COMPREHENSIVE PRIMARY HEALTH CARE PROGRAM (CPHC)

Curriculum of CPHC Training Program

Part – 1

Department of Health and Family Welfare Government of Kerala
Table of Contents

ACKNOWLEDGEMENT III
GLOSSARY OF TERMS IV
INTRODUCTION 1
CURRICULUM FOR CPHC TRAINING PROGRAMME 3
USING THE TRAINING MANUAL 5
CHEST PAIN 7
JOINT PAIN 12
HEADACHE 19
JAUNDICE 23
ACUTE DIARRHOEA 28
ACUTE RESPIRATORY INFECTIONS 34
HYPERTENSION 38
DIABETES MELLITUS 47
STROKE 59
CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) 64
BRONCHIAL ASTHMA 71
ACUTE POISONING 80
THYROID DISORDERS-HYPOTHYROIDISM AND HYPERTHYROIDISM 88
OPHTHALMOLOGY 96
TRAUMA AND BURNS 109
Acknowledgement

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## Glossary of Terms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AACE</td>
<td>American Association Of Clinical Endocrinologists</td>
</tr>
<tr>
<td>ABC</td>
<td>Airway Breathing Circulation</td>
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<tr>
<td>ABRS</td>
<td>Acute Bacterial Rhino sinusitis</td>
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<tr>
<td>ACE</td>
<td>Angiotensin Converting Enzyme</td>
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<tr>
<td>ACLS</td>
<td>Advanced Cardiac Life Support</td>
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<tr>
<td>ACS</td>
<td>Acute Coronary Syndrome</td>
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<tr>
<td>ACT</td>
<td>Artemisinin Combination Therapy</td>
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<tr>
<td>AIDS</td>
<td>Acquired Immunodeficiency Syndrome</td>
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<tr>
<td>AKI</td>
<td>Acute Kidney Injury</td>
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<tr>
<td>ALT</td>
<td>Alanine Aminotransferase</td>
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<tr>
<td>ANA</td>
<td>Anti Nuclear Antibody</td>
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<tr>
<td>ANCA</td>
<td>Anti-Neutrophil Cytoplasmic Antibody</td>
</tr>
<tr>
<td>ANTI TM Antibody</td>
<td>Anti Thyroid Microsomal Antibody</td>
</tr>
<tr>
<td>AOM</td>
<td>Acute Otitis Media</td>
</tr>
<tr>
<td>APD</td>
<td>Acid Peptic Disease</td>
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<tr>
<td>APH</td>
<td>Ante Partum Hemorrhage</td>
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<tr>
<td>ARB</td>
<td>Angiotensin Receptor Blocker</td>
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<tr>
<td>ARDS</td>
<td>Acute Respiratory Distress Syndrome</td>
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<tr>
<td>ARI</td>
<td>Acute Respiratory Infection</td>
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<tr>
<td>ASHA</td>
<td>Accredited Social Health Activist</td>
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<tr>
<td>ASO</td>
<td>Anti Streptolysin O</td>
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<tr>
<td>AST</td>
<td>Aspartate Amino Transferase</td>
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<tr>
<td>ATLS</td>
<td>Advanced Trauma Life Support</td>
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<tr>
<td>BUN</td>
<td>Blood Urea Nitrogen</td>
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<tr>
<td>CAD</td>
<td>Coronary Artery Disease</td>
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<td>CBC</td>
<td>Complete Blood Count</td>
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<tr>
<td>CBD</td>
<td>Common Bile Duct</td>
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<tr>
<td>CCB</td>
<td>Calcium Channel Blocker</td>
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<td>CCF</td>
<td>Congestive Cardiac Failure</td>
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<tr>
<td>CEA</td>
<td>Carcino Embryonic Antigen</td>
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<tr>
<td>CLD</td>
<td>Chronic Liver Disease</td>
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<tr>
<td>CNS</td>
<td>Central Nervous System</td>
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<td>COPD</td>
<td>Chronic Obstructive Pulmonary Disease</td>
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<tr>
<td>CPKMB</td>
<td>Creatine Phosphokinase – Mb Isoenzyme</td>
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<tr>
<td>CPM</td>
<td>Chlorpheniramine Maleate</td>
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<tr>
<td>CRS</td>
<td>Chronic Rhino Sinusitis</td>
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<tr>
<td>CVA</td>
<td>Cerebrovascular Accident</td>
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<tr>
<td>CVD</td>
<td>Cardiovascular Disease</td>
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<tr>
<td>CVS</td>
<td>Cardiovascular System</td>
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<tr>
<td>CXR</td>
<td>Chest X Ray</td>
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<td>DD</td>
<td>Differential Diagnosis</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>DHF</td>
<td>Dengue Hemorrhagic Fever</td>
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<td>DM</td>
<td>Diabetes Mellitus</td>
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<tr>
<td>DMARD</td>
<td>Disease Modifying Anti Rheumatic Drugs</td>
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<tr>
<td>DPI</td>
<td>Dry Powder Inhaler</td>
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<tr>
<td>DPP4</td>
<td>Dipeptidyl Peptidase 4</td>
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<tr>
<td>DSS</td>
<td>Dengue Shock Syndrome</td>
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<tr>
<td>DVT</td>
<td>Deep Vein Thrombosis</td>
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<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
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<tr>
<td>ECHO</td>
<td>Echocardiography</td>
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<tr>
<td>EIA</td>
<td>Enzyme Immuno Assay</td>
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<tr>
<td>ELISA</td>
<td>Enzyme Linked Immunosorbent Assay</td>
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<tr>
<td>ESR</td>
<td>Erythrocyte Sedimentation Rate</td>
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<td>FBS</td>
<td>Fasting Blood Sugar</td>
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<tr>
<td>FNAC</td>
<td>Fine Needle Aspiration Cytology</td>
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<tr>
<td>FOGSI</td>
<td>Federation Of Obstetric And Gynaecological Societies Of India</td>
</tr>
<tr>
<td>FUO</td>
<td>Fever Of Unknown Origin</td>
</tr>
<tr>
<td>G6PD</td>
<td>Glucose 6 Phosphate Dehydrogenase</td>
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<tr>
<td>GCS</td>
<td>Glasgow Coma Scale</td>
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<tr>
<td>GDM</td>
<td>Gestational Diabetes Mellitus</td>
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<tr>
<td>GERD</td>
<td>Gastroesophageal Reflux Disease</td>
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<tr>
<td>GOLD</td>
<td>Global Initiative For Chronic Obstructive Lung Disease</td>
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<tr>
<td>HAV</td>
<td>Hepatitis A Virus</td>
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<tr>
<td>HBSAG</td>
<td>Hepatitis B Surface Antigen</td>
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<tr>
<td>HCV</td>
<td>Hepatitis C Virus</td>
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<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<tr>
<td>INR</td>
<td>International Normalised Ratio</td>
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<tr>
<td>JNC</td>
<td>Joint National Committee</td>
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<tr>
<td>JPHN</td>
<td>Junior Public Health Nurse</td>
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<tr>
<td>JVP</td>
<td>Jugular Venous Pressure</td>
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<tr>
<td>LABA</td>
<td>Long Acting Beta 2 Agonist</td>
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<tr>
<td>LAMA</td>
<td>Long Acting Muscarinic Antagonist</td>
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<tr>
<td>LBBB</td>
<td>Left Bundle Branch Block</td>
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<tr>
<td>LDH</td>
<td>Lactate Dehydrogenase</td>
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<td>LSG</td>
<td>Local Self Government</td>
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<tr>
<td>MDI</td>
<td>Metered Dose Inhaler</td>
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<tr>
<td>MMSE</td>
<td>Mini Mental State Examination</td>
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<tr>
<td>MRI</td>
<td>Magnetic Resonance Imaging</td>
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<tr>
<td>MS</td>
<td>Mitral Stenosis</td>
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<tr>
<td>MVP</td>
<td>Mitral Valve Prolapse</td>
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<tr>
<td>NGO</td>
<td>Non Governmental Organisation</td>
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<tr>
<td>NICE</td>
<td>National Institute For Health And Care Excellence</td>
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<tr>
<td>NS1</td>
<td>Non Structural Protein 1</td>
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<tr>
<td>NSAID</td>
<td>Non Steroidal Anti Inflammatory Drug</td>
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NSTE MI  Non St Elevation Myocardial Infarction
NYHA  New York Heart Association
OGTT  Oral Glucose Tolerance Test
OHA  Oral Hypoglycemic Agent
ORS  Oral Rehydration Solution
OSAS  Obstructive Sleep Apnoea Syndrome
OSCE  Objective Structured Clinical Examination
OTC  Over The Counter
PCOD  Poly Cystic Ovarian Disease
PCV  Packed Cell Volume
PE  Pulmonary Embolism
PEFR  Peak Expiratory Flow Rate
PF HRP 2  Plasmodium Falciparum Histidine Rich Protein 2
PHC  Primary Health Centre
PND  Paroxysmal Nocturnal Dyspnoea
PPBS  Post Prandial Blood Sugar
PPH  Post Partum Haemorrhage
PPPG  Post Prandial Plasma Glucose
PT  Prothrombin Time
PTU  Propyl Thio Uracil
RA  Rheumatoid Arthritis
RBC  Red Blood Cell
RDT  Rapid Diagnostic Test
RFT  Renal Function Test
RL  Ringer Lactate
SABA  Short Acting Beta 2 Agonist
SBP  Systolic Blood Pressure
SIRS  Systemic Inflammatory Response Syndrome
SLE  Systemic Lupus Erythematosus
SNRI  Serotonin Nor Epinephrine Re Uptake Inhibitor
SSRI  Selective Serotonin Re Uptake Inhibitors
STEMI  St Elevation Myocardial Infarction
TBSA  Total Body Surface Area
TIA  Transient Ischemic Attack
TMT  Treadmill Test
TPO  Thyroid Peroxidase
TRSAB  Thyroid Receptor Stimulating Antibody
TSA  Thyroid Stimulating Antibody
TSH  Thyroid Stimulating Hormone
UA  Unstable Angina
UDCA  Ursodeoxycholic Acid
UPT  Urine Pregnancy Test
USG  Ultra Sonography
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>USS</td>
<td>Ultra Sound Scan</td>
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<tr>
<td>UTI</td>
<td>Urinary Tract Infection</td>
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<tr>
<td>VDRL</td>
<td>Venereal Disease Research Laboratory</td>
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<tr>
<td>WBC</td>
<td>White Blood Cell</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Introduction

The Comprehensive Primary Health Care (CPHC) program focuses on the Primary Health Care system of the State and aims at improvement in overall health of the community and individuals. The primary health care centres are acknowledged as the key component for implementing this comprehensive health strategy including curative, rehabilitative, preventive and health promotion aspects. Strengthening of the primary health care system is the most important step towards this whereby the primary health care doctor becomes the first contact point for the population. The primary health care doctor should act as the family doctor providing total family care. This family care doctor should possess the knowledge, skills and attitude to address the problems as the first contact personal. Then there should be a two directional communication between the primary health care and the District hospital/Medical college hospitals. To achieve this, quality training should be imparted to the primary care doctors, which will improve the confidence and competency of primary care providers. For this purpose a detailed curriculum with methodologies of training is needed.

Association of Physicians of India (API) is the largest academic organization of Physician's of India. API Kerala chapter was given the responsibility to prepare a training curriculum and modules to empower the primary health care doctors by Additional Chief Secretary, The Department of health and family welfare Govt. of Kerala, Sri Rajeev Sadanandan. As part of collaboration with the government, API Kerala chapter was very happy to be a participant to fulfill the long felt need of empowering primary care medical officers (PCMO) and has made an attempt to make the training modules. After discussions held by the Additional Chief Secretary, the first step was to identify the areas in which the training is needed. During the meetings organized by SHSRC, the medical officers of primary health centers and physicians of secondary health care who were part of API identified the different areas in which modules are required. Then the formats for the modules are finalized and the members of API with the support and constant guidance from our patrons Prof. K.V. Krishnadas and Prof. K.P. Poulose prepared the various modules. During preparation of modules the current guidelines and the standard best practices have been looked into and incorporated. Members from other associations like KFOG, associations of ENT surgeons, Ophthalmologists, Dermatologists, Dental department, Surgery and mental health departments have helped in forming the modules pertaining to their discipline. The valuable inputs received from the primary health care doctors were very helpful in designing the modules. The effort done by SHSRC in coordinating the activities was commendable. The modules were peer reviewed by the members and finalized. This is the first ever attempt made by API Kerala chapter in preparing the curriculum and training modules. There could be lot of inadequacies in the modules which could be refined by further peer reviews. This could also be improved upon with the feed backs.
after the field testing. The API Kerala chapter immensely thanks the Government of Kerala for giving us the opportunity to be part of the noble cause.

This first draft of the modules needs to be field tested and further reviewed. The feedback from the trainers and participants could be incorporated to refine and finalize this. For the training, there should be course coordinator and facilitators who should be familiar with the overall content and details of specific modules. Facilitators should also have the technical competencies to conduct the training. A pre training orientation session should be done for all members of the core team. The training of trainers (TOT) from each district could be done by members of the core team and these trainers could train the primary health care doctors of the districts.

Skill development is an important part of this training. Practical sessions and clinical case discussions should be conducted for this at teaching hospitals or general hospitals. There should be a constant communication between the primary care and the secondary/tertiary care institutions for the success of this program.

Dr. Suma T.K.
President, API Kerala

Dr. Chandni R.
Secretary, API Kerala
Curriculum for CPHC training programme

Need for a CPHC training manual

The Department of Health and Family welfare, Government of Kerala envisages having a comprehensive primary health care programme to improve upon the health care and health status of the community and individuals. Strengthening of the primary health care system is the most important step towards this goal. Here, the primary healthcare doctor becomes the first contact point for the population and he or she should act as the family doctor providing total family care. In order to improve upon the knowledge, skill and attitude of the primary care doctors to address the common problems of the population, training is needed. For this training, this curriculum is designed, incorporating the common health issues and problems encountered by the health care personnel in the primary health care setting. The training for primary care doctors across the state should be uniform and should be according to a centralized curriculum which should be followed by the trainers imparting training to the primary care doctors.

Goal

The community health care provider should be able to diagnose common clinical conditions and manage patients as per modern standard guidelines.

Competencies to be developed

1. **Knowledge:** The doctor at the primary health centre should have adequate knowledge of the common diseases encountered, should recognize patterns of common diseases, plan necessary investigations and manage common problems effectively. They should be able to integrate peripheral centre with referral centres and tertiary care centres.

2. **Skills:** The doctor should be able to demonstrate skills required for basic life support, first aid, appropriate clinical diagnosis, early identification of complications and documentation.

3. **Communication and attitude:** The doctors should demonstrate skills in communicating bad news, to counsel patients regarding illness, options of treatment, to comfort and to console them. They should demonstrate counseling skills for the timely referral of patients.

Objectives

The learner shall be able to:

1. Recognize the symptoms and signs related to common diseases enlisted
2. Generate common differential diagnosis
3. Decide on appropriate and required investigations
4. Have knowledge of the guidelines available for each disease
5. Know the basic management principles as enlisted in the modules
6. Recognize red flag signs, and refer patients for higher care
7. Show basic skills in clinical diagnosis, first aid and basic life support
8. Demonstrate communication skills about breaking bad news and discussing the treatment options
9. Demonstrate skills of counseling regarding end of life care
10. Demonstrate skills of counseling for referral

Details of training: The duration of the training will be 60 + 20 hours (knowledge + skill)

No of sessions: 8-10, including skills training (to be conducted as sessions at medical colleges/general hospitals)

Methodology: Contact sessions at district or zonal level, being conducted by trainers from health care sector

Training methodology: List of diseases and modules prepared for each of them

Assessment methods:

1) At end of each module, formative assessment as planned.
2) At the end of the total course, summative assessment will be conducted.
Using the training manual

This curriculum and training module contains 24 different modules pertaining to different symptom groups and diseases usually come across in primary health care sector. The module is meant for the trainers who will be imparting knowledge (cognitive domain), skills (psychomotor) and communication and attitude (affective) to the primary health care medical officers. Before the training the trainers must be familiar with the competencies to be achieved by the trainee, and also the objectives, content and details of specific modules. Trainers (facilitators) should also have the technical competence to conduct the training.

Target audience

Faculty

A course coordinator and facilitators are to be selected from those who are involved with the development of modules (from API and other organizations involved - Core team). Persons who have good knowledge and skills (psychomotor and communication) who can efficiently train the primary care doctors could be considered as faculty.

Participants

Participants are the medical officers posted in the primary health centres under Department of Health and Family welfare, Government of Kerala.

Approach to training

The manual guides the faculty on how each topic should be introduced to the participants. Each chapter contains a module for training on a symptom complex/disease with its own goals, objectives and competencies to be achieved. For ease of learning, each module is further subdivided into sessions to achieve the required competencies. The sessions include presentations, exercises like discussion of case scenarios and question & answer sessions. The manual seeks to facilitate an interactive approach to learning whereby concepts introduced in presentations and readings are reinforced so that they can be effectively applied in clinical practice.

For the skill development clinical case discussions, demonstration of findings, hands on training on certain procedures are to be done. A schedule should be made for the clinical training in medical colleges/general hospitals in continuation with the training of the modules. Communication skills like how to break a bad news, counseling the patient to be referred to another center could also be done in these sessions. Another important requirement is to know how a proper reference letter to be drafted and also to advise patients on further follow up once they come back after treatment from the secondary/tertiary care centers. There should be a two-way communication between the primary care and the higher levels so that the patients are optimally
benefitted. The trainers also should be trained on to provide proper feedback to the PHC doctors.

Assessment should be done for the participants and also for the facilitators. For participants, there could be pre-test at the beginning of the training and post-test at the completion of all modules. For each module assessment should be done as specified. The facilitators should be monitored for the delivery content of the modules so that there will be uniformity as well as adherence to the module.

**Teaching the manual**

A course coordinator and facilitators selected (core team) could start the training programme as per schedule. Initially, a group of prospective trainers (from District level medical officers/ medical colleges) could be selected and trained by the core group. Then, a group of learners from the primary health care could be selected and they should be trained by the previously trained trainers/members of the core team. Feedback should be obtained from both the groups. Subsequently; different groups of learners from the primary health care level can be trained in different sessions.

