blood sugar
- Full blood count.
- ECG

PHARMACOLOGIC TREATMENT

- Give oxygen if SPO2 is less than 92%.
- **Start BLS CPR protocol**

- Initiate CPR and defibrillation of shockable rhythm according to the ACLS protocol.

➔ **Refer to a physician specialist after Return of Spontaneous Circulation (ROSC).**

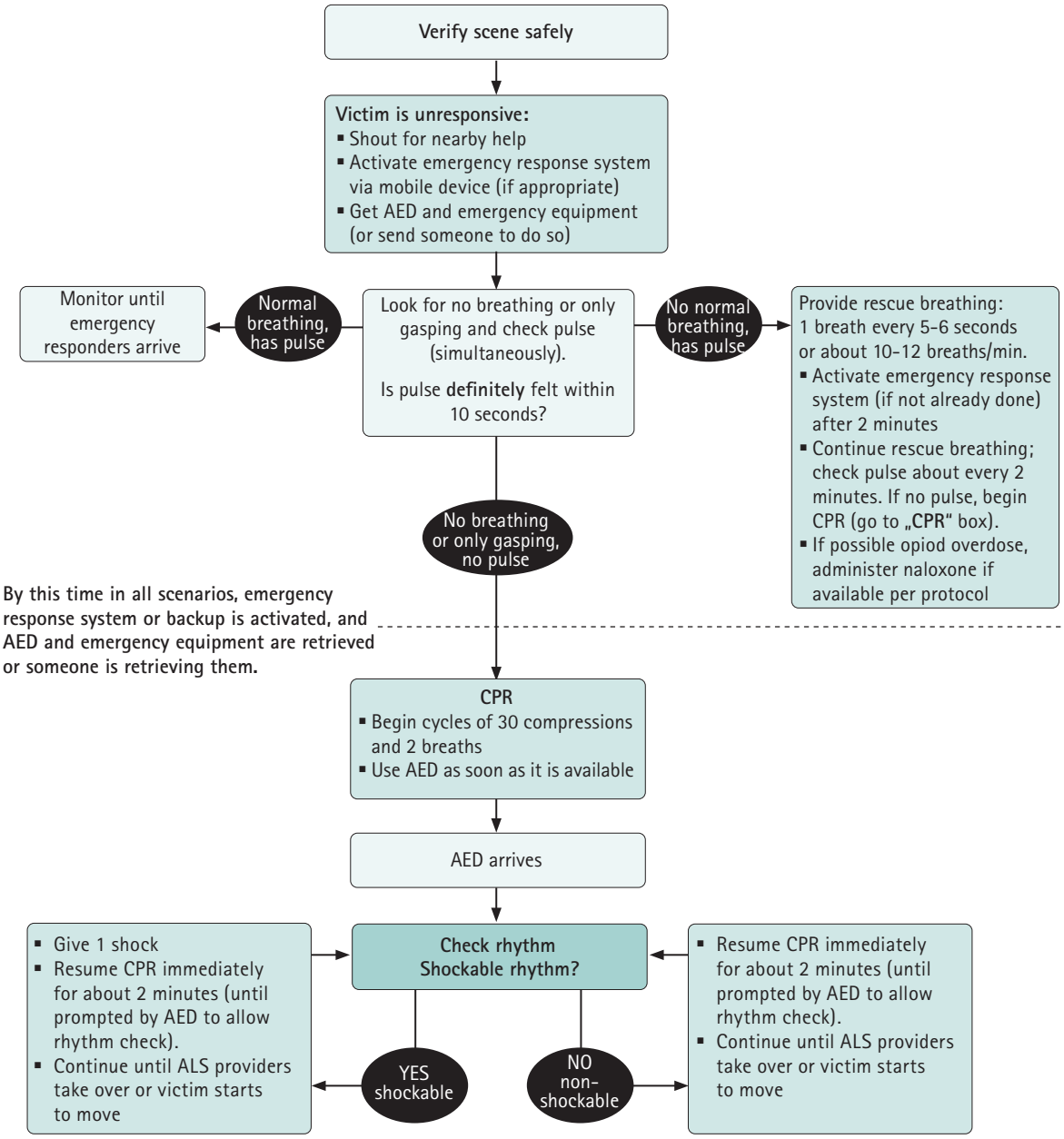


Figure 5: Basic Life Support (BLS) Algorithm

LABORATORY INVESTIGATIONS

- BC, RBS, BUE & Cr,
- ABGs, TFTs, LFT, ECG, Echo
- Chest X-ray, lipid profile when stable.