**Field testing and further improvement of the manual**

Specific feedback forms and evaluation forms could be used to find out the usefulness of training, inadequacies and scope for improvement. Feedbacks and other remarks can be obtained from the trainers as well as the trainees. The training could be supervised; monitored and or necessary inputs could be given by the core group.
Chest Pain

Goal
All Primary care doctors should be able to appropriately assess and give preliminary treatment for a patient who complains of chest pain.

Competencies
Primary care doctors should be able to
1. Differentiate cardiac chest pain from non-cardiac chest pain and differentiate between life threatening and non life threatening causes.
2. Do investigation and interpret the results to differentiate the causes of chest pain.
3. Administer the initial management before the referral to higher centre

Module outline
1. Common causes of chest pain
2. Common symptoms of acute coronary syndrome
3. Symptoms of Other Types of Chest Pain
4. Clinical assessment of the patient
5. Redflag signs for early referral

Time requirements: 60 mins (Presentation 20 mins & Exercises 40 mins)

Competency 1
Primary care doctors should be able to recognize chest pain of cardiac and non-cardiac cause and to differentiate between life threatening from non-life threatening causes.

Session objectives: At the end of the session the learner should be able to
1. To identify the common causes of chest pain
2. Differentiate life threatening versus non-life threatening causes of chest pain

Time requirement: 30 mins (Brain storming: 10 mins & presentation 20 mins)

Content:
Chest pain is a common complaint among patients in outpatient departments and hospital wards. Due to its association with the Acute Coronary Syndrome (ACS) and several other life threatening diseases, it is essential to recognize the qualifying symptoms of chest pain that make it more typical of life threatening diseases than of those which are not life threatening

Common life threatening causes of chest pain
- Acute coronary syndrome
- Tension pneumothorax
- Dissecting aortic aneurysm
- Pulmonary embolism
- Pericarditis
- Esophageal rupture
Common causes of chest pain which typically non-life are threatening

- Pleurisy
- Musculoskeletal pains
- Gastroesophageal reflux disease
- Esophageal spasm
- Peptic ulcer disease
- Herpes zoster in thoracic dermatome
- Psychogenic chest pain

Symptoms of Acute Coronary Syndrome

- Location of chest pain – substernal / epigastric, or any vague poorly localized chest pain.
- Anger animi- the sense of being in the act of dying.
- Aggravated by exertion
- Relieved by rest or sub lingual nitrate
- Quality – vary considerably
- Persistent pain suggest acute myocardial infarction
- Radiation: to neck, jaw, either arm
- Associated symptoms: Dyspnea, sweating, Palpitation, Dizziness, Nausea, vomiting

Symptoms of Other Types of Chest Pain

**Dissecting Aortic Aneurysm:**
Sudden onset severe chest pain with a tearing or rippling quality with radiation to back, may be associated with syncope. Asymmetrical pulse, Interarm blood pressure difference > 20mm Hg.

**Pericarditis:**
Associated viral syndrome common, central or left sided chest pain, radiating to one or both shoulders, relieved by leaning forward.

**Pulmonary Embolism:**
Sharp, pleuritic, sudden onset chest pain, dyspnea, tachypnea, tachycardia.

**Pneumothorax:**
Spontaneous vs. traumatic, associated dyspnea, pleuritic pain.

**Musculoskeletal Pain:**
Associated with trauma, localized, may be worsened by movements with local tenderness.

**Esophageal Spasm:** Sudden onset non cardiac but relieved by nitrate aggravated by hot & spicy foods.

**GERD:**
Burning sensation, sour taste in mouth, aggravated by lying flat, spicy foods.

**APD:**
Relieved by food or antacids
Clinical assessment of the patient

To determine if the patient is having a life threatening cause of chest pain or any of the non-life threatening causes the following history should be asked for

1. Who is the patient? How old is the patient? Do they have known CAD or prior DVT/PE? What symptoms do they have? Is there any history of trauma?

2. Do they have any risk factors for coronary artery disease?
   Male >55yrs, Female >65yrs, diabetes, smoking history, hyperlipidemia, hypertension, family history of Coronary Artery Disease (CAD in 1st degree relative (Male <50yrs, Female <60yrs)

Physical Examination

**Vital Signs:** Are they clinically stable? Are they having tachycardia, hypotension/hypertension, tachypneic, hypoxic? Patient may be normal on examination. Look for peripheral pulses, Blood pressure in all four limbs; differences may suggest dissection or occlusion. Elevated JVP, third or fourth heart sounds, crackles in lungs, symmetric leg edema. Position of trachea, Crackles/dullness/changes in vocal fremitus (pneumonia or effusion). Tracheal shift, tympaniticpercussion note and decreased breath sounds (pneumothorax)

Normal physical examination does not exclude an ischemic cardiac chest pain

Competency 2

Primary care doctors should be able to do the investigation and interpret the results to differentiate the causes of chest pain.

Session objectives: At the end of the session the learner shall be able to

1. To decide on when to investigate and what necessary investigations to carry out.
2. To know how to interpret the investigation to differentiate the causes of chest pain.

Time requirements: **Total time 10 mins** (Discussion 10 mins)

Content:

**Investigations (wherever available**

a) The first step is to evaluate cardiac causes of chest pain with an ECG. Do they have an abnormal ECG? Rate, rhythm, intervals, ischemic changes (ST depression/inverted T waves), evidence of prior myocardial infarction (Q waves), new onset LBBB, or ST elevation

Normal ECG does not exclude acute myocardial infarction.

b) The second step is to evaluate pulmonary causes of chest pain with a chest radiograph.
Chest Radiograph may be done if available to rule out pulmonary causes.
Competency 3
Primary care doctor should be able to administer the initial management before referral to higher centre.

Session objectives: At the end of the session the learner shall be able to
1. Identify the red flag signs for early referral.
2. Initiate the immediate management before referral.

Time requirements: Total time 10 mins (Case based discussion 10 mins)

Case 1
65 years old male, presents to you at 08. 30 AM. He gives history of chest pain previous night, at around 2 am which woke him from his sleep and lasted about 20–25 minutes. Patient had sweating during the pain. He did not want to bother anyone so he rested and the pain eased. He reports that it was intolerable pain and therefore wanted to meet the doctor today. He is currently not having any pain, although he feels quite tired. He has been a smoker for 40 years. On average, he smokes around 10 cigarettes a day. He is diabetic for last 7 years on OHA. He has no past medical history of chest pain, ischemic heart disease or heart failure.

Question 1: As the primary care doctor should you suspect acute coronary syndrome (ACS)? If so, why?
Question 2: What immediate management should you offer?
Question 3: You do not have an ECG machine at your centre, Should you refer him to higher centre? If so, how urgently?

Case 2
35 year old male presents with a history of new-onset, upper-left-sided chest pain after heavy gardening. The pain does not radiate and there are no other symptoms. The pain is almost constant, is worse when he moves his left arm and is reduced a little with paracetamol and non-steroidal anti-inflammatory drugs.

Question 1: As the primary care doctor should you suspect acute coronary syndrome (ACS)? If so, why?
Question 2: What immediate management should you offer?

Red flag signs for early referral
1. Chest pain with fear of impending death
2. Chest pain with ECG changes
3. Chest pain with risk factors (if ECG not available).
4. Patient having features of pulmonary oedema.
5. Patient in hypotension, tachycardia, bradycardia, irregular pulse, asymmetry of pulse.
6. Patient having hypoxia [spo2<90%].
7. Patient having features of pneumothorax/ Aortic dissection.
Initial management before referral
1. ACS
   a) Aspirin 300 mg orally (to be chewed by patient)
b) Clopidogrel 300mg stat

c) Atorvastatin 40 mg stat

d) Sublingual nitrate (if no hypotension)

e) Oxygen via nasal cannula

**Immediate referral is of utmost important; delay in referral badly affects the outcome. Follow up** – Please refer the section on CAD

**2. Pneumothorax**

a) Oxygen at high flow (>28%) to maintain a saturation of >92%,

b) If tension pneumothorax is present, the patient requires immediate intervention with large bore needle at anterior second intercostal space in the midclavicular line to the pleural space, which must be left in place until a thoracostomy tube is placed.

**3. Dissecting Aortic Aneurysm**

Large bore IV cannula to be placed and refer the patient immediately to the higher centre.

**Assessment (5 MCQs): time 10 minutes**

1. Which of the following is a non life threatening cause of chest pain?
   a) Acute coronary syndrome   b) Tension pneumothorax
   c) Aortic dissection         d) Esophageal spasm

2. Which of the following is a red flag sign in chest pain for early referral?
   a) Typical chest pain with ECG changes   b) Typical chest pain with risk factors
   c) Patient having features of pulmonary oedema   d) all of the above

3) All are features of pericarditis EXCEPT?
   a) Associated with viral syndrome   b) Pain radiating to one or both shoulders
   c) Pain relieved on leaning forward   d) Pain aggravated by food intake

4) Which of the following is NOT a typical feature of aortic dissection?
   a) Tearing or rippling quality of pain   b) Radiation to arm
   c) Asymmetrical pulse               d) Inter arm blood pressure difference>20mm Hg.

5) Anger animi is described in
   a) Acute coronary syndrome   b) COPD
c) Bronchial asthma               d) Pneumonia

**Answers: 1) d 2) d 3) d 4) b 5) a**
Joint Pain

Goal
All primary care physicians must be able to diagnose and manage common musculoskeletal diseases.

Competencies
All primary care doctors
1. Should be able to recognize arthritis and non arthritic conditions (symptoms, signs, diagnosis and differential diagnosis)
2. Able to manage common arthritis and related diseases.
3. Identify the red flag signs for early referral.

Module outline
1) Differentiating arthritis from arthralgia
2) Differentiating Inflammatory arthritis from non inflammatory arthritis
3) Clinical pattern recognition in arthritis
4) Investigations in arthritis
5) Management of arthritis
6) Red flag signs in arthritis

Time requirements: 90 minutes (Presentation 60 minutes & exercises 30 minutes)

Competency 1
Primary care doctor should be able to recognize arthritis from non arthritic conditions (Symptoms, signs, diagnosis and differential diagnosis)

Objectives: At the end of the session primary care doctor should be able to
1. Enlist the common musculoskeletal problems encountering at the PHC level.
2. Differentiate clinically arthritis from arthralgia
3. To arrive at a diagnosis by clinical pattern recognition

Time requirements: 30 minutes (Brainstorming: 10 minutes & Podium power point presentation 20 minutes)

Content
40% of all consultations to primary care practitioners are for musculoskeletal symptoms, which, in the majority of cases, are for self-limiting soft tissue rheumatism. Furthermore, the commonest cause of physical disability in the elderly is osteoarthritis (OA).

The important points to differentiate arthritis from other joint related symptoms

<table>
<thead>
<tr>
<th>Localisation of pathology based on joint range of motion</th>
<th>Joint range of motion (ROM)</th>
<th>Joint range of motion (ROM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referred pain</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Peri-articular</td>
<td>Decreased</td>
<td>Normal</td>
</tr>
<tr>
<td>Intra-articular</td>
<td>Decreased</td>
<td>Decreased</td>
</tr>
</tbody>
</table>
After confirming it as a joint pain, the following 3 broad categories of joint disease must be differentiated clinically (Table 2).
- Inflammatory arthritis (e.g., Rheumatic arthritis, Rheumatoid arthritis)
- Non-inflammatory arthritis (e.g., Osteoarthritis)
- Arthralgia (e.g., fever with arthralgia – viral fever)

**Table 2**

<table>
<thead>
<tr>
<th></th>
<th>Inflammatory arthritis</th>
<th>Non-inflammatory arthritis</th>
<th>Arthralgia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain at rest</td>
<td>√</td>
<td>NO</td>
<td>Variable</td>
</tr>
<tr>
<td>Pain with motion</td>
<td>√</td>
<td>YES</td>
<td>Variable</td>
</tr>
<tr>
<td>Morning Stiffness</td>
<td>√ &gt;30 mts</td>
<td>±&lt; 30 mts</td>
<td>Absent</td>
</tr>
<tr>
<td>Signs of inflammation</td>
<td>√</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>synovial hypertrophy</td>
<td>√</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Joint deformity</td>
<td>√</td>
<td>Not common</td>
<td>Absent</td>
</tr>
<tr>
<td>Fatigue</td>
<td>afternoon or early evening</td>
<td>Absent</td>
<td>upon arising in the morning if psychogenic</td>
</tr>
</tbody>
</table>

Monoarthritis - 1 joint
Oligoarthritis - 2–4 joints
Polyarthritis - ≥ 5 joints

Medical causes of generalized musculoskeletal pain
- Rheumatic
- Fibromyalgia syndrome
- Primary hypermobility syndrome
- Polymyalgia rheumatic
- Hypothyroidism
- Osteomalacia
- Hyperparathyroidism
- Always rule out history of trauma

**Osteoarthritis**

It is the commonest cause for a clinic visit at PHCs. Degeneration of the articular cartilage is the principal pathologic feature of osteoarthritis. It predominately affects the weight bearing joints usually knee joints and pain worsened by activity. There are both local and host factors that predispose to Osteoarthritis.

- **Local factors like** Previous joint trauma
- **Host factors** - Obesity & Occupation (Prolonged standing)

**Clinical pattern recognition**

This is the single best way to diagnose an arthritic syndrome

**History is the best tool here**

**Duration**
- Acute versus chronic
- acute (< 6 weeks in duration) or chronic (> 6 weeks)
Pattern
- Additive
- Intermittent
- Migratory arthritis,
- Persistent

**Competency 2**
All primary care doctors should be able to manage common arthritis and related diseases.

**Objectives:** All primary care doctors should be able to
1. Do the preliminary investigation to plan the management and need for referral.
2. Give the initial treatment.
3. Recognize the red flag signs for early referral.
4. Follow up of arthritis patients.

**Time requirements:** Interactive session 30mts

**Case scenario - Case 1**
56 year old head load worker comes with left knee joint pain. On examination his knee is tense but he denies fever. He has helped in lifting bricks for his daughter’s house construction. He denies any trauma. He had these pains on days of over work for last 2 years and getting relieved on taking rest.
1. What is the possible diagnosis?
2. Do you want to investigate this patient?
3. What will you advise this patient (on life style and medication)?

**Case 2**
34 year lady comes with symmetrical polyarthritis of 3 years. She has morning stiffness lasting more than 30mts. She has no oral ulcers or facial rash. She had symptom relief during last pregnancy, but promptly recurred after delivery.
1. What is the possible diagnosis?
2. What minimum investigation you want to do for confirming your diagnosis?
3. Describe the management?

1. Able to investigate common arthritis syndromes.
   (each group will discuss one case)
   What is minimum needed
   Fallacies in investigation
   The discussion should be focusing the PHC services.

**Content**

**Blood investigations**
- The full blood count is a useful screening test.
- Anaemia is common, mostly due to anaemia of chronic disorders, but can also result from iron deficiency secondary to NSAID drug induced peptic ulcer disease,
- Leucocytosis is a feature of septic arthritis, acute gout and juvenile arthritis.
Leucopaenia, and especially lymphopaenia, in a patient presenting with polyarthritis, is very suggestive of SLE. Note that Felty’s syndrome, characterized by neutropaenia, is a long-term complication of poorly-controlled RA and therefore not seen in early RA.

Reactive thrombocytosis is common with active chronic inflammatory arthritis, like RA and juvenile idiopathic arthritis. Thrombocytopenia can be a presenting feature of SLE.

An acute phase response, with elevation of ESR. Screening for rheumatoid factor and antinuclear antibodies (ANA) is indicated in the patient presenting with polyarthritis, the latter test being especially useful when there are associated connective tissue disease symptoms. This is neither 100% sensitive or specific and should never be the sole basis on which a diagnosis of a systemic rheumatic disease is made.

Hyperuricaemia is a feature of gout, 40% of patients have a normal serum uric acid level during an acute attack of gout. Conversely, hyperuricaemia is common in hypertension, obesity and the elderly of whom only a small proportion may have gout. Hence, hyperuricaemia is significant in patients presenting with a typical acute arthritis or tophaceous gout.

2. What to prescribe and what not to prescribe

- **Bust Myth of NSAIDS - Dos and Don’ts**
- Steroids – When and how
- DMARDS - when to prescribe
- Biologics - What you should know

**Which NSAID is right?**
The most important factors to consider when choosing an NSAID is how well it works, its availability, the potential side effects of the product, for how long to continue, and the price. NSAIDs may increase the risk of heart attack, stroke, and high blood pressure. Caution is advised in:

- Kidney disease
- CLD
- CCF
- Stroke
- High blood pressure
- NSAIDs may increase the risk of ulcer or bleeding from the stomach or intestines.
- Pregnancy

<table>
<thead>
<tr>
<th>NSAID</th>
<th>Dose</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diclofenac</td>
<td>50-150 mg</td>
<td>3</td>
</tr>
<tr>
<td>Ibuprofen</td>
<td>200-1200 mg</td>
<td>3</td>
</tr>
<tr>
<td>Meloxicam</td>
<td>15-30 mg</td>
<td>1</td>
</tr>
<tr>
<td>Naproxen</td>
<td>250-750 mg</td>
<td>3</td>
</tr>
<tr>
<td>Etoricoxib</td>
<td>60-120 mg</td>
<td>1</td>
</tr>
<tr>
<td>Piroxicam</td>
<td>20-40 mg</td>
<td>1</td>
</tr>
</tbody>
</table>
Do and don’ts in NSAID use
- Choose your patient wisely
- Adequate dose and frequency is paramount
- Choose a drug you are familiar with
- Use anti ulcer treatment in indicated cases
- Do not change drugs unnecessarily
- Enquire common adverse effects

Disease-modifying antirheumatic drugs (DMARDs) is a category of otherwise unrelated drugs defined by their use in rheumatology to slow down disease progression

<table>
<thead>
<tr>
<th>Name</th>
<th>Dosage</th>
<th>Administration</th>
<th>Adverse effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfasalazine</td>
<td>500-2000mg</td>
<td>Once or twice a day</td>
<td>Sulfa allergy gastritis</td>
</tr>
<tr>
<td>Hydroxychloroquine</td>
<td>200-400mg</td>
<td>Once or twice a day</td>
<td>Retinopathy</td>
</tr>
<tr>
<td>Azathioprine</td>
<td>50-150mg</td>
<td>Once or twice a day</td>
<td>Immunosuppression Jaundice</td>
</tr>
</tbody>
</table>

Steroids – When and how?
Corticosteroids can improve the symptoms of patients with rheumatic diseases. They may also have a disease-modifying effect. They are not first-line treatment. Adverse effects are related to the dose and duration of treatment. Corticosteroids have a wide range of biological activities including anti-inflammatory and immunosuppressive effects. They have major effects on leucocyte movement and, to a lesser extent, on leucocyte function. In general, they have greater effects on cellular than humoral processes. They inhibit the production of arachidonic acid metabolites, e.g. prostaglandins and leukotrienes, as well as that of certain cytokines e.g. interleukin 1.

Adverse effects associated with corticosteroid use
Corticosteroid therapy has many possible complications. More common adverse effects with long-term use include:
- Weight gain and cushingoid features e.g. moon face
- Hirsutism
- Skin atrophy
- Bruising
- Posterior subcapsular cataract
- Mood changes
- Osteoporosis

Some of the adverse effects are more serious and may require monitoring:
- Elevation of blood glucose level, especially if the patient is a diabetic
- Hypertension
- Increased susceptibility to infection
- Avascular necrosis of bone

Practical prescribing tips
Withdrawal of corticosteroids
- Start steroids only after arriving a proper diagnosis
Use the lowest possible dose
Use once a day
When there is an infection or other stressful condition, while on steroids, the dose of steroids may need to be increased
Consider bone conserving therapies in appropriate
Patients treated with long-term moderate or low doses of corticosteroids should have their corticosteroid dose reduced and withdrawn slowly. The reasons for this are to:

Allow time for the HPA axis to recover as it can be suppressed by only 3 weeks of systemic treatment
Reduce the likelihood of relapse of the underlying condition being treated, particularly symptomatic inflammatory disease e.g. RA
Avoid the `corticosteroid withdrawal syndrome

<table>
<thead>
<tr>
<th>Table 5 - Corticosteroid equivalence chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocortisone</td>
</tr>
<tr>
<td>Prednisolone</td>
</tr>
<tr>
<td>Dexamethasone</td>
</tr>
<tr>
<td>Methyl prednisolone</td>
</tr>
</tbody>
</table>

**Biological - What you should know**

In management of inflammatory arthritis a new class of drugs called Biologicals is being used. These are large complex protein molecules designed to block aspects of the immune system e.g. Infliximab, Rituximab, Etanacept, Adalimumab. In our practice we may see some patients being treated with these drugs coming on follow up or with some other illness. Biologics are expensive and therefore only used in severe disease after other more traditional drugs have not worked or are not tolerated. These people are prone to develop reactivation of latent Tuberculosis.

**The red flag signs in arthritis.**

- Persisting Night pain
- Extra-articular manifestations
- Altered mentation
- Persisting fever
- Toxic patient
- Tachypnoea
- Hypotension
- Recent care giver dependence
- Red eye
- Oral and nasal ulcerations
- Malar erythema
- Photosensitive rash
- Raynaud's phenomenon
- Pregnancy in a previously diagnosed SLE / RA
Follow up of arthritis patient
Always assess symptom response.
Ask positively for adverse events to drugs.
Ask for drug interaction especially in elderly and people with comorbidities
Ask for new symptoms (as autoimmune disorders are known to have new symptoms and signs later on in course of illness)
10 minute power point presentation

Assessment – 5 MCQs
1) A 22-year-old male develops the insidious onset of low back pain improved with exercise and worsened by rest. There is no history of diarrhea, conjunctivitis, urethritis, eye problems, or nail changes. On examination, the patient has loss of mobility with respect to lumbar flexion and extension. He has a kyphotic posture. What is the likely diagnosis?
   a) Osteoarthritis spine  
   b) Fracture lumbar spine  
   c) Spondyloarthritis  
   d) SLE
2) A 20-year-old woman has developed low-grade fever, a malar rash, and arthralgias of the hands over several months. What is your clinical diagnosis?
   a) Malingering  
   b) Leukemia  
   c) Gout  
   d) SLE
3) Which of the following test is useful in follow up of an inflammatory arthritis?
   a) ESR  
   b) ANA titre  
   c) ASO titre  
   d) X-ray of affected joint
4) A 25-year-old male complains of arthritis and eye irritation. He has a history of burning on urination 2 weeks back. On exam, there is a joint effusion of the right knee and dermatitis of the glans penis. Which of the following is the most likely diagnosis?
   a) Reactive arthritis  
   b) Septic arthritis  
   c) Osteoarthritis  
   d) AIDS
5) A patient with rheumatoid arthritis asks whether he can exercise
   a) Forbid him  
   b) Encourage him  
   c) Warn him about fracture risk  
   d) Sparingly he can

Answers
1) c  2)d  3) a  4) a  5) b
Headache

Goal
The primary care doctor should be able to differentiate between various causes of headache, identify the common causes, identify the red flag signs and prompt referral and manage a case of headache

Competencies

Primary care doctor should be able to
1. Differentiate between various types of headache and identify the common causes of headache
2. Manage a case of headache

Module outline
1. Common causes of headache.
2. Clinical differentiation of various types of headache.

Time requirement
Total time 60 minutes (Presentation 30 minutes & exercises 30 minutes)

Competency 1
Should be able to differentiate between various types of headache and identify the common causes (Symptoms, Signs, Diagnosis and Differential Diagnosis)

Session objectives: at the end of the training session, the participant should be able
a) To identify the symptoms of Typical primary headaches
b) When to consider a dangerous etiology for headache

Time requirement: 30 minutes (Podium presentation 10 minutes & case discussion 20 minutes)

Content
Identification of common causes of primary headache and various types of secondary headache.

Some important differential diagnosis which should not be missed if a patient comes to the ED with headache (secondary headaches)

1. Meningitis
   Acute severe headache, fever and neck stiffness. Associated vomiting and photophobia should not be mistaken as migraine. Lumbar puncture and immediate treatment mandatory

2. Intracranial haemorrhage
Acute severe headache (thunderclap headache, once worst headache of lifetime etc) sometimes with neck stiffness (if Subarachnoid haemorrhage present). An emergency imaging (CT or MRI of brain) warranted.

3. **Brain tumours**

Sleep disturbance, vomiting preceding headache by weeks, abrupt headache after bending lifting or coughing, headache arising in a patient with known malignancy and headache on awakening from sleep may give a clue for investigating for a tumour. Only 30% of patients with brain tumour present with headache and usually this headache are nondescript.

4. **Temporal arthritis**

Seen in elderly, presents with headache, jaw claudication, joint pain, fever, weight loss or visual loss. Usually a superficial pain; Scalp tenderness often present; Worse at night and on exposure to cold; High ESR s a clue.

5. **Glaucoma**

Headache often starts with eye pain, also associated with red eyes and fixed moderately dilated pupil.

**Case 1**

A 41 year old male, a manual laborer, with no prior history of significant illness, occasionally consumes alcohol, not smoker, brought to casualty with acute onset severe headache and vomiting developed while he was working. He was lifted by his co-workers. On arrival he was conscious, restless, BP of 160/100, pulse rate 104/mt, was moving all limbs, pupils equal size and reacting to light, neck stiffness present. Other system examination was normal. What is the most probable diagnosis, how will you proceed?

**Different Types of Primary Headache**

Following points to be noted from the history

- Frequency, duration and severity of headaches
- Any precipitating factors
- Associated symptoms
- Treatment modalities taken

<table>
<thead>
<tr>
<th>Feature</th>
<th>Tension headache</th>
<th>Migraine</th>
<th>Cluster headache</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of pain</td>
<td>Bilateral</td>
<td>Unilateral / Bilateral</td>
<td>Unilateral , around the eyes</td>
</tr>
<tr>
<td>Type of pain</td>
<td>Tightness or band like sensation</td>
<td>Throbbing</td>
<td>Sharp, excruciating and explosive</td>
</tr>
<tr>
<td>Other symptoms</td>
<td></td>
<td>Nausea, vomiting, Photophobia, phonophobia Aura Visual symptoms like flickering of lights, spots or lines</td>
<td>Red and watery eyes Nasal congestion or running nose Swollen eye lid Forehead and facial sweating Restlessness, aggressiveness</td>
</tr>
<tr>
<td>Duration of pain</td>
<td>Prolonged &gt;15 days month</td>
<td>4 – 72 hours &lt; 15 days month –</td>
<td>Periodic 1 – 8 attacks /day Each episode 15 – 180 minutes</td>
</tr>
</tbody>
</table>

*SHSRC-K*
Case 2
A 32 year old female, a computer instructor, brought to casualty with severe headache from her office. She describes the headache as pulsating pain on the front and sides of her head. Vomited 3 times; She remembers similar pain from her college days. Usually pain occurs after long travels, sleep deprivation and sometimes during menstrual cycles. She used to get at least 4 or 5 such episodes monthly which have reduced in frequency recently. Usually during pain she takes Paracetamol and prefers to sleep in a dark noiseless room. On examination she s struggling with pain, conscious, BP 140/80, pulse 98/mt, afebrile, no focal neurological deficits, no neck stiffness. What is she suffering from? How to manage her?

Competency 2

Primary care doctor should be able to manage a case of headache.

Session objectives: At the end of the training session, the participant should be able to manage common headaches.

Time requirement (Podium presentation: 20 minutes and case discussion: 10 minutes)

a. Order for investigations and management / referral if the headache is associated with any features suggesting a serious etiology listed previously
b. Patients with typical features of migraine, tension headache or cluster headache need not be referred for neuro imaging.

Information for the patients

Explanation of the diagnosis and reassurance
Options of the management
Headache diary
Risk of medication overuse

Tension type headache

Acute presentation – paracetamol; chronic presentation – amitriptyline, relaxation techniques

Migraine

Regular diet, exercise, sleeps pattern; Avoid excess caffeine, alcohol; Avoid acute changes in stress levels

Acute attack

Oral paracetamol 500mg – 1000mg /± antiemetics (Metoclopramide 10mg or Domperidone 10mg); If no relief with oral medicines or if severe vomiting; Parenteral paracetamol, metoclopramide, referral to higher center
Chronic – prophylaxis
If 5 or more attacks per month; Consider patient s preferences, co morbidities, risk of adverse effects
Propranolol 40 – 120mg BD
Amitriptyline 10 – 75mg at night
Review the need of continuation of prophylaxis after 6 months. Continuous and periodic appraisal of knowledge and updating of new information with e learning or contact classes

Case 3
A 25 year old female 36 weeks gestation brought to casualty with acute onset headache and vomiting. She cannot remember any such episodes of headache till date. No fever or weakness of limbs. On examination she was conscious, comfortable, vitals normal and no focal neurological deficits. In casualty, she developed one episode of generalized tonic clonic movements of body. How to proceed?

Assessment : 5 MCQs
1) Thunderclap headache is characteristically seen in?
a) Subarachnoid hemorrhage b) Meningitis c) Migraine d) Tension headache
2) Fifteen year old boy presents with fever headache vomiting and on examination found to have neck stiffness. What is your diagnosis?
a) Meningitis b) Cluster headache c) Ruptured aneurysm d) Migraine
3) Tension headache is characterized by all the following except?
a) Unilateral headache b) Bilateral headache c) Prolonged d) Band like sensation
4) Following drugs are used in migraine prophylaxis except?
a) Propranolol b) Flunarazine c) Amitryptilline d) Ibuprofen
5) Features of cluster headache include
a) Periodicity b) Unilateral c) Red and watery eyes d) All of the above

Answers
1) a 2) a 3) a 4) d 5) d
Jaundice

Goal
All primary care doctors must be able to evaluate and manage a patient presenting with Jaundice and identify the red flag signs for early referral.

Competencies
1. To know the different causes of jaundice in a primary care centre
3. How to manage a patient with Acute Viral Hepatitis
4. To identify the red flag signs

Module outline
1) Diagnostic approach in jaundice
2) Clinical assessment of patient with jaundice
3) Laboratory investigation of patient with jaundice
4) Management of viral hepatitis

Time requirement: 45 minutes (presentation-30 minutes & exercise 15 minutes)

Competency 1

Session objectives: At the end of the session, the learner should be able to
- Enlist the different causes of jaundice in a primary care centre
- Come to a reasonable diagnosis from history and physical examination

Time requirement: 20 minutes (brainstorming-10 minutes & presentation 10 minutes)

Content
Jaundice is yellowish discoloration of the skin, sclera and other tissues caused by excess circulating bilirubin. Jaundice and asymptomatic hyperbilirubinemia are common clinical problems that can be caused by a variety of disorders, including bilirubin overproduction, impaired bilirubin conjugation, biliary obstruction, and hepatic inflammation. Jaundice is clinically detected if serum bilirubin level is more than 3 mg/dL.

Common causes of jaundice in our setting are
1. Viral hepatitis
2. Alcoholic liver disease
3. Leptospirosis
4. Malaria
5. Dengue fever
6. Hemolytic jaundice
7. Obstructive jaundice
Diagnostic approach to jaundice

Symptoms and Signs
- Mild jaundice without dark urine suggests unconjugated hyperbilirubinemia caused by hemolysis (hemolytic anemia) or Gilbert's syndrome rather than hepatobiliary disease.
- More severe jaundice or dark urine clearly indicates a liver or biliary disorder.
- Patients often notice dark urine before skin discoloration; thus, the onset of dark urine better indicates the duration of jaundice.
- A history of alcoholism, substance abuse, poison intake or drug intake (e.g., Paracetamol over dosage) if any should be documented.

The onset may be acute or chronic. Suspected liver disease with abnormal liver function tests of more than 6 months, it is considered chronic liver disease.

If the onset is acute
- A prodrome of fatigue, myalgia, nausea, vomiting and anorexia precedes acute viral hepatitis. Mild fever precedes jaundice and when jaundice appears, fever disappears.
- If fever occurs abruptly with severe myalgia and red eyes possibility of Leptospirosis should be considered.
- Fever, arthralgia, myalgia headache and low backache may suggest Dengue fever, which may be associated with jaundice.
- Jaundice associated with high-grade fever, chills and rigor may suggest malaria or sepsis with multi organ damage.
- Abdominal pain or rigors favor the cholangitis or biliary calculi.

When to suspect chronic
- Signs of portal hypertension, ascites or skin and endocrine changes usually imply a chronic rather than an acute process.
- Dark urine, pale stools, and generalized pruritus may indicate long-standing obstruction.

Competency 2
Primary care doctor should be able to do a clinical and laboratory assessment of a patient with jaundice

Session objectives: At the end of the session the learner should be able to
- Come to an etiological diagnosis of jaundice
- Recognise any associated factors contributing adverse outcome

Time requirement: 15 minutes (podium presentation - 15 minutes)

Content
Clinical Examination should include:
- Monitoring Temperature, pulse, BP, respiratory rate
- Icterus, muscle tenderness, conjunctival congestion
- Evidence of altered mentation and flap should be looked for and suggests hepatic encephalopathy
Liver dullness should be percussed, obliteration of which may give a clue regarding liver necrosis.

Look for hepatosplenomegaly, ascites and other system involvement.

**Laboratory Findings**

- CBC and ESR help to differentiate Leptospirosis from viral hepatitis. The former may show polymorphonuclear leukocytosis and raised ESR. Leukopenia may be seen in acute viral hepatitis.
- Mild hyperbilirubinemia with normal aminotransferase and alkaline phosphatase levels usually reflects hemolysis or Gilbert’s syndrome rather than liver disease.
- Aminotransferase elevations > 500 U suggest hepatitis or an acute hypoxic episode.
- Disproportionate increases of alkaline phosphatase suggest a cholestatic or infiltrative disorder.
- The most common intrahepatic causes are hepatitis, drug toxicity, and alcoholic liver disease.
- The most common extrahepatic causes are a common bile duct stone and pancreatic cancer.
- Low albumin and high globulin levels indicate chronic rather than acute liver disease.
- RFT and serum electrolytes should be checked.
- PT/INR if impaired suggest adverse outcome.
- Anti HAV, HBs Ag, & Anti HCV estimation may give etiological clue in case of viral hepatitis.
- Tests may be repeated periodically (wherever available).

**Competency 3**

Primary care doctor should know how to manage a patient with acute viral hepatitis

**Session objectives:** At the end of the session the learner should

- Be able to treat a patient with uncomplicated A/C viral hepatitis

**Time requirement:** interactive session- 10 minutes

**Content**

Primary management of viral hepatitis is symptomatic out patient care. Correct dehydration if any. Normal diet is advisable. Adequate Salt intake must be emphasized. Tepid sponging may be given if there is fever. Alcohol, NSAIDS, hepatotoxic drugs (Paracetamol, INH, Rifampicin, Pyrazinamide, Methyldopa, Methotrexate, Chlorpromazine, Estradiol, Antibiotics, Phenytoin, Propyl Thiouracil, Amiodarone) should be avoided. Drugs with unknown modes of action should be discouraged. Ursodeoxycholic acid (UDCA) may help to reduce pruritus. Caretakers should be given health education regarding prevention and vaccination.

**Competency 4**

Primary care doctor should be able to identify the red flag signs
Session objectives: At the end of the session the learner should be able
- To describe the adverse outcome predictors
- To describe when to refer a patient to the higher centre

Time requirements: 10 minutes (Brainstorming session 10 minutes)

Content

Adverse outcome predictors needing urgent referral to a higher centre
- Altered mentation
- Flapping tremor
- Obliterated liver dullness
- External bleeding tendency
- Altered Prothrombin Time/INR
- Persisting high-grade fever
- Hypotension
- Respiratory Rate more than 20/minute
- Suspected poisoning & drug induced hepatotoxicity
- Severe anemia or drop in Haemoglobin
- Edema / Hypo albuminemia
- Immunosuppressed due to any cause (On Chemotherapy, steroids, Diabetes, Retroviral infection, nutritional deficiencies)

Assessment (5 MCQs)

1) 22 years old male came with history of recurrent jaundice. He had been on prolonged Ayurvedic medications for the same. He is apparently healthy. He does not have anorexia, nausea, weight loss or external manifestations of CLD. Per Abdomen, no hepatosplenomegaly. His LFT is as follows. S. Bilirubin 2.1, Direct 0.7, SGPT 32 units, ALP 110 IU, Total protein 5.8, Albumin 3.4. What is most likely diagnosis in this patient?
   A) A/C Viral Hepatitis
   B) Gilbert syndrome
   C) Hemolytic anemia
   D) Drug induced jaundice

2) M 35yrs, manual labourer, abrupt onset fever, myalgia and head ache. On examination, he is febrile, icterus +, conjunctiva congested, calf muscle tenderness is elicited. What is your diagnosis and which rapid test gives the diagnostic clue?
   A) CBC/ESR
   B) LFT
   C) RFT
   D) PT/INR

3) F 45 yrs, presented with jaundice and generalized pruritus. Having anorexia and nausea of 3 wks duration. Similar history in neighbourhood. She has a low grade fever also. LFT as follows. Bilirubin 12.8 mg/dL, Direct 9.2 mg/dL, ALP 458 IU, SGPT 355 IU, Total protein 6.4 g/dL, Albumin 4.4 g/dL. What is most likely diagnosis?
A) Leptospirosis
B) Cholestatic phase of viral hepatitis A
C) Acute Cholangitis
D) CBD obstruction

4) M32yrs, chronic alcoholic, presented with fever, myalgia, anorexia. O/E Icteric, confused, febrile, hyper pigmented, pedal edema +, hepatosplenomegaly & Ascites present. What management strategy will you follow?
   A) I/V Thiamin
   B) IV Fluids and bowel wash
   C) Antibiotics
   D) Referral to a higher centre

5) Which of the following is an adverse predictor in a jaundiced patient
   A) Altered mentation
   B) Flap
   C) Obliterated liver dullness
   D) all of the above

Answers- 1) b 2) b 3) b 4) d 5) d
ACUTE DIARRHOEA

Goal
The primary care doctor should be able to diagnose and management a case of diarrhea in the PHC level

Competencies
All primary care doctors should be able
1) To recognize and do the clinical assessment of diarrhea
2) To recognize complications of diarrhea and manage a case of diarrhea

Module outlines
1. Definition
2. Types of diarrhoea
3. Causes of diarrhea
4. Dehydration assessment
5. Complications of diarrhea
6. Management of diarrhoea

Time requirement: 60 mins (presentation 30 mins &exercise 30 mins)

Competency 1
All primary care doctors should be able
1) To recognize and do the clinical assessment of diarrhea

Session objectives: At the end of the session learner will be able to
1. Define the types of diarrhoea.
2. Assess the levels of dehydration in Adults.