PHARMACOLOGIC TREATMENT

- Identify **reversible** causes of cardiac arrest and treat after ROSC.

The most common reversible causes of cardiac arrest are summarized below (5Ts and 5Hs):

5Hs

- Hypovolaemia
- Hypoxia
- Hydrogen ions (acidosis)
- Hypo-/hyperkalaemia
- Hypo-/hyperglycaemia

5Ts

- Tension pneumothorax
- Tamponade (cardiac)
- Toxins (including drugs)
- Thrombosis (pulmonary embolism)
- Thrombosis (ACS or MI)

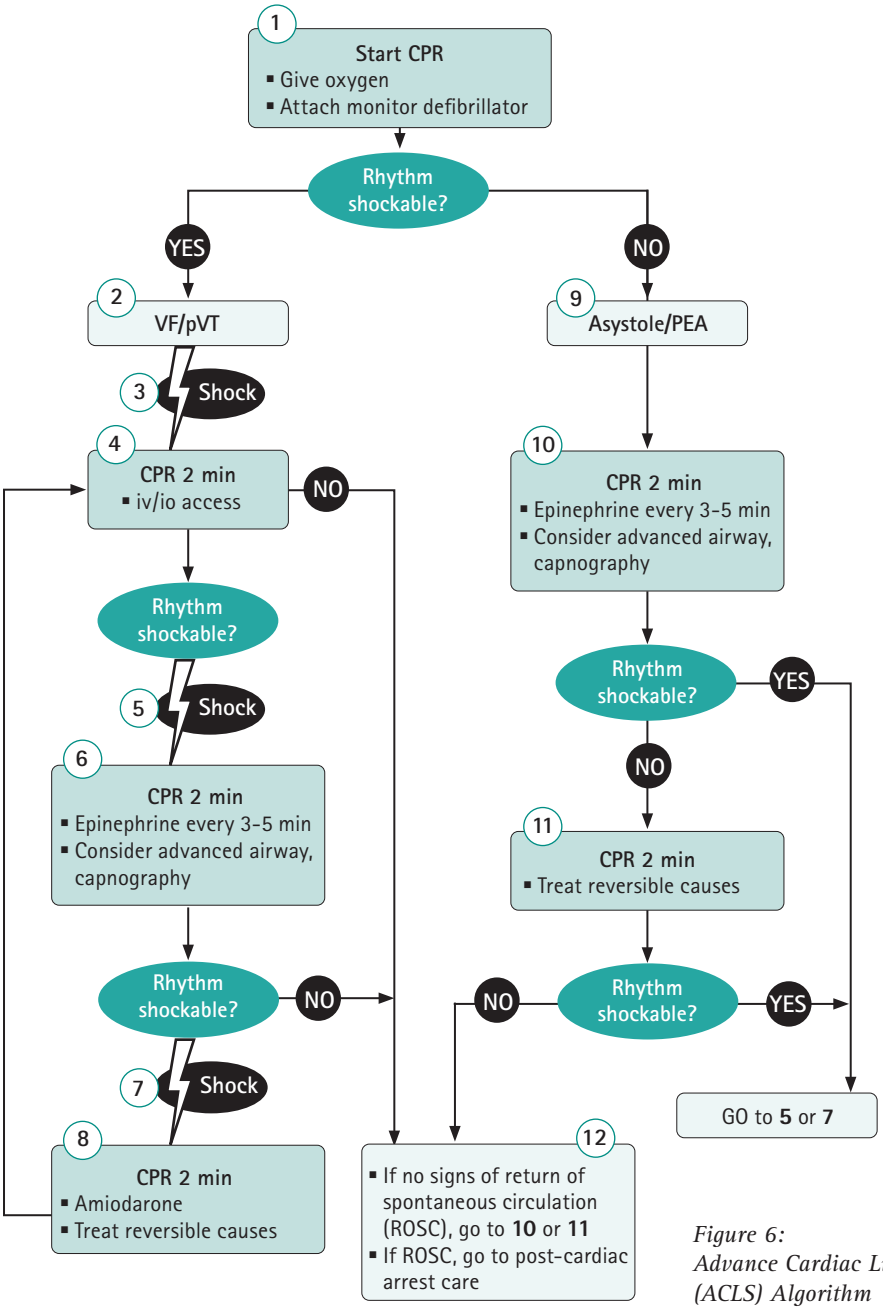


Figure 6: Advance Cardiac Life Support (ACLS) Algorithm

CASE SCENARIOS (30 MINUTES)

- Ask the participants to form groups of 5. Each group should work on one case scenario, write the answers of the questions on a flip chart and present them in the plenary.