Time requirement: 30 Mins (Case discussion 10 minutes &presentation 20 minutes)

Case study
Mr. J. 46 yr old came to your OPD with loose stools, abdominal cramps and vomiting. He is brought by his wife. He is looking very ill. He had food from a hotel on previous night. What else you would like to know from him and how will you assess his condition?

What is diarrhoea?
Diarrhoea occurs when stools contain more water than normal, and are loose or watery. In many regions diarrhoea is defined as three or more loose or watery stools in a 24-hour period. It is more common in settings of poor sanitation and hygiene, including a lack of safe drinking water.

What are the types of diarrhoea in adults?
Most diarrhea that causes dehydration is loose or watery. Cholera is one example, though only a small proportion of all loose or watery diarrhoeas are due to cholera.
Acute diarrhoea is an episode of diarrhoea that lasts less than 14 days. Acute watery diarrhoea causes dehydration and contributes to electrolyte imbalance.

Persistent diarrhoea lasts 14 days or more. Up to 20% of episodes of diarrhea become persistent, and this often causes nutritional problems.

Dysentery is diarrhoea with blood in the stool, with or without mucus. The most common cause of dysentery is Shigella bacteria. Amoebic dysentery is common in adults. The patient may have both watery diarrhoea and dysentery.

How will you assess?
First, you should ASK whether he has diarrhoea. You might need to explain diarrhoea as loose, watery stools if the patient needs clarification.
If NO diarrhoea, ask about the next main symptom, fever. You do not need to further assess for diarrhea.
If Yes, You will then assess in two parts:
1. Type of diarrhoea: acute, persistent, or dysentery
2. Signs of dehydration

Ask: for how long?
Acute Diarrhoea is usually due to acute infectious gastroenteritis, although there are several other causes. Diarrhoea which lasts 14 days or more is persistent diarrhoea. Ask: is there blood in the stool?

Ask the patient if he has seen blood in the stools at any time during this episode of diarrhoea. Dysentery is diarrhoea with blood in the stool, with or without mucus. The most common cause of dysentery is Shigella bacteria. Dysentery will require specific treatments.

### Causes of Acute Diarrhoea (Brain Storming)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Bacteria</th>
<th>Viruses</th>
<th>Parasites</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infectious Gastroenteritis</strong></td>
<td>Vibrio Cholera, Shigella, E.Coli, Salmonella, Campylobacter, Clostridium</td>
<td>Rotaviruses, Calicivirus, Enteroviruses, Adenovirus, Astrovirus</td>
<td>Entamoeba histolytica, Giardia intestinalis</td>
</tr>
<tr>
<td><strong>Antibiotic Associated Diarrhea</strong></td>
<td>Overgrowth of Clostridium difficile</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Traveller's Diarrhea</strong></td>
<td>Giardia, E.coli</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Post operative and nosocomial diarrhea</strong></td>
<td>Drugs, enteral feeding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- When vomiting is very prominent and overshadows diarrhoea, the possibility of viral gastroenteritis or of food poisoning must be considered.
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- Cholera, ET- E coli, Viral gastroenteritis present with severe watery diarrhoea.
- Dysentery is usually due to shigella, EI-Ecoli, E.histolytica.

Dehydration

Dehydration results when the patient loses too much water and salt from the body. This causes a disturbance of electrolytes, which can affect vital organs.

**Symptoms of dehydration in adults include:**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Mild/Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiredness</td>
<td>Dizziness or light-headedness.</td>
</tr>
<tr>
<td>Headache</td>
<td>Muscular cramps.</td>
</tr>
<tr>
<td>Sunken eyes</td>
<td>Passing little urine.</td>
</tr>
<tr>
<td>A dry mouth and tongue</td>
<td>Weakness.</td>
</tr>
<tr>
<td>Becoming irritable</td>
<td>Confusion.</td>
</tr>
<tr>
<td>Coma</td>
<td>A greatly reduced amount of urine output.</td>
</tr>
</tbody>
</table>

How will you assess dehydration?

There are several signs that help you decide the severity of dehydration. As the body loses fluids, the eyes may look sunken, and skin loses elasticity. If dehydration continues, the person becomes lethargic or unconscious.

How do you classify dehydration?

There are three possible classifications for the type of diarrhoea. These are:
1. Severe dehydration
2. Mild dehydration
3. No dehydration

**Assessment of dehydration (video support)**

<table>
<thead>
<tr>
<th></th>
<th>Mild</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Thirsty, alert, restless, sunken eyes</td>
<td>Drowsy, cold, sweaty, comatose</td>
</tr>
<tr>
<td>Radial pulse</td>
<td>Normal rate and volume</td>
<td>Rapid, feeble, Impalpable</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>Normal</td>
<td>&lt;80, unrecordable</td>
</tr>
<tr>
<td>Skin Elasticity</td>
<td>Pinch retracts immediately</td>
<td>Slowly retracts &gt; 2 seconds</td>
</tr>
<tr>
<td>Tongue</td>
<td>Moist</td>
<td>Very dry</td>
</tr>
<tr>
<td>Urine flow</td>
<td>Normal</td>
<td>Little or none</td>
</tr>
<tr>
<td>% body weight loss</td>
<td>4-5%</td>
<td>10% or more</td>
</tr>
<tr>
<td>Estimated fluid deficit</td>
<td>40-50 ml/kg</td>
<td>100-110 ml/kg</td>
</tr>
</tbody>
</table>

In adults, presence of tachycardia and orthostatic postural hypotension signifies loss of blood volume, while supine hypotension indicates loss of over 20% of circulating blood volume.

**Competency 2**

All primary care doctors should be able to recognise complications of diarrhea.
Session objectives: At the end of the session primary care doctor should be able to
1. Recognise the complications
2. Manage a case of diarrhea

Time requirement: 30 Mins (presentation 20 minutes & Discussion 10 minutes)

Content

Complications of acute diarrhoea
- Haemoconcentration;
- Pre-renal uraemia;
- Renal failure;
- Acidosis;
- Hypokalemia
- Malnutrition;
- Sepsis;
- Encephalopathy;
- Haemolytic uremic syndrome;
- Toxic mega colon

Diagnosis

Investigations are generally not required, however the following investigations are considered in selected patients if required.
- Hanging drop
- Stool microscopy
- Stool culture
- EIA for rota virus and Cl. difficile toxins

Management

In patient with mild dehydration it is sufficient to rehydrate the patients through the oral route with ORS. When ORS cannot be taken orally as in patients with profuse vomiting, intravenous rehydration is indicated. Patients with severe dehydration, the lost fluid has to be replaced with intravenous route over a period of four to six hours. In cholera and severe diarrhoea, the choice of fluid is ringer lactate solution which is similar in composition to the fluid lost in the stools and corrects the electrolyte losses. A volume equivalent to 10% of the body weight is infused over 4 hours, the first 30% in one hour and remaining 70% in three hours.

Antibiotics in diarrhoea:

Antibiotics are not necessary in most patients with watery diarrhea with exception of cholera.

In suspected Cholera

Doxycycline 300mg stat or Ciprofloxacin 500 twice daily for three days or Azithromycin 500 stat.
For Amoebic Dysentery
Metronidazole 800 mg three times for five days. These patients should receive diloxanidefuroate for two weeks after Metronidazole treatment.

For shigellosis
Ciprofloxacin 500 mg twice daily for three days. Avoidantimotility drugs

Identify Red flag signs and refer patients
- Severe dehydration,
- Oliguria,
- Anuria,
- Hypotension,
- Altered sensorium,
- Seizure,
- Abdominal distension
- Acidosis

Prevention of Diarrhoea:
- Hand washing before and after eating
- Disinfection of drinking water at home
- Safe drinking water and implementation of safe food handling practices
- Avoidance of flies
- Care of food handlers

Skill development
- Demonstration of Hand washing Technique
- Preparation of Oral Rehydration Solution

Assessment: 5 MCQs

1. Most common cause of dysentery is
   A. Shigella
   B. Staphylo
   C. E coli
   D. Giardia

2. Estimated fluid loss in severe diarrhea
   A. 10-30ml/kg
   B. 30-50ml/kg
   C. 100-110ml/kg
   D. 150-200ml/kg

3. Complications of diarrhea is
   A. Acidosis
   B. Hypokalemia
   C. Encephalopathy
   D. All the above
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4. **DYSENTERY** is
   A. Diarrhea with blood in the stool, with or without mucus.
   B. Diarrhea with mucus only
   C. Watery diarrhea
   D. Parenteral diarrhea

5. **ACUTE DIARRHOEA** is an episode of diarrhoea that lasts less than
   A. 14 days
   B. 18 days
   C. 16 days
   D. 20 days

Answers: 1) a  2) c  3) d  4) a  5) a
Acute Respiratory Infections

Goal
The primary care physician should be able to diagnose and manage Acute respiratory infections (ARI)

Competencies: Primary care doctor should be able to
1. Diagnose ARI at primary health care setting.
2. Manage ARI.
3. Identify the red flag signs for early referral.

Module outlines:
1. Classification of ARI
2. Investigations in ARI
3. Management of ARI
4. Red flag signs in ARI

Time requirements: 45 Mins (Podium presentations 20 mins & exercise 25 minutes)

Competency 1
Primary care doctor should be able to diagnose ARI at Primary Health Centre.

Session objectives: At the end of the session, the learner should be able
a) To identify the symptoms & signs of ARI
b) To arrive at a diagnosis of ARI
c) To identify common differentials

Method: Brain storming session 10 minutes & Podium presentation 10 minutes

Content
Acute respiratory infections are an important cause of morbidity and mortality around the world, especially in children. Respiratory tract infection refers to any infectious disease which involves the respiratory tract.

Can be classified into upper respiratory tract infection and lower respiratory tract infection
Upper respiratory tract consists of airways from nostrils to vocal cords in the larynx including the paranasal sinuses and middle ear. Lower respiratory tract extends from the level of vocal cords to the alveoli and includes the trachea, bronchi, bronchioles and the alveoli.

Upper respiratory tract infection refers to an acute infection involving the nose, sinuses, pharynx and larynx. This commonly refers to tonsillopharyngitis, laryngitis, sinusitis, otitis media, epiglottitis and the common cold.

Common cold is commonly caused by adenovirus, influenza, parainfluenza, RSV etc. Clinical features include fever, serous discharge, irritability, cervical lymphadenopathy, nasopharyngeal congestion, serous otitis media.
Acute tonsillo pharyngitis is usually caused by viral or bacterial infection of the pharynx and tonsils. It is characterised by fever, headache, sore throat, pharyngitis, tonsillar congestion or exudates, enlarged and inflamed tonsils.

Acute epiglottitis: Life threatening infection of the epiglottis, the aryepiglottic folds and arytenoids soft tissue. Peak incidence is 1-6 years and is usually caused by Hemophilus influenza type B. Concomitant bacteremia, pneumonia, otitis media, arthritis may be present. Usually presents as high fever, sore throat, dyspnea and rapidly progressing respiratory obstruction. Patient may be toxic with laboured breathing and hyper extended neck. It may eventually lead to cyanosis, coma and death. Stridor is a late finding. Do not examine the throat. Severity assessed by stridor, Pulse rate, Respiratory rate, level of consciousness and pulse oximetry (if available). Xray will show thumb sign on lateral neck radiograph. Refer to higher centre for IV antibiotics and intensive supportive care. Rifampicin prophylaxis should be given to close contacts.

Acute laryngotracheobronchitis (croup) is a viral infection leading to mucosal inflammation of the glottis and subglottic region. Initially characterised by rhinorrhea, mild cough and fever and later followed by barking cough, hoarseness of voice noisy breathing mainly on inspiration. Symptoms worse at night and on lying down. Clinical examination reveals normal to moderately inflamed pharynx, slightly increased RR with prolonged inspiration and inspiratory stridor.

Tonsillitis is characterised by fever, sore throat, inflamed and enlarged tonsils. Quinsy is characterised by peritonsillitis or peritonsillar abscess and causes medial displacement of the tonsil and often spread of infection to the carotid sheath.

Sinusitis is usually a bacterial infection characterised by fever, headache, nasal discharge and sneezing.

Competency- 2: Primary care doctor should be able to manage ARI.

Objectives: At the end of this session the primary care doctor should be able to

1. Choose the appropriate investigations in ARI
2. To describe the treatment of ARI

Time requirement: Group discussion – 15 minutes (5 minutes for each group in URI and LRI and 5 minutes consolidation)

Principles of management are

1. Symptom based therapy
2. Probable diagnosis of a bacterial infection
3. Prescribing the right antibiotic for right dose and right duration

Symptom based therapy:

Paracetamol, Aspirin should be avoided in children due to risk of Reye syndrome. Corticosteroids are not recommended.
• Warm saline gargle
• Steam inhalation
• Saline nasal drops
• Adequate hydration – plenty of oral fluids
• Antihistamines - CPM

Antibiotic preferred
Streptococcus Pneumoniae or H. Influenzae - AmoxycillinClavulanate 625 mg BD for 7 to 10 days, If allergic to Penicillin, Doxycycline100 bd / Levofloxacin 500 od , If patient do not respond or worsen in 3 days of empiric therapy, refer to higher center.

Diphtheria – Diphtheria Antitoxin, Penicillin / Azithromycin

Special attention
- In extremes of age
- Pregnancy
- Immuno compromised patients (HIV infection, Cancer or cancer therapy, Diabetes, Splenectomised, Dialysis, post transplant patients

Follow up care
If symptoms do not improve in 72 hours, with any of the red flag signs, refer to higher center

COMPETENCY- 3- Primary care doctor should be able to identifying the red flag signs

Objective: At the end of this session the primary care doctor should be able to
• Identify the red flag signs and make a prompt referral to higher centre

Time requirement: Group discussion 10 mins

Red flag signs in upper respiratory infections
- Presence of stridor. Avoid instrumentation in suspected epiglottitis. Before referral, intravenous or inhaled glucocorticoids may be given to reduce inflammation. Avoid sedation. IV fluids if dehydration is present. Needs immediate referral
- Rapidly progressing respiratory obstruction
- Hypoxaemia on pulse oximetry (if available)
- Presence of pseudomembrane on throat examination suggesting diphtheria
- Cyanosis
- Depressed level of consciousness.
- Hypotension

Multiple choice questions
1) Acute epiglotitis is commonly caused by
   a) Hemophilus influenza b) Pneumococci c) Staphylococci d) Streptococci

2) All are true about croup except
   a) Caused by viral infection b) symptoms worse at night c) Hoarseness of voice d) Bovine cough
3) Which of the following is a redflag sign in ARI
a) Stridor  b) Hypotension  c) Presence of pseudomembrane  d) all of the above

4) Empirical antibiotic in acute respiratory infections are all except
a) Amoxycillinclavunate b) Azithromycin c) Levofloxacin d) Linezolid

5) Which of the following should be avoided in the symptomatic treatment of ARI in children
a) Saline gargle b) Antihistamines c) Aspirin d) Steam inhalation

Answers
1) a  2)d  3)d  4)d  5)c
Hypertension

Goal
The primary care doctor should be able to diagnose and manage a case of hypertension and follow up of patients.

Competencies
Primary care doctor should be able to
1) Diagnose a case of hypertension
2) Manage a case of hypertension with appropriate drugs
3) Identify red flags in hypertension
4) Follow up a case of hypertension

Module outline
1) Case definition of hypertension
2) Clinical features of hypertension
3) Features of secondary hypertension
4) Baseline investigations in hypertension
5) Management of hypertension

Time requirements: **100 Mins** (presentation 60 mins & exercise 40 mins)

Competency 1
1) Primary care doctor should be able to diagnose a case of hypertension

Objectives: At the end of this session the learner should be able to:
a) Know the clinical features of hypertension
b) Record and document blood pressure by the proper method and diagnose hypertension
c) Distinguish between the different types of hypertension

Time requirements: (Brainstorming: 5 min & Podium presentation: 10 min)

Content
Case definition
A case of Hypertension: Hypertension in adults >18 yrs is defined as systolic blood pressure of ≥140 mm Hg or greater and or diastolic blood pressure of ≥90mm of Hg or greater, based on the average of two or more properly measured BP readings on each of two or more visits.

Essential hypertension: When a definite etiology is unknown, as in 90 to 95% of hypertension

Secondary hypertension: Hypertension with an identifiable cause, secondary to which hypertension appears.
**Isolated systolic hypertension:** A systolic blood pressure of ≥160, with diastolic pressures ≤90 mm of Hg, most common in elderly patients, due to reduced vascular compliance.

**Classification of Blood pressure (BP) in mm of Hg**  
*source: JNC VII*

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic</th>
<th>Diastolic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Pre hypertension</td>
<td>120-139</td>
<td>80-89</td>
</tr>
<tr>
<td>Hypertension stage 1</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Hypertension stage 2</td>
<td>&gt;160</td>
<td>&gt;100</td>
</tr>
</tbody>
</table>

**Clinical features**

Nearly one-third of people with hypertension remains undetected and hence every opportunity must be utilized for screening and documentation of blood pressure. If blood pressure is extremely high, there may be certain symptoms to look out for:

- Severe headache
- Fatigue or confusion
- Visual problems
- Chest pain
- Breathlessness
- Irregular heartbeat
- Pounding in chest, neck, or ears

*Remember most of the time hypertension has no symptoms hence aptly called – The silent Killer.*

**Blood pressure measurement by the proper method and establish hypertension**  
*Role play - recording BP - 15mins*

**Salient points to be discussed**

- Allow patient to rest 5 mins before BP measurements
- Take at least 2 readings if BP is high and in both arms
- Normal bi brachial difference—(upto 10 mm of Hg >20 abnormal)
- Need for multiple readings in context as arrhythmias like AF
- Which arm should be examined in conditions like hemiplegia (use unaffected limb)
- Have the cuff at level of heart
- Proper size of cuff
- Caffeine, exercise, and smoking should be avoided for at least 30 minutes prior to measurement.
- Familiarization with types of BP apparatus (A BRIEF DISCUSSION ON MERCURY AND ANEROID APPARATUS). The need for standardisation of BP apparatus, Home BP and ambulatory BP recordings, white coat hypertension, masked hypertension

**Think of the possibility of secondary hypertension in patients with**

- Resistant hypertension
- Hypertensive crisis
- New onset hypertension in very young and elderly
• Flash pulmonary oedema
• Renal bruit – Renovascular hypertension
• Central obesity, moon face, purple striae and hyperglycemia (suspect Cushing’s syndrome)
• Paroxysmal hypertension, labile hypertension, palpitation, headache and sweating (suspect pheochromocytoma)
• Differences in pulse and blood pressure between the upper and lower limbs (coarctation of aorta)
• Fatigue, weight gain, hair loss, diastolic hypertension (hypothyroidism)
• Headaches, fatigue, visual problems, enlargement of hands, feet, tongue (Acromegaly)
• Kidney stones, osteoporosis, depression, lethargy, muscle weakness (hyperparathyroidism)

Competency 2
Primary care doctor should be able to manage a case of hypertension with appropriate drugs.

Objectives: At the end of session
a) To do the baseline investigations (wherever available)
b) List the different categories of drugs available for management
c) Selection of appropriate drug for management of a case of hypertension
d) Stepwise treatment of hypertension

Time requirements: 30 Mins (podium presentation 30 mins)

Content:

Baseline investigation
✓ Urine routine – look for proteinuria, RBCs, casts
✓ Complete blood count – Hb - anemia, polycythemia
✓ ESR
✓ Renal function test-Urea, creatine
✓ Serum electrolytes Na, K, Ca (when available)
✓ ECG (when available)
✓ Chest XRay PA view (when available)

<table>
<thead>
<tr>
<th>Class</th>
<th>Drug</th>
<th>Usual Dose Range, mg/d</th>
<th>Usual Daily Frequency</th>
<th>Common adverse effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thiazide diuretics</td>
<td>Hydrochlorothiazide</td>
<td>12.5–25</td>
<td>1</td>
<td>Dyselectrolemia, precipitation of gout, hyperglycemia</td>
</tr>
<tr>
<td>Beta blockers (BBs)</td>
<td>Atenolol</td>
<td>25–100</td>
<td>1</td>
<td>Bradycardia, Unawareness of hypoglycemia</td>
</tr>
<tr>
<td></td>
<td>Metoprolol</td>
<td>50–100</td>
<td>1–2</td>
<td></td>
</tr>
<tr>
<td>Angiotensin Converting</td>
<td>Ramipril</td>
<td>2.5–20</td>
<td>1</td>
<td>Hyperkalemia</td>
</tr>
<tr>
<td>Enzyme</td>
<td>Enalapril</td>
<td>2.5 10mg</td>
<td>2</td>
<td>Angioedema</td>
</tr>
</tbody>
</table>
Goals of Therapy

- To reduce SBP and DBP to < 140/90 mm Hg
- In patients with hypertension and diabetes or renal disease, the BP goal is < 130/80 mm Hg

Life style modification

- Adoption of healthy lifestyles by all patients is an indispensible part of the management of hypertension and should be advised in all individuals with high normal blood pressure.
- Weight reduction.
- Dietary approach diet rich in fruits (300–400 gms/day) and vegetables, low in fat dairy products, cholesterol saturated and total fat, dietary sodium less than 2.4 g of sodium.
- Regular physical activity. Brisk walking atleast 30 minutes per day.

Pharmacological treatment

<table>
<thead>
<tr>
<th>(ACE) inhibitors</th>
<th>Losartan</th>
<th>Telmisartan</th>
<th>25–100</th>
<th>20–80</th>
<th>1–2</th>
<th>Hyperkalemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Channel Blockers (CCBs) Dihydropyridines</td>
<td>Nifedipine long-acting</td>
<td>30–60</td>
<td>1</td>
<td>Pedal edema Headache</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amlodipine</td>
<td>2.5–10</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cilnidipine</td>
<td>5–20</td>
<td>1–2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Strategies for initiating anti hypertensive at primary care level in patients without compelling indication

For stage 1 hypertension (BP systolic 140-159 and/or diastolic 90-99)

- For young patients with stage 1 hypertension start with ACE or ARBs (Enalapril 5 mg or Losartan 25 mg or Telmisartan 40 mg) Must be avoided in women of reproductive age group planning pregnancy – consider CCB in them.
- For elderly with stage 1 hypertension start with CCB (Amlodipine 5 mg) or Diuretic (Hydrochlorothiazide 12.5 mg) (elderly on diuretic watch for postural hypotension and hyponatremia)

For stage 2 hypertension

- Young patients start with a combination of ACE inhibitors/ARB with calcium channel blocker or diuretic
- Elderly a combination of CCB+ diuretic
**Strategies for titration of dosage**
Maximize first medication before adding second drug or add second drug before maximizing the first drug

**If goal BP not attained**
- Reinforce medication and lifestyle adherence
- Add Diuretic/CCB/ACE or ARB and titrate the dosage (use medication class not previously used and avoid ACE and ARB combination)

**Goal blood pressure still not attained**
- Reinforce medication and lifestyle adherence
- Add Diuretic/CCB/ACEI or ARB and titrate the dosage (use medication class not previously used and avoid ACEI and ARB combination)

**Goal blood pressure still not attained**

**Do more frequent monitoring?**
- Reinforce medication and lifestyle adherence.
- Add additional medication class (Beta blockers, Aldosterone antagonist and refer the patient to higher centre if goal BP not attained in 2-3 months)

**Competency 3**
Primary care doctor should be able to identify red flag signs in hypertension for prompt referral

**Objectives:** Primary care doctor should
1) Identify the common complications of Hypertension
2) Identify red flag signs and prompt referral

**Time requirements:** 30 Mins (podium presentation 10 mins & case discussion 20 mins)

**Case 1**
50 year old male known hypertensive on irregular treatment presenting in PHC with a BP of 210/150 mm Hg. Weight is stable at 88 kg, height is 193 cm. He reports new onset blurring of vision and headache for the past 3-4 days, nocturia 3-4 times per night for last 2 weeks and frothy urine of 8 months. He denies edema, pain, nausea, or vomiting. Systemic examination within normal limits.

1) What is the difference between hypertensive urgency and hypertensive emergency?
2) What is the diagnosis in this patient?
3) What are the treatment implications for this diagnosis?
4) How will you manage this patient at PHC?

**Case 2**
74-year-old man came for a routine visit to PHC, complaining of occipital head-ache for a few days. There were no other medical problems. He rarely consults a doctor and could not recall any prior blood pressure (BP) testing. On examination, he was comfortable but complaining of headache. His BP was 224/120 mm Hg, with a heart rate of 72 beats/minute. Otherwise, physical examination is within normal limits.
1) What is the difference between hypertensive urgency and hypertensive emergency?
2) What is the diagnosis in this patient?
3) What are the treatment implications for this diagnosis?
4) How will you manage this patient?

Hypertensive urgency
Severely elevated blood pressure (ie, systolic >220 mm Hg or diastolic >120 mm Hg) with no evidence of target organ damage.
No evidence suggests a benefit from rapidly reducing blood pressure in patients with hypertensive urgency and aggressive therapy may harm the patient, resulting in cardiac, renal, or cerebral hypo perfusion.

Hypertensive emergency
Here uncontrolled blood pressure lead to progressive or impending end-organ dysfunction.

1. Neurologic end-organ damage
   - Hypertensive encephalopathy
   - Cerebral vascular accident
     - Cerebral infarction,
     - Subarachnoid haemorrhage
     - Intra cranial haemorrhage
       - Ask for - seizures, visual disturbances, weakness
       - Look for - altered level of consciousness, focal neurologic signs.

2. Cardiovascular end-organ damage
   - Myocardial ischemia/infarction,
   - Acute left ventricular dysfunction,
   - Acute pulmonary edema,
   - Aortic dissection.
     - Ask for - Chest pain( myocardial ischemia or infarction), back pain(aortic dissection); and dyspnea (pulmonary edema or congestive heart failure)
     - Look for: elevated JVP, crackles on auscultation, and peripheral edema.

3. Other organ systems
   ✓ Acute renal failure,
   ✓ Retinopathy,
   ✓ Eclampsia, Microangiopathic hemolytic anemia.
   ✓ In hypertensive emergency, BP should be lowered aggressively over minutes to hours.

Red flags in hypertension
✓ Papilloedema/blurred vision
✓ High BP in Pregnancy
✓ Very much elevated BP with headache
✓ Fits or coma
✓ Features of Heart failure –like dyspnea,elevatedJVP,oedema
✓ Chest pain
Irregular heartbeat
Blood in the urine, frothing of urine (proteinuria)
Headache

**Competency 4**
Primary care doctor should be able to do the regular follow up of hypertensive patients

**Objectives**
a) Identify long term complications of hypertension  
b) Counsel the patient regarding life style modification and drug compliance.

**Time requirements**: 20 Mins (presentation 10 mins & exercise 10 mins)

**Content**

<table>
<thead>
<tr>
<th>Organ</th>
<th>Features</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heart</strong></td>
<td>Heart failure</td>
<td>History: Exertional breathlessness, PND, orthopnea, edema</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Examination: Pedal edema, JVP, diffuse apical impulse, S3, S4, chest examination for pulm edema.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Investigation: Referral for evaluation</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>History of angina, prior myocardial infarction, Prior coronary revascularization</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Examination: Referral for evaluation</td>
</tr>
<tr>
<td><strong>Brain</strong></td>
<td>Stroke or transient ischemic attack</td>
<td>History of sudden onset, transient / persistent neurological deficit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Examination: Referral for evaluation</td>
</tr>
<tr>
<td>Dementia</td>
<td></td>
<td>MMSE( Mini Mental Status Examination) Neurological examination</td>
</tr>
<tr>
<td><strong>Chronic kidney disease</strong></td>
<td>Uremic complaints, urine out-put, dyspnea</td>
<td>Pallor, edema, peripheral neuropathy, sensorium and orientation, asterexis, uremic odour and clinically assess requirement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Investigation: Referral for evaluation</td>
</tr>
<tr>
<td>Peripheral arterial disease</td>
<td>H/o claudication</td>
<td>Assess peripheral pulses, look for arterial bruits</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Retinopathy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Case 3:**
A 72-year-old woman was seen in the PHC. Her blood pressure is 180/100 mm of Hg. She says her BP is always high for the last 1 year, she stated that she was compliant with her treatment of 20/25 mg daily of lisinopril/hydrochlorothiazide, and 180 mg daily of extended-release verapamil.
1) What is resistant hypertension?
2) What are the causes of resistant hypertension?

### 1. Problems with blood pressure measurement

<table>
<thead>
<tr>
<th>Problem Description</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of too small a cuff (air bladder)</td>
<td>Use of a cuff with a width of 40% of the brachial girth and a length sufficient to cover at least 80% of the brachial girth</td>
</tr>
<tr>
<td>Pseudohypertension</td>
<td>Attention to marked atherosclerosis</td>
</tr>
<tr>
<td>White coat hypertension/white coat phenomenon</td>
<td>Measurement of the home blood pressure or ambulatory blood pressure</td>
</tr>
<tr>
<td>2. Poor adherence</td>
<td>Overcoming the anxiety on long-term pill-taking by sufficient explanation. Changing the drug if adverse effects are observed. Considering psychological factors if drug maladjustment is repeated. Considering economic problems. Considering the dosing schedule matched with the patient’s lifestyle.</td>
</tr>
<tr>
<td>3. Life style problems</td>
<td>Repeated guidance in restriction of energy intake and exercise,</td>
</tr>
<tr>
<td>Progression of obesity</td>
<td></td>
</tr>
<tr>
<td>Excessive drinking, Smoking</td>
<td>Guidance to restrict the alcohol intake at ≤20–30 ml ethanol per day, avoid smoking</td>
</tr>
<tr>
<td>Sleep apnea syndrome</td>
<td></td>
</tr>
<tr>
<td>4. Volume overload</td>
<td></td>
</tr>
<tr>
<td>Excessive salt intake</td>
<td>Explanation of the significance and necessity of salt restriction.</td>
</tr>
<tr>
<td>Inappropriate use of drugs</td>
<td>In combinations of three or more drugs, one should be a diuretic</td>
</tr>
<tr>
<td>5. Concomitant use of drugs</td>
<td>oral contraceptives, corticosteroids, non-steroidal anti-inflammatory drugs (including selective COX-2 inhibitors),</td>
</tr>
<tr>
<td>6. Concomitant use of antihypertensive drugs with similar action mechanisms</td>
<td>Combinations of antihypertensive drugs that have different action mechanisms from different pharmacologic classes which are complimentary in effect.</td>
</tr>
</tbody>
</table>
Assessment-(MCQ-5 nos)
1 You examine a person rushing into OPD after a hot coffee. He is normal except his BP is 150/106 mm Hg and denies having hypertension
   a) You diagnose him as anew hypertensive   b) Give him nifedipine
   c) Take his ECG   d) Ask him to rest for 30 mts and recheck his BP

2 Preferred drug in diabetes with hypertension
   a) ACE inhibitor   b) Beta blocker   c) Thiazides   d) Alpha blocker

3. Hypertension is called 'silent killer' because
   a) It is the Greek word for 'silent killer'   b) It causes target organ damage without obvious symptoms
   c) People with hypertension are homicidal   d) None

4. Commonest cause of secondary hypertension is
   a) Hypothyroidism   b) Hyperthyroidism   c) Renal disease   d) Cushing’s disease

5. This is a common side effect of Losartan
   a) Cough   b) Angioedema   c) Hyperkalemia   d) Pedal edema

Answers
1) D   2) A   3) B   4) C   5) C

Skill development
✓ Measurement of BP
✓ Demonstration of different types of BP Apparatus
✓ Clinical examination of patient to look for end organ damage
Diabetes Mellitus

Goal
All Primary care doctors should be able to diagnose and manage diabetes mellitus and follow up patients having diabetes mellitus.

Competencies
Primary care doctor should be able to
1. Recognize the symptoms and various clinical presentations of Diabetes Mellitus (DM)
2. Diagnose and classify diabetes mellitus.
3. Do the Clinical assessment of a person diagnosed to have Diabetes Mellitus.
4. Manage and follow up of diabetic patients.
5. Recognize the complications of diabetes mellitus and plan the appropriate management
6. Manage associated co-morbidities in diabetes mellitus

Module outline
2. Criteria for diagnosis of diabetes
3 Clinical assessment of diabetic patient
4 Management of diabetes
5 Diabetes in special situations
6 Follow up of diabetic patients.

Time requirements: Total time 180 mins (Presentations 110 mins & exercise70 mins)

Competency 1
Primary care doctor should be able to recognize the symptoms and various clinical presentations of diabetes.

Objectives: At the end of this session the learner should be able to
1) Recognize the symptoms of diabetes
2) Enumerate the clinical settings in which diabetes mellitus is to be suspected and tests organized.

Time requirement: Case discussion15 minutes (2 groups 5 minutes for discussion of case among group members and 5 minutes for each group to present and conclude)

Case 1
A 20 yr old male presents with tiredness, excessive thirst and urination, increased appetite, and blurred vision. He has lost 10kg over the last one month. He has no family history of diabetes.
Case 2
A 45 year old overweight lady, gets her blood glucose done around 10 AM in a camp in her residential association and says she has no symptoms. The Blood glucose value is 300 mg/dL her mother, brothers and sister are getting treatment for diabetes. She has delivered a baby of 4 Kg at 32 yrs of age.

Case 3
A 60 year old male visited his eye doctor because of visual blurring for a spectacle change. His doctor asks for a Blood Glucose test, reported to be Fasting Plasma Glucose – 145 mg/dl and 2 hrs Post Prandial Glucose-285 mg / dL. He says he has no other symptoms. But he remembers he has been recently consuming a lot of water.

Content
- The classical symptoms of diabetes are polyuria, polydypsia, polyphagia and weight loss. They may not be observed by the patient, but recall if questioned specifically
- Type 1 diabetes is usually dramatic in onset and may present with complications like ketoacidosis.
- Type 2 Diabetes usually comes with a family history. Indians are ethnically predisposed, and so family history is not a must.
- Obesity, Polycystic Ovary Disease (Metabolic syndrome), Gestational Diabetes mellitus (GDM), delivering a large birth weight baby all are risk factors. A recent change in glasses, recurrent infections may be pointers.
- Type 2 diabetes may remain undiagnosed for a long duration and may diagnose with complications, usually retinopathy, neuropathy, nephropathy, acute myocardial infarction or stroke.
- All subjects in the primary health centre area must be included in the regular screening program.
- Early diagnosis and treatment prevent and delay complications.

Competency 2
The primary care doctor should be able to diagnose and classify diabetes

Objectives: At the end of this session the learner should be able
1) To diagnose a case of diabetes mellitus using the criteria of diabetes
2) To classify diabetes mellitus

Time requirements: (Podium presentation for 15 minutes.)

Content
Criteria for the diagnosis of diabetes
With classic symptoms of hyperglycemia, a random plasmaglucose ≥ 200 mg/dL (11.1 mmol /L) confirms the diagnosis of diabetes.