CASE SCENARIO 18: CARDIAC ARREST

You are called to evaluate a one-month-old girl. She is on a cardiac monitor and pulse oximeter and has iv access. Alarms have been chiming (which is not unusual but the rhythm on the monitor is odd). Your initial impression is that the child is grunting and not breathing effectively. She is not responsive to sternal rub. There is a weak, slow pulse (~30 bpm).

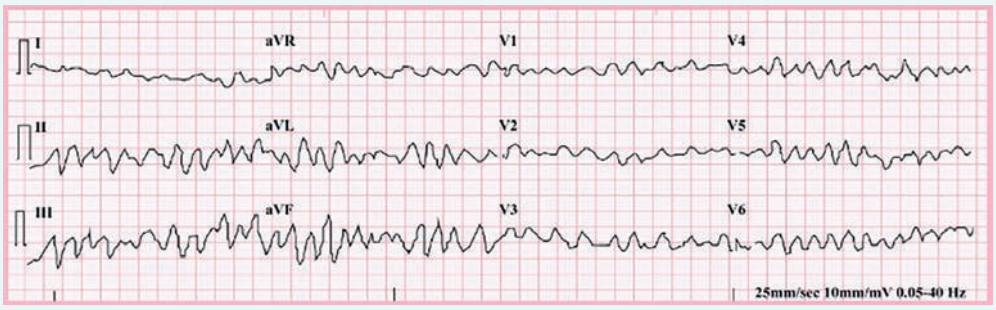
Which of the following is your first intervention?

a) Shout for help: active pediatric/neonatal code.
b) Start chest compressions.
c) Go to the patient's chart to read the child's past medical history.
d) Perform secondary assessment.

Answer:
Shout for help: active pediatric/neonatal code.

CASE SCENARIO 19: CARDIAC ARREST

A 54 year old man presents to the emergency room with chest pain and nausea. He is noted to be diaphoretic and appears uncomfortable. The nurse is taking his initial vitals when he suddenly becomes unresponsive. You see the following on the monitor:



1. What is the next best step?
2. You defibrillate the patient and he remains pulseless. What do you do next?

Answers:
1. You go through the following steps:

- **Begin effective CPR**
- **Call for help/AED**
- **Defibrillate**
- **Resume CPR**
- **Follow ACLS protocol, once ROSC is achieved, admit to ICU/HDU.**
- **Investigate for and manage inciting factors.**

2. After defibrillation, if the patient remains pulseless:
   - Resume CPR
   - Follow ACLS protocol, once ROSC is achieved, admit to ICU/HDU
   - Investigate for and manage inciting factors

CASE SCENARIO 20: CARDIAC ARREST

After initial defibrillation and round of CPR, a patient remains in ventricular tachycardia. You attempt defibrillation again and continue CPR.

What medication, other than epinephrine, can be administered next?

Answer:
- Atropine
- Amiodarone
- Adenosine
- Atenolol

CASE SCENARIOS (1 HOUR)

The facilitator should prepare the class to practice CPR according to BLS and ACLS protocol in groups on mannequins.

- Let the participants go into groups of five and a group leader be appointed.
- Each group will be assigned a mannequin.
- The group leader will read the instruction guide on how to conduct CPR.
- Each group member will take turns to conduct CPR on the mannequin.
- After each session, the group members will provide feedback to the person performing the CPR.

The facilitator will go around the groups during the session to provide feedback.

- Cardiac arrest is common and hence every team should be CPR-ready.
- Each group should rehearse protocols on daily basis to ensure the team and equipment are ready.
- Hypertension and acute coronary syndrome are the leading causes of cardiac arrest and should be prevented.

LIST OF TABLES

LIST OF FIGURES

MINISTRY OF HEALTH
REPUBLIC OF GHANA