OR
In the absence of classic symptoms of hyperglycemia, diabetes is diagnosed from any of the three criteria given below, but the results should be confirmed by repeat testing.

OR
Fasting Plasma Glucose ≥ 126 mg/dL
2-h Plasma Glucose ≥ 200 mg/dL during an OGTT
HbA1C ≥ 6.5%

OR
Fasting is defined as no caloric intake for at least 8 h
OGTT using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water. The patient must be on a normal carbohydrate diet for 3 days prior.

Diagnosis of Gestational Diabetes:
It is necessary to test for Gestational Diabetes at 24-28 weeks of Pregnancy (if not detected Diabetes earlier) by 75 gm Oral Glucose Tolerance Test and any value above range must be diagnosed to have GDM and needs appropriate referral for management. (Fasting 92 mg/dL, 1 hour 180 mg/dL and 2 hours 153 mg/dL of Plasma Glucose)

Source: ADA-Standards of Medical Care in Diabetes – 2017

Please note: HbA1c can be used only if well standardized laboratory facilities are available and the availability of laboratory services must be verified when working in Primary care centres.

Classification of Diabetes
At Primary care level, the learner should be able to classify a diagnosed case of Diabetes into
- Type 1 Diabetes
- Type 2 Diabetes
- Gestational Diabetes
- Others – Diabetes in Chronic Calcific Diabetes etc.

Most of the cases, Type 1 and Type 2 will be obvious.
In young adolescents where there are problems, the case must be referred to get a reasonable conclusion as the treatment can be tailored accordingly.

Competency 3
Primary care doctor should be able to do clinical assessment of a person diagnosed to have diabetes mellitus.

Objectives: At the end of the session the learner should be able to
1) Evaluate a person diagnosed to have diabetes mellitus attending the primary care centre.

Time requirements: 15 Mins (Podium presentation interactive session 15 minutes)

Content
The following points must be documented in the case sheet on first visit and subsequent visits. Height, Weight, Waist circumference, BMI, Pulse rate, palpate and document peripheral pulses, BP in mm of Hg sitting, for postural hypotension (supine & standing), General examination specifically: pallor, edema, skin changes or infection, acanthosis nigricans, examination of feet: look for features of neuropathy especially sensory loss
[dryness, atrophy of muscles, calluses (thick hyper keratotic skin), web spaces, nails, paronychia, foot deformity], Systemic examination: specially for hepatomegaly, cardiomegaly, cardiac failure, any focus of infection.

**In a female patient**
Advise on the need of good glycemic control before planning pregnancy
In the reproductive age, always decide on teratogenic potential when prescribing drugs in diabetic, drugs to be avoided are ACE inhibitors, ARBs and Statins during pregnancy.
In post menopausal women, specifically look for vaginal infections.

**After clinical assessment**
Categorize the patient based on the age, gender, duration of diabetes, complications, co-morbidities, social support, and occupation, ability to manage -self help- and plan individualized care.
FPG, PPPG, blood urea, serum creatinine, HbA1c, a fasting lipid profile, assessment of random urine albumin-tocreatinine ratio, and a dilated fundus (eye) examination should be organized at diagnosis in all type 2 diabetes patients.

**Competency 4**
Primary care doctor should be able to manage and follow up diabetic patients.

**Objectives:** At the end of the session, the learner should be able
1. To provide patient education on diabetes.
2. To enlist currently available oral drugs.
3. To initiate and continue management with oral drugs.
4. To initiate and continue insulin appropriately in diabetes management.
5. Monitoring of glycemic control.

**Time requirements:** 30 Mins (Brain storming: 20minutes & Podium presentation:  30 Mins)

**Discuss the principles of Diabetes management.**
1. Patient education - dietary advice& physical activity
2. Oral drugs for diabetes
3. Insulin
4. Monitoring of glycemic control
5. Management of Blood Pressure, dyslipidemia, thyroid diseases, cardiovascular diseases

**Management of Diabetes in a Primary care level:-**

**Treatment goals are**
- Alleviation of symptomatic hyperglycemia
- Prevention of the development of diabetes complications
- Monitoring for & treatment of diabetes complications
- Diabetes self management, education & counselling
1. Patient education - dietary advice & physical activity

Patient Education
It is always preferable to have small sessions on patient education on the topics-
- What is diabetes
- What causes it
- Why we need to treat it
- The need for management even if there are no symptoms
- Role of diet and exercise
- Need for individualization of therapy
- Available treatment options, drugs, insulin
- Hypoglycemia recognition and management
- Other Complications
- The need for continuation of therapy.
(Common ppt presentations to be added)

This advice will empower the patient to tackle the disease long term.
The support from family and society is of great importance in diabetes management and every opportunity to spread correct information must be utilized by the primary care provider.

Dietary advice in a diabetic patient
A diabetic diet must be a balanced diet. It should not be anything totally different from what he or she is used to and based on his or her cultural beliefs and practices, and must be individualized. Proper dietary therapy and exercise is useful in reducing blood glucose and therefore HbA1c, similar to the tune of many currently available glucose lowering drugs.

It is a continuous process and must be re-enforced on each visit. Calorie requirement must be based on a patient's body weight (overweight, ideal or underweight) and physical activity (Sedentary / moderate or strenuous activity).

Complex carbohydrates are preferred to simple ones. About 4 to 5 servings of vegetables and fruits in moderation should be included. This diet will help to ensure adequate fibre intake. Proteins need to be restricted only in patients with advanced Chronic Kidney Disease (CKD). Cooking oil must be used sparingly. Avoid fried foods and sweets except very occasionally.

Smoking must be avoided. Alcohol pushes the patient to the risk of hypoglycemia, neuropathy and other complications like Chronic Liver Disease in a diabetic patient and hence not advisable.

Exercise in Diabetes
- There are many benefits of doing regular exercise in a diabetic patient. It increases energy expenditure and promotes weight loss.
- It also improves Insulin sensitivity and if regular can reduce the drugs or Insulin requirement.
- Improves blood pressure and lipid profile and hence lower Cardio Vascular Disease risk.
- Effective weight loss is the most cost-effective means of controlling diabetes
• It is advisable to have 30 minutes per day at least 5 days a week ie 150 minutes per week. In a person with long standing diabetes before advising on exercise, we have to assess the cardiac fitness, peripheral occlusive vascular disease, peripheral neuropathy, foot problems, visual disturbances including proliferative retinopathy and take decisions on an individual basis.

**Oral drugs for diabetes**

Four standard modalities of Diabetes management

- Diet, exercise, oral anti-diabetic drugs and Insulin

The management must be individualised and one drug will not fit all. Pharmacologic therapy includes Metformin, Pioglitazone, Sulfonylureas, other insulin secretagogues, and insulin.

Type 1 diabetes mellitus always needs Insulin. Type 2 diabetes mellitus if there are no acute hyperglycemic complications, start with oral drugs. Special care is required in prescribing and monitoring.

Diseases behave differently in elderly and we need to start low and go slow. With long acting sulfonylureas ie Glibenclamide, risk of life threatening hypoglycemia is high and hypoglycemia symptoms may be blunted. Glycemic goals must be individualized.

Requirement of Insulin, Sulphonyl ureas and Glinides (Repaglinide) comes down when patient develops renal impairment and always be careful to avoid hypoglycemia.

**Metformin**

Oral drugs are used only for type 2 diabetes mellitus and the first drug prescribed is almost always Metformin. Dose 500 mg BD and titrated to a maximum of 2000 mg per Day. Advantages of Metformin are it do not cause hypoglycaemia when used as monotherapy and do not cause weight gain; may contribute to weight loss.

**Contraindications for Metformin are**

- Advanced Renal insufficiency
- Liver failure
- Heart failure
- Severe gastrointestinal disease.

Metformin should be discontinued 24 hours before procedures requiring intravenous contrast dye and can be restarted 48 hours after the procedure if renal function is not compromised.

**Insulin Secretagogues – Sulphonylureas**

- Glipizide - 2.5 mg to 5 mg OD to BD
- Glimiperide – 1 mg to 4 mg OD
- Glibenclamide – 2.5 mg to 5 mg OD to BD (Avoid in situations of high risk for hypo as in elderly)

Important side effects are hypoglycemia and weight gain.

**Risk of hypoglycemia is higher in**

- Renal or hepatic insufficiency
- Elderly, debilitated or malnourished patients
- After severe or prolonged exercise
- Alcohol ingestion
- Multiple glucose lowering drugs
- Adrenal or pituitary insufficiency
Other oral drugs

- Pioglitazone 15 mg/day targets insulin resistance. Do not produce hypoglycemia. Important side effects are edema and weight gain, risk of fracture in post menopausal women by reducing bone density.

- α Glucosidase inhibitors are specifically used to reduce post prandial glucose spikes. Commonly used one is Voglibose – 0.2 to 0.3 mg with food. If a patient is on other drugs, patient may develop hypoglycemia and must be treated with oral glucose and not Sugar (Sucrose).

- DPP4 inhibitors: Sitagliptin, Vildagliptin, Saxagliptin, Linagliptin, Teneligliptin

Combination therapy
First drug in type 2 diabetes mellitus management is always Metformin. Then in the primary care level the second drug could be a Sulphonyl urea namely Glipizide or Glimeperide. If there is a high risk of hypoglycemia, Glitins can be a good choice. Post prandial hyperglycemia – α glucosidase inhibitor will be an option. Adherence in diabetes management depends upon the safety, affordability, availability of drugs and physician-patient communication and achieving the glucose control.

Insulin’s

Indications of Insulin therapy

- Type 1 Diabetes
- At onset, if FPG is > 250 mg/dl and ketonuria, dehydration
- In stressful situations – Infections, Stroke, MI
- During pregnancy
- Peri-operative state
- Acute complications
- Idiosyncrasies to oral anti-diabetic agents

*Before prescribing Insulin always assess that patients or caregivers have good visual and motor skills and cognitive ability.*

Normal physiology of Insulin secretion
Insulin is secreted from the β-cells of islets of Langerhans in the pancreas. α-cells secrete glucagon. Insulin is used for diabetes management from 1920s and from 1990s only human insulin is used replacing all animal insulins. In normal persons, in the nonfed state insulin is secreted in a low level known as basal insulin secretion and increased secretion following meal known as meal related insulin secretion. This helps to maintain normal blood glucose. Basal insulin secretion is needed to supress the hepatic glucose output. To mimic normal physiology of insulin secretion we need to give basal insulin to tackle the hepatic glucose output and bolus insulin for meal related peaks.

Pharmakokinetics of basal and bolus Insulins currently available
Pharnacokinetics of bolus (prandial) Insulins
Pharmacokinetics of basal insulin’s

<table>
<thead>
<tr>
<th>Insulin type</th>
<th>Onset</th>
<th>Peak activity</th>
<th>Duration of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPH Insulin</td>
<td>1-2 hrs</td>
<td>4-8 hrs</td>
<td>08-12 hrs</td>
</tr>
<tr>
<td>Insulin glargine</td>
<td>½ - 1 hr</td>
<td>No peak</td>
<td>20-24 hrs</td>
</tr>
<tr>
<td>Insulin Detemir</td>
<td>½ - 1 hr</td>
<td>No peak</td>
<td>16-24 hrs</td>
</tr>
<tr>
<td>Insulin degludec</td>
<td>½ - 1½ hrs</td>
<td>No peak</td>
<td>&gt; 24 hrs</td>
</tr>
</tbody>
</table>

Adjusting Insulin dose

<table>
<thead>
<tr>
<th>Glucose out of target</th>
<th>Adjust this Insulin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post BF / Pre lunch</td>
<td>Pre BF Rapid/Regular</td>
</tr>
<tr>
<td>Post lunch/Pre supper</td>
<td>Pre lunch Rapid/Regular or Morning NPH</td>
</tr>
<tr>
<td>Mid afternoon</td>
<td>Morning NPH or Detemir / Glargine</td>
</tr>
<tr>
<td>Post supper / Bed time</td>
<td>Pre supper Rapid/Regular</td>
</tr>
<tr>
<td>Early morning</td>
<td>Evening NPH / Detemir / Glargine</td>
</tr>
</tbody>
</table>

Complications of Insulin use: Most important and life threatening is hypoglycemia. Others are infections, local allergy, lipodystrophy, insulin oedema

Hypoglycemia

Always use medical IDs (with patients name, address, phone number, current treatment with the message that “I am a diabetic and if I am found unconscious”)
please take me to the nearest hospital") to get appropriate care if found unconscious.

- Blood glucose < 70 mg/dL is hypoglycemia, <40 mg/dL is severe hypoglycemia.
- Causes: A missed meal, unusual physical exercise, excessive dose of insulin or OHA, liver, kidney diseases.

**Hypoglycemia management:**
Consuming 15 gms of glucose or 1 table spoon sugar, recheck blood glucose after 15 minutes, repeat if hypo continues. Once blood glucose returns to normal eat a small snack if next meal is more than an hour away. If unconscious, or cannot take orally administer 15-20 grams of 50% Dextrose IV and recheck blood glucose after 15 minutes. Always assess and correct the precipitating cause.

**Insulin use – Practical tips**
Always be familiar with the following points:
- Strength of Insulin vials – 40 I.U./ml and 100 I.U./ml
- Use appropriate Syringes (40 IU/ml, 100 IU/ml)
- Regular & NPH insulin to be given 20-30mts. before the meal.
- Technique sub cutaneous plane, the site should be rotated in the same area as there are regional differences in absorption.
- Mixing insulin
- Storing insulin - 4-8 °C
- Options- Syringes, pens, prefilled pens

**How to start treatment**
To be individualized considering the following parameters:
- Onset & duration of diabetes
- Symptoms
- Weight loss & dehydration
- Vitals, Body weight, BMI
- Relevant biochemical investigations
- Education – Smoking, Alcohol
- Life style, income
- Hypoglycemia

Optimize the dose based on metabolic needs and frequent monitoring of blood glucose. Always we must prescribe the dose suit ing the patient’s life style and activity avoiding hypoglycemia and aiming the best possible control.

**Monitoring of Glycaemia Control**
The management includes regular monitoring. This can be done through plasma glucose estimations and self monitoring of blood glucose using glucometers.

**Competency 5**
Primary care doctor should be able to assess the complications of diabetes mellitus and to plan the approach.
Objectives: At the end of this session, the learner should be able
- To recognize the acute complications of diabetes.
- To recognize the chronic complications of diabetes.
- To give initial management and prompt referral of diabetes patients with complication.
- Prevention of type 2 diabetes in future generation.

Time requirements: 30 Mins (Presentation 20 Mins & Discussion 10 Mins)

Acute complications

Hyperglycemic complications – Diabetic ketoacidosis and hyperosmolar state

Hypoglycemia for the patient means the difference between life & death. "Identity card with Personal & diabetes treatment information" must be provided to all patients with diabetes. Less stringent treatment goals are kept in patients with limited life expectancies, in the very young or older adults, in individuals with co-morbid conditions and those with severe or frequent hypoglycemia.

Chronic Complication
- Micro vascular complications - (retinopathy, nephropathy, neuropathy)
- Macro vascular complications - CVD including CAD, Cerebro-vascular disease, Peripheral Vascular disease
- Diabetic foot - (Preventive foot care – education leaflet to be given)
- Dental care

Periodic screening – how to plan in basic care setting, refer for:
Screening for retinopathy, nephropathy and neuropathy
- Yearly from the diagnosis in type 2 diabetes
- With duration of 5 years in type 1 diabetes.

Competency 6:
Primary care doctors to assess and plan associated co-morbidities in diabetes mellitus

Objectives: At the end of the session, the learner should be able:
- To enumerate the important co-morbidities (hypertension, dyslipidemia, thyroid diseases, depression) and its management associated with diabetes.
- To manage diabetes in special situations.

Time requirement: 35 Mins (Group discussion: 20 mins & Podium presentation: 15 minutes)

Case scenario:
45 year old male having type 2 diabetes with good control of blood glucose on regular management. He is detected to have high blood pressure on two occasions and today his reading is 150/96 mm of Hg. He says he was evaluated last month and told he has no proteinuria. How are you going to manage?

Content
For patients without albuminuria, any of the four classes of blood pressure medications (ACE Inhibitors, Angiotensin Receptor Blockers, Thiazide-like diuretics, Calcium
Channel Blockers) can be used. Please refer Hypertension Module. Thiazides are known to cause hyperglycemia, hyperuricemia, hyponatremia, hypokalemia, lethargy and confusion especially in hot weather and needs extra caution when used. In nonpregnant patients with diabetes and hypertension having elevated urinary albumin–to–creatinine ratio, either an ACE inhibitor or an angiotensin receptor blocker is recommended. An ACE inhibitor or an angiotensin receptor blocker is not recommended for the primary prevention of diabetic kidney disease in patients with diabetes who have normal blood pressure, normal urinary albumin–to–creatinine ratio (30 mg/g creatinine), and normal estimated glomerular filtration rate. Statin therapy is recommended in all patients with type 2 diabetes mellitus and one other risk factor (which include LDL cholesterol > 100 mg/dL (2.6 mmol/L), high blood pressure, smoking, chronic kidney disease, albuminuria, and family history of premature cardiovascular disease.

Special situations
- Pregnancy:
  - Diagnosis and management of diabetes in Pregnancy is different and there should be pre-conception counseling and early screening in all female adolescent and young adults for early diagnosis and optimization of management.
  - Insulin is the treatment of choice in pre-existing diabetes in pregnancy and gestational diabetes.
  - There should be very frequent monitoring and optimization of treatment and if the primary care doctor has not attained adequate experience, it must be referred.
  - On every visit blood pressure must be recorded and if high must be treated.
  - All GDM patients, after the delivery must be encouraged for a healthy lifestyle and must be followed up with yearly fasting and 2 hrs postprandial plasma glucose for timely detection and treatment of diabetes.

Elderly and frail people:
- Diabetes need not come with the classic symptoms, could be falls, fatigue, dizziness, and increased incontinence due to hyperglycemia associated polyuria or weight loss.
- Risk of hypoglycemia is high in elderly people, frail people, living alone, having dementia, new onset diabetes, and requires repeated education and special care.
- Glibenclamide should never be started in this group as risk of hypoglycemia is very high in them. After metformin, shorter acting sulphonyl urea like Glipizide in smaller dose is preferred in this special group after Metformin if required.

Skill development
- Patient education
- Clinical assessment
- Diabetic foot assessment
- Insulin types and techniques
- Case studies
**Assessment: 5 MCQs**

1) Diagnostic criteria of diabetes include all except?
   a) FPG ≥ 126 mg/dL  
   b) PPMPG ≥ 140 mg/dL  
   c) RPG ≥ 200 mg/dL with classical symptoms of diabetes  
   d) HbA1c ≥ 7%

2) Patient with diabetes on glibenclamide reports episodes of palpitation, sweating and tiredness by evening. What will you suspect?
   a) DKA  
   b) Hypoglycemia  
   c) Anxiety state  
   d) None of the above

3) All are microvascular complication of diabetes except?
   a) Diabetic nephropathy  
   b) Diabetic neuropathy  
   c) Diabetic retinopathy  
   d) Diabetic gangrene

4) Type 1 diabetes patient on insulin brought to your clinic in an unconscious state with hypoglycaemia? What is your first treatment?
   a) Give orange juice  
   b) Give 1 mg glucagon  
   c) Give 25% dextrose 50 ml IV  
   d) Change the insulin dose

5) Patient is planning for a contrast CT, which drug must be stopped?
   a) Glibenclamide  
   b) Metformin  
   c) Insulin  
   d) Pioglitazone

**Answers: 1) B 2) B 3) D 4) C 5) B**
Stroke

Goal
Primary care doctors should be able to identify symptoms and signs of stroke, administer initial management and promptly refer to higher centre and follow up a patient with completed stroke.

Competencies
Primary care doctors should be able to
1. Identify symptoms and signs of stroke
2. Administer the initial management before referral to higher centre
3. To follow up a case of completed stroke

Module outline
1. Identify symptoms and signs of stroke
2. Administer the initial management before referral to higher centre
3. To follow up a case of completed stroke

Time requirement: **1 hr 15 mins** (Presentation 1 hr, Exercise 15 mins)

Competency- 1: **Total time 45 mins**
Primary care doctors should be able to identify symptoms and signs of stroke and diagnose an acute event of stroke.

Session objectives: At the end of the session the learner shall be able to
1. Identify the clinical features suggesting an acute event of stroke
2. Assess a patient with stroke

Brain storming session: **10 mins**
Podium presentation – **20 mins**

A stroke, or cerebrovascular disease, is defined as an abrupt onset of a neurologic deficit that is attributable to a focal vascular cause. Strokes can be classified into two major categories:

**Ischemic strokes** - Occur when a blood vessel supplying the brain is occluded.
**Hemorrhagic strokes** - Occur when a cerebral artery ruptures.

Although both forms can be life threatening, ischemic stroke rarely leads to death within the first hour, whereas hemorrhagic stroke can be fatal at onset. Even among those who survive the first few hours after a stroke, brain injury progresses quickly and can lead to permanent disability. The classification of stroke as ischemic or hemorrhagic is important because management of the two differs markedly.

**Transient Ischemic Attack (TIA)**
TIA means that all neurologic signs and symptoms resolve within 24 h without evidence of brain infarction on brain imaging. **TIA is the most important forecaster of impending stroke.**
Intracranial Haemorrhage
Caused by bleeding directly into or around the brain; it produces neurologic symptoms by producing amass effect on neural structures, from the toxic effects of blood itself, or by increasing intracranial pressure. It could be an intracerebral haemorrhage or a subarachnoid haemorrhage
- Hypertension is the most common cause of intracerebral hemorrhage.
- Other causes: Aneurysms and Arteriovenous malformations

The most common cause of a subarachnoid hemorrhage is an aneurysm rupture (excluding trauma). Arteriovenous malformations account for approximately 5% of all subarachnoid hemorrhages

Pathophysiology of Ischemic Stroke
Acute occlusion of an intracranial vessel causes reduction in bloodflow to the area of brain it supplies. A decrease in cerebral blood flow to zero, causes death of brain tissue within 4–10 minutes. If blood flow is restored to ischemic tissue before significant infarction develops, the patient may experience only transient symptoms, and the clinical syndrome is called a TIA.
Another important concept is the ischemic penumbra, defined as the ischemic but reversibly dysfunctional tissues surrounding a core area of infarction. The ischemic penumbra will eventually progress to infarction if no change in flow occurs, and hence saving the ischemic penumbra is the goal of revascularization therapies.

Risk factors of Stroke:

Modifiable risk factors:
- Hypertension
- Smoking
- Diabetes Mellitus
- Asymptomatic Carotid Stenosis
- Atrial Fibrillation
- Hyperlipidemia
- Sickle Cell Disease
- Other cardiac diseases
- Obesity
- Physical Inactivity
- Poor Diet/Nutrition
- Alcohol Abuse
- Drug Abuse
- Hypercoagulability
- Hormone Replacement Therapy
- Oral Contraceptive Use
- Vasculitis

Non modifiable risk factors:
- Age
- Sex
• Race/Ethnicity
• Family History

Stroke is considered in any patient with sudden onset of any of the following: weakness/numbness of one half of body or one part of body; inability or difficulty in speech; imbalance; blindness; dizziness or spinning; severe headache or loss of consciousness

Clinical features of a haemorrhagic stroke

Patients with haemorrhagic stroke may present with severe headache or vomiting due to raised intracranial pressure, Progressive deterioration from continued bleeding, neck stiffness from meningeal irritation, Bilateral babinski’s sign from enlargement of the haemorrhage beyond the blood vessel involved or coma from bilateral cerebral dysfunction or uncal herniation

2. Assessment of a patient with suspected stroke

Case scenario: 5 mins

A 65 yr old female with Type 2Diabetes Mellitus and hypertension develops acute onset left face droop, left arm and leg weakness.

-what are the key components of history you will look for?

-what are the key components of physical examination?

Podium presentation 10 min

Key Components of History

• Time of onset

Last Known Well Time: Identify and document the time when the patient was last known to be neurologically normal. If the patient was sleeping and wakes up with symptoms, time last know well is the last time the patient was seen to be normal. History of Head trauma or previous stroke including TIA, headache, seizures, loss of consciousness should be asked for.

Physical Examination

The physical examination must encompass all of the major organ systems

1. Airway, breathing, and circulation (ABCs)
2. Vital signs: pulse- rhythm abnormalities, absent pulses; BP-usually hypertension, temperature-look if febrile
3. A careful examination of the head and neck is essential. Contusions, lacerations, and deformities (suggest trauma as the etiology)

Three signs (Cincinnati Prehospital Stroke) which may indicate that the patient is having a stroke and should be hospitalised

1. Facial droop: Have the person smile or show his or her teeth. If one side doesn’t move as well as the other so it seems to droop, that could be sign of a stroke.
   • Normal: Both sides of face move equally
   • Abnormal: One side of face does not move as well as the other (or at all)
2. **Arm drift**: Have the person close his or her eyes and hold his or her arms straight out in front for about 10 seconds. If one arm does not move, or one arm drifts down more than the other, that could be a sign of stroke.
   - Normal: Both arms move equally or not at all
   - Abnormal: One arm does not move, or one arm drifts down compared with the other side

3. **Speech**: Have the person say, some simple, familiar words or sentence. If the person slurs the words, gets some words wrong, or is unable to speak, that could be sign of stroke.
   - Normal: Patient uses correct words with no slurring
   - Abnormal: Slurred or inappropriate words or mute

One of these 3 findings as a new event - 72% probability of an ischemic stroke. If all 3 findings are present the probability of an acute stroke is more than 85%

**Competency -2**: Total time 15 min

2. Primary care doctor should know the initial management of a patient with suspected stroke before referral to higher center.

**Interactive session: 15 min**

**Objectives**: To give appropriate initial management to patients with suspected stroke

**Management**
The goal for the emergent management of stroke is to assess the patient’s airway, breathing, and circulation (ABCs); stabilize the patient as necessary; and complete initial evaluation and assessment. Secure the airway by keeping the patients head to a side; if breathing is compromised, bag and mask ventilation will be required.

- Circulation should be maintained by securing a good IV line and infusing isotonic solutions Normal Saline or Ringer Lactate.
- Rule out hypoglycaemia by capillary glucose estimation if available
- Patient positioning: In nonhypoxic patients able to tolerate lying flat, a supine position is recommended. Patients at risk for airway obstruction or aspiration and those with suspected elevated intra cranial pressure should have the head of the bed elevated 15° to 30°. Patient has to be immediately referred to higher centre.

**Competency -3**: Time 15 Mins

Primary care doctor should be able to follow up a case of completed stroke

**Objective**: At the end of the session the learner shall be able to list the steps of follow up of a patient with completed stroke

**Interactive session 15 mins**

Follow up to be kept at 3 or 6 monthly intervals depending on individual merits of the case.
   - Look for Functional recovery
   - Check blood pressure and to be kept under control
   - Monitor compliance with rehabilitation measures
• Continue Tab Aspirin 75 mg OD or Tab Clopidogrel 75 mg OD - single anti platelet drug
• Tab Atorvastatin 10 mg HS
• Cardio-embolic strokes will need oral anticoagulants with monitoring of prothrombin time.
• Advice on Dietary and lifestyle modification.
• Counselling regarding vocational guidance and eventual return to work

**SKILL DEVELOPMENT**

**Clinical examination**-
- Important history elicitation
- Demonstration of signs of stroke in a patient

**Assessment MCQs**

1. The most common cause of intracerebral bleed is
   a) Aneurysm
   b) AV malformation
   c) Trauma
   d) Systemic hypertension

2. The most important forecaster of impending stroke
   a) Systemic hypertension
   b) Transient ischaemic attack
   c) Coronary Artery Disease
   d) Diabetes mellitus

3. Cincinnati prehospital stroke scale includes all EXCEPT
   a) Facial droop
   b) Speech abnormality
   c) Loss of consciousness
   d) Arm drift

4. Ischaemic but reversibly dysfunctional tissue surrounding an area of infarction is called
   a) Transition zone
   b) Ischaemic penumbra
   c) Pseudoinfarct
   d) None of the above

5. Appropriate initial management of a patient with suspected stroke includes all EXCEPT
   a) Maintain circulation
   b) Rule out hypoglycaemia
   c) Administer heparin
   d) Secure the airway

**Answers:** 1-d, 2-b, 3-c, 4-b, 5-c
**Chronic Obstructive Pulmonary Disease (COPD)**

**Goals**
Primary care doctor should be able to diagnose a case of COPD, differentiate this from other conditions of dyspnoea, manage and follow up effectively and identify red flag sign and refer promptly to higher centre.

**Competencies**
Primary care doctor shall be able to
1. Make a Diagnosis of COPD by differentiating it from other causes of dyspnoea
2. Manage stable COPD and acute exacerbations of COPD
3. Identify red flag signs and promptly refer to higher centre
4. Follow up of chronic obstructive airways disease patients

**Module outline**
1. Definition and Risk factors of chronic obstructive pulmonary disease (COPD)
2. Clinical features of COPD
3. Diagnosis of COPD
4. Management of stable COPD-pharmacological and non-pharmacological
5. Management of acute exacerbations
6. Red flag signs in COPD
7. Follow up and subsequent management

**Time Requirement:** 1 hr 30 min (Presentation: 45 min, Exercise: 45 min)

**Competency-1**
Make a diagnosis of COPD by differentiating it from other causes of dyspnoea

**Objectives:** At the end of the session the learner shall be able to:
1. Define chronic obstructive pulmonary disease
2. Enlist the risk factors for COPD
3. Identify the signs and symptoms of COPD
4. Diagnose a case of COPD

**Time requirement:** 30 Mins (Brain storming: 10 Mins, Podium presentation: 20 Mins)

**Content:**

**DEFINITION**
The Global Initiative for Chronic Obstructive Lung Disease (GOLD) defines COPD as a disease state characterized by progressive development of chronic airflow limitation that is not fully reversible and includes chronic bronchitis, emphysema, and small airway disease.
Emphysema is associated with long history of exertional dyspnoea, minimal cough with scanty, mucoid sputum whereas in Chronic bronchitis there is presence of cough and sputum production for at least 3 months in each of two consecutive years.

**Risk Factors for COPD**

1. Smoking is the most commonly recognized risk factor for the development of COPD.
2. Women may be more susceptible to lung injury from smoking than men.
3. Indoor Air Pollution
   a) Carbon Monoxide (CO), a by-product of combustion of fuels, burning cigarettes, gas cooking stoves, fireplaces and wood stoves, and unvented space heaters.
   b) Nitrogen Dioxide- from unvented gas cooking stoves and kerosene space heaters.
   c) Second hand Smoke (SHS) - refers to the combination of side stream smoke that is released from the cigarette’s burning end and the mainstream smoke exhaled by the smoker
   d) Others---Wood smoke, organic compounds- released from furnishings and equipment, construction materials, and consumer and office products, asbestos and artificial fibers, biological agents including indoor allergens and microbes.
4. Occupation—construction works
5. Childhood lower respiratory infection
6. Genetics—alpha 1 antityrpsin deficiency.

**Key indicators** for considering a diagnosis of COPD

1. Progressive dyspnoea
2. Chronic cough and sputum production
3. History of exposure to risk factors: Tobacco smoke (including popular local preparations), Smoke from home cooking and heating fuels. Occupational dust and chemicals.
4. Family history of COPD

**Symptoms**

- Dyspnoea : a cardinal symptom of COPD
- Chronic Cough : often the first symptom of COPD
- Sputum production : small quantities of tenacious sputum after coughing bouts

**Assessment of Disease**

1. Symptom assessment
2. Assessment of exacerbation
3. Assessment of comorbidities
4. Pulse oximetry (if available)
Symptom assessment

Modified Medical Research Council Questionnaire for Assessing the Severity of Breathlessness

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not troubled with breathlessness except with strenuous exercise</td>
</tr>
<tr>
<td>1</td>
<td>Troubled by shortness of breath when hurrying on the level or walking up a slight hill</td>
</tr>
<tr>
<td>2</td>
<td>Walks slower than people of the same age on the level because of breathlessness or has to stop for breath when walking at own pace on the level</td>
</tr>
<tr>
<td>3</td>
<td>Stops for breath after walking about 100 yards or after a few minutes on the level</td>
</tr>
<tr>
<td>4</td>
<td>Too breathless to leave the house or breathless when dressing or undressing</td>
</tr>
</tbody>
</table>

2) Assessment of exacerbation-The best predictor of having frequent exacerbations (2 or more exacerbations per year) is a history of previous treated events.

3) Assessment of comorbidities- Comorbidities that occur frequently in COPD patients include cardiovascular disease, respiratory infection, skeletal muscle dysfunction, diabetes mellitus, osteoporosis, anxiety and depression and lung cancer, bronchiectasis etc. Though we can consider diagnosis of COPD in a patient with cardinal features confirmation of diagnosis requires Spirometry.

COPD and Differential diagnosis

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPD</td>
<td>Onset in mid-life. Symptoms slowly progressive. History of tobacco smoking or exposure to other types of smoke</td>
</tr>
<tr>
<td>ASTHMA</td>
<td>Onset early in life (often childhood). Symptoms vary widely from day to day. Symptoms worse at night/early morning. Allergy, rhinitis, and/or eczema also present. Family history of asthma.</td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td>H/o heart disease may be present, Predominantly exertional breathlessness, bilateral pedal oedema, bilateral basal crepitations</td>
</tr>
<tr>
<td>Bronchiectasis</td>
<td>Large volumes of purulent sputum. Commonly associated with bacterial infection. Chest X-ray/CT shows bronchial dilation, bronchial wall thickening</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>Onset all ages. Chest X-ray shows lung infiltrate. Microbiological confirmation. High local prevalence of tuberculosis</td>
</tr>
</tbody>
</table>

Competency-2
Manage stable COPD and acute exacerbations of COPD

Objectives: At the end of session learner shall be able to
1. Describe pharmacologic and non-pharmacologic methods of management
2. List the drug used in treatment of COPD
3. Describe steps in treatment of COPD
**Time requirement:** **45 Mins** (Brain storming: 10 mins, Presentation: 20min, Case scenario: 15 min)

**Management - Therapeutic option for COPD**

- **STABLE COPD**
- **EXACERBATION**
- **NON pharmacological**
- **Pharmacological**

**Management of stable COPD**

**Pharmacotherapy**

**Aims**
1. To reduce symptoms
2. To reduce frequency/severity of exacerbations
3. To improve health status
4. To reduce mortality

**Drugs commonly used**

<table>
<thead>
<tr>
<th>Bronchodilators</th>
<th>SHORT ACTING</th>
<th>Duration of action</th>
<th>Inhaled Medication (micro gm)</th>
<th>Nebulizer Mg/ml</th>
<th>Oral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salbutamol</td>
<td></td>
<td>4-6 hrs</td>
<td>100, 200 micro gm (MDI &amp; DPI)</td>
<td>5mg/ml</td>
<td>2mg or 5mg Syrup 2mg/5ml</td>
</tr>
<tr>
<td>Levosalbutamol</td>
<td></td>
<td>6-8 hrs</td>
<td>45-90 (MDI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LONG ACTING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salmeterol</td>
<td></td>
<td>12hrs</td>
<td>25-50 (MDI &amp; DPI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formoterol</td>
<td></td>
<td>12hrs</td>
<td>4.5-12 (MDI &amp; DPI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ANTICHOLINERGIC</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>SHORT ACTING</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ipratropium bromide</td>
<td></td>
<td>6-8 hrs</td>
<td>20, 40 (MDI)</td>
<td>0.25-0.5</td>
<td></td>
</tr>
<tr>
<td>Tiotropium</td>
<td></td>
<td>24hrs</td>
<td>18 (DPI), 5 (SMI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COMBINATION short-acting beta2-agonist plus anticholinergic in one inhale</strong></td>
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<td></td>
</tr>
<tr>
<td>Salbutamol/Ipratropium</td>
<td></td>
<td>6-8hrs</td>
<td>100/20 (SMI)</td>
<td></td>
<td></td>
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<tr>
<td>Inhaled corticosteroids</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Beclomethasone</td>
<td>50-400</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Budesonide</td>
<td>100,200,400</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Fluticasone</td>
<td>50-500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYSTEMIC</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>CORTICOSTEROID</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Prednisolone</td>
<td>5-60mg</td>
<td></td>
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</tr>
</tbody>
</table>

- For both beta2-agonists and anti-cholinergics, long-acting formulation are preferred over short-acting formulations.
- The combined use of short- or long-acting beta2-agonists and anti-cholinergics may be considered if symptoms are not improved with single agents.
- Long-term treatment with inhaled corticosteroids is recommended for patients with severe and very severe COPD and frequent exacerbations that are not adequately controlled by long-acting bronchodilators.
- Long-term mono-therapy with inhaled corticosteroids is not recommended in COPD because it is less effective than the combination of inhaled corticosteroids with long acting beta2-agonists.
- Long-term treatment containing inhaled corticosteroids should not be prescribed outside their indications, due to the risk of pneumonia and the possibility of an increased risk of fractures following long-term exposure.
- Consider antibiotics when signs of bacterial infection.

**Non-pharmacologic treatment**

- Smoking cessation
- Identify / reduce biomass fuel and other allergen exposure
- Respiratory protective measurement
- Change of work environment

**Vaccination**

- Pneumococcal
- Influenza vaccine annually

1) **Smoking Cessation** - Smoking cessation should be considered the most important intervention for all COPD patients who smoke regardless of the level of disease severity.

2) Physical Activity
3) Rehabilitation
4) Vaccination

**Case scenario: 10mins**

**Case-1**

50 year old male, a smoker, c/o recurrent dyspnoea on exertion of 3 years duration, cough with white mucoid sputum. He is a painter by occupation. No h/o allergy/atopy, hemoptysis. He is not a Diabetic or hypertensive. O/E-Ptdyspnoeic, emaciated, No cyanosis,
clubbing or pedal oedema. Respiratory system examination. B/L rhonchi++. His sputum AFB-negative, X-ray chest, Hyperinflation, tubular heart.

**Discussion**

From history and clinical examination, diagnosis of COPD can be made [For confirmation of diagnosis and for staging PFT is needed for which patient is to be referred to higher center, matter discussed and reference given.]

Treatment to be started with inhaler therapy with SABA or anticholinergics [tiotropium/Ipratropium] and oral theophyllines.

Smoking cessation and use of mask or towel while working should be advised.

Patient to be reviewed and advised to continue on Ipratropium MDI.

**Management of COPD exacerbations**

- Goal of treatment for COPD exacerbations are to minimize the impact of the current exacerbation and prevent the development of subsequent exacerbations.
- More than 80% of exacerbations can be managed on an outpatient basis with pharmacologic therapies including bronchodilators, corticosteroids, and antibiotics (if needed)
- The most common cause appears to be viral upper respiratory tract infections and infection of the tracheobronchial tree, where antibiotics are not needed.
- Antibiotics should be given to patients with exacerbations of COPD who have three cardinal symptoms – increase in dyspnea, sputum volume, purulent sputum

**Management of severe but not life threatening COPD**

1. Increase doses and/or frequency of short-acting bronchodilators
2. Combine short-acting beta2-agonists and anticholinergics
3. Use spacers or air-driven nebulizers
4. Add oral corticosteroids

Therapy with oral prednisolone 40 mg daily

Antibiotic if sputum purulent, increased volume, increased cough

**Case no. 2- (5 Min)**

The same patient in Case No.1, patient lost for follow up. Six months later he came back with c/o severe dyspnoea, cough productive with purulent sputum and fever. No hemoptysis, O/E – Patient dyspnoeic, chest bilateral rhonchi present. How do you manage this patient?

**Management to be given**

- O2 inhalation
- Nebulization with sabutamol 5mg/ipratropium 500 microgram
- Inj.Deriphylline 100 mg I/V
- Inj.Hydrocortisone 100 mg i/v or Tab.Prednisolone 40 mg st.
- Once Patient is better, could be discharged with advice
- MDI –LABA/ICS combination (Budesonide+Formoterol)-1 puff thrice daily
✓ Oral prednisolone 40 mg once daily for 5 days
✓ Antibiotic-Amoxycillin+Clavulanate 625mg1-0-1 for 5 days
✓ Supportive/symptomatic measures

**Competency-3: Time 5 Mins**

**Objective:** Identify red flag signs and promptly refer to higher centre

**Indication for Referral**

Severe dyspnea, cyanosis, drowsiness, hypotension, arrhythmias, silent chest

**Competency- 4: Time 10 Mins**

Follow up of chronic obstructive airway disease patients

**Group discussion**

**Follow up of patient**

For both chronic stable patients and patients referred back from higher centre. Check for aggravation of signs/symptoms, and also look for any need to step up treatment. On each visit compliance to treatment should be assessed, correct inhaler technique advised and various non-pharmacological measures to be taught

**Assessment: MCQs**

1) The following is a prominent clinical feature of emphysema  
   a) Recurrent cough b) Profuse sputum production c) Exertional dyspnoea d) All of the above

2) Risk factors for COPD are all EXCEPT  
   a) Smoking b) Exercise c) Air pollution d) Alpha-1 antitrypsin deficiency

3) The cardinal symptoms of COPD are all EXCEPT  
   a) Dyspnoea b) Chronic cough c) Sputum production d) Chest pain

4) The following are indications for antibiotic therapy in COPD  
   a) Worsening of dyspnoea b) Purulent sputum c) Increase in sputum volume d) All of the above

5) The most common cause of an acute exacerbation of COPD is  
   a) Pneumonia b) Upper respiratory infection c) Tuberculosis d) Carcinoma lung

6) Indications for referral of a patient with COPD exacerbation are all EXCEPT  
   a) Cyanosis b) Hypotension c) Fever d) Silent chest

**Answers:** 1-c 2-b 3-d 4-d 5-b 6-

**Skill development**

1) Clinical case discussion, 2) Demonstration of physical findings, 3) Objective Structured Clinical examination (OSCE)
Bronchial Asthma

Goal
The primary care doctors should be able to diagnose a case of bronchial asthma from different causes of dyspnoea, effectively manage the acute exacerbations of bronchial asthma, identify the redflag signs and promptly refer the patients to higher centre and also do the follow up treatment of patients with Bronchial Asthma.

Competencies
The primary health care doctor should be able to:
1. Diagnose Bronchial Asthma by differentiating this from other causes of acute dyspnoea
2. Manage acute exacerbations of bronchial asthma
3. Identify red flag signs and promptly refer the patient to higher centre
4. Follow up the patients with bronchial asthma

Module Outline
1. Important causes of acute onset of dyspnoea
2. Definition of bronchial asthma
3. Diagnosis of asthma
4. Investigations
5. Goals of management of bronchial asthma
6. Pharmacological management
7. Assessment of severity and management of acute exacerbation
8. Red flag signs
9. Non pharmacologic and pharmacologic management of a patient on follow up
10. Steps to assess control of asthma
11. Identify difficult asthma

Total Time requirement: 1Hr 30 min (Presentation: 55 min, Exercise: 35 min)

Competency 1
To diagnose bronchial asthma

Objective: At the end of the session the learner shall be able to differentiate the causes of acute onset of dyspnoea and diagnose bronchial asthma

Time requirement: 15 mins
Brain storming session 5 mins- Causes of dyspnoea, diagnosis of bronchial asthma
Podium/powerpoint presentation- 10 mins

Content:
1. Important Causes of acute onset of dyspnoea
   - Acute Bronchial asthma
   - Acute exacerbation of COPD
- Pneumothorax
- Acute left ventricular failure
- Foreign body inhalation
- Acute pulmonary embolism

2. Definition of Bronchial Asthma
Chronic inflammatory disorder of airways associated with airway hyper responsiveness leading to episodes of wheezing, dyspnoea, chest tightness, and cough with variable airflow limitation within lungs, which is reversible spontaneously or with treatment.

3. Various factors precipitating factors of Asthma

4. Salient features of other causes of dyspnoea
   a) **Acute exacerbation of COPD**: Breathlessness and Chronic cough with mucoid sputum, No symptom free period. On examination, breath sounds equal bilateral, bilateral rhonchi
   b) **Pneumothorax**: Acute onset of dyspnoea associated with chest pain, O/E Tracheal shift, Absence of breath sounds on affected side
   c) **Acute left ventricular failure**: Acute onset of dyspnoea during night, paroxysmal nocturnal dyspnoea, cough with frothy sputum/haemoptysis, chest-bilateral basal crepitations
   d) **Foreign body inhalation**: usually in children associated with stridor, sudden onset of breathlessness
   e) **Acute pulmonary embolism**: acute onset of breathlessness, chest pain, haemoptysis, loud P2, pulmonary hypertension
5. Diagnosis of Asthma
Diagnosis is mainly clinical. Recurrent wheeze, cough, chest tightness, shortness of breath – symptoms worse at night/early morning; H/O triggering factors may be present; O/E: breath sounds equal, bilateral polyphonic wheeze.

6. Investigations
- Blood routine examination to assess eosinophil count, absolute eosinophil count and to r/o infections
- Chest X-ray (if available for patients not responding to treatment, r/o pneumothorax, pneumonia)
- PEFR – Peak Expiratory Flow Rate—measured with a peak flow meter (if available)

Competency 2
Management of acute exacerbations of bronchial asthma

Objectives: At the end of the session, the learner shall be able to
1. Enlist the Goals of management
2. Enlist the various groups of drugs used in management
3. Describe the assessment of severity and management of a patient with bronchial asthma

Time Requirement: 45 min (Brain storming: 5 mins, Podium presentation: 20 min)

Content
1. Goals of management of bronchial asthma
   - Control of symptoms
   - Achievement of normal/near normal lung function
   - Maintaining normal activity levels
   - Prevention of exacerbations

2. Pharmacological management

Drugs- classification
1. Bronchodilators (Relievers)-Quick relief of symptoms by acting on airway smooth muscles
   a) Beta 2 agonists- Inhaled/oral Short Acting Beta Agonists (SABA)
   b) Anticholinergics - prevent cholinergic induced bronchoconstriction and mucus secretion
   c) Phosphodiesterase inhibitors (Methyl xanthines)- short acting theophylline

2. Controllers (Preventers)-prevent the onset of symptoms by controlling inflammation
   a) Inhaled corticosteroids,
   b) Systemic corticosteroids,
   c) Long Acting Beta Agonists (LABA)
d) Sustained release theophylline
e) Antileukotrienes

Table 1: Bronchodilator drugs in Bronchial Asthma

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Dose</th>
<th>Mechanism of action</th>
<th>Adverse effects</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SABA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Salbutamol</td>
<td>Oral: 2-4mg</td>
<td>Relaxes smooth muscle cells</td>
<td>Tremor</td>
<td>Quick onset of action, persists for 4-6hrs</td>
</tr>
<tr>
<td></td>
<td>Inhalation: 100-200mcg Q8H</td>
<td>Inhibits Inflammatory cells-mast cells</td>
<td>Arrhythmias Hypertension</td>
<td></td>
</tr>
<tr>
<td>- Levosalbutamol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LABA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Formoterol</td>
<td>Inhalation: 4.5-9mcg Q12H</td>
<td></td>
<td></td>
<td>Slow onset of action Persists for &gt;12 hrs</td>
</tr>
<tr>
<td>- Salmeterol</td>
<td>50-100 mcg Q12H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Anticholinergic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ipratropium bromide</td>
<td>Inhalation 40 mcg QID</td>
<td>Muscarinic receptor Antagonists</td>
<td>Mucosal dryness</td>
<td>Synergetic to beta2 Agonists</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Less effective than Beta 2 agonists</td>
<td>Useful in COPD/elderly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Action 4-6hrs</td>
</tr>
<tr>
<td><strong>Tiotropium bromide</strong></td>
<td>Inhalation 2.5 mcg OD</td>
<td>Prevent bronchoconstriction &amp;mucus secretion</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Methyl xanthines</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theophylline</td>
<td>Oral-100-300mg Q8H I/V or I/M 100mg Q8H</td>
<td>Weak anti-inflammatory &amp;immunomodulator smooth muscle relaxation improve diaphragmcontractility &amp; mucociliary clearance</td>
<td>Nausea, vomiting Arrhythmias, seizures Insomnia</td>
<td>Long term prevention of symptoms Add on benefit to Inhaled/oral steroid Narrow therapeutic range</td>
</tr>
<tr>
<td>Aminophylline</td>
<td>I/V-250 mg slow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doxophylline</td>
<td>Oral-400mg OD</td>
<td></td>
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</tr>
</tbody>
</table>
### Table 2. Anti-inflammatory drugs used in Bronchial Asthma

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Mechanism of action</th>
<th>Dosage</th>
<th>Adverse effects</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Corticosteroids</strong></td>
<td>Reduces inflammatory cell activation; ICS reduce bronchial hyperirritability and mucosal edema; Supress inflammatory response to Ag-Ab reaction</td>
<td>200-1600mcg 100-1000mcg</td>
<td>ICS-cough, dysphonia Oral candidiasis, Anorexia, laryngomalacia Systemic steroids hypokalemia Worsening of diabetes, peptic ulcer Myopathy, osteoporosis</td>
<td>Maximise therapy with ICS Oral steroids-Minimum dose Possible During exacerbations Prednisolone Tab.form 40-50mg OD for 5 days</td>
</tr>
<tr>
<td><strong>1. Inhaled (ICS)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beclomethasone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budesonide</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Fluticasone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. Systemic steroid</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral, I/V or I/M</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prednisolone</td>
<td>Tablet</td>
<td>20-40mgOD Oral-6-12mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deflazacort</td>
<td>Tablet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methyl Prednisolone</td>
<td>Both tab/Inj.</td>
<td>Tab-4-16mg Inj.125-250mg 100mgIVQ8H 0.5-5mgqd Inj.4-8mgqd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrocortisone</td>
<td>Injection form</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>Both tab and injection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Anti-leukotrienes</strong></td>
<td>Anti inflammatory Action through Competitive antagonism of leukotrienes</td>
<td>Oral 5-10mgOD</td>
<td>Rarely headache, cough, Nausea, diarrhea For asthma induced by exercise &amp; aspirin, add on therapy to ICS</td>
<td></td>
</tr>
<tr>
<td>Monteleukast</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### A. Modes of delivery of drugs
- Parenteral/Oral/Aerosol
- Aerosol
Case Scenario (10 min)

39 year old male, smoker, presented with complaints of cough & dyspnoea of 2 weeks, fever of 1 day. H/o Cough with mucoid sputum; Both cough and dyspnoea were more at night and early morning. No h/o chest pain; Past h/o similar episodes for 2 years and on oral drugs; No h/o any comorbidities. O/E : Patient is dyspnoeic; RR-25/min, PR-100/mt, BP-130/80 mm Hg, afebrile; No pallor/cyanosis/clubbing; Respiratory system examination breath sounds equal; B/L expiratory rhonchi present.

Q.1. What is the diagnosis?
Q.2. How will you manage the patient?

3. Assessment of severity and management of acute exacerbation

Podium presentation - 10 min

Content:

If patient presents with acute/subacute asthma exacerbation, assess severity as per the clinical features.

<table>
<thead>
<tr>
<th>Mild – Moderate</th>
<th>Severe</th>
<th>Life threatening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory rate ≤ 25/min</td>
<td>Respiratory rate ≥ 25/min</td>
<td>Silent chest</td>
</tr>
<tr>
<td>Able to complete sentences in 1 breath</td>
<td>Inability to complete sentences in 1 breath</td>
<td>Cyanosis</td>
</tr>
<tr>
<td>Heart rate &lt; 110/min</td>
<td>Heart rate ≥ 110/min</td>
<td>Feeble respiratory effort</td>
</tr>
<tr>
<td>PEF &gt;50% predicted</td>
<td>PEF 33–50% predicted</td>
<td>Bradycardia or arrhythmias</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hypotension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Confusion/Coma</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SpO2 &lt;92 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEF &lt; 33 %</td>
</tr>
</tbody>
</table>

Management

Mild-moderate Asthma
1. Inhaled beta agonist - Nebulisation using salbutamol (0.5 ml) OR 4-10 puffs by MDI (preferably with a spacer); repeat every 20mts for 1 hr
2. Inj.Hydrocortisone 100-200 mg IV stat dose OR Tab.Prednisolone 40 mg stat dose
3. Oxygen inhalation
Assess after 1hr-symptoms improved and SpO2>94%
Patient may be discharged once the patient improves with advice to continue inhaled beta agonist; step up dose of inhaled corticosteroids, Tab.Prednisolone for 5-7 days (no need for tapering).

**Severe/Life threatening asthma**

Any case of severe or life threatening asthma requires hospitalisation and intensive management, and henceforth be referred urgently to a higher centre. However, the initial management may be given at the primary health centre before referral.

1. Inhaled beta agonist - Nebulisation using salbutamol (0.5 ml)
2. Inj. Hydrocortisone 100-200 mg IV stat dose OR Tab. Prednisolone 40 mg stat dose
3. Oxygen inhalation

**Competency 3**

Identify red flag signs and promptly refer the patient to higher centre

**Objective:** At the end of the session the learner shall be able to identify the red flag signs and promptly refer the patient to higher centre

**Time requirement:** **15 min** (Brainstorming - 5 min, Question answer session: 10 min)

**Content:**

Identify the red flag signs

- Features of acute severe/life threatening asthma-
- Suspicion of pneumothorax
- Patient in hypotension
- Patient with mild to moderate asthma not improving with the standard treatment

If any of these are present patient need to be referred immediately to higher center

**Question answer session**

1. Features of acute severe asthma
2. What do you mean by the term ‘silent chest’?
3. What are the clinical features by which you diagnose pneumothorax?
4. What all precautions should be taken before referral of a patient with acute severe asthma?

**Competency - 4**

Follow up and subsequent treatment of patients

**Objectives:** At the end of the session the learner shall be able to

1. Describe the Non pharmacological and pharmacological management of a patient on follow up
2. Describe the step wise approach in management
3. List the steps to assess control of asthma
4. Identify difficult asthma

**Time requirement:** Presentation: 15min

**Content:**

a) **Non pharmacological management**
   - Smoking cessation
   - Avoid exposure to allergens
   - Breathing exercises

b) **Pharmacological management**
   - Reliever - as and when needed,
   - Controller - continue in high dose for short term (1-2wks) or Long term (3 mths)
   - Check and correct modifiable risk factors including inhaler technique
   - Step down once good control is achieved for 3 months

c) **Describe the step wise approach in management**

<table>
<thead>
<tr>
<th>Choice of drugs</th>
<th>Step-1</th>
<th>Step-2</th>
<th>Step-3</th>
<th>Step-4</th>
<th>Step-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferred Controller</td>
<td>Low dose inhaled ICS</td>
<td>Low dose ICS+ LABA</td>
<td>Medium/high dose ICS+LABA</td>
<td>Step 4+ oral steroid, Anti IgE (either one or both)</td>
<td></td>
</tr>
<tr>
<td>Other Controller</td>
<td>Leukotriene modifier</td>
<td>Medium/High Dose ICS or Low dose ICS+ Leukotriene modifier/Theophylline SR</td>
<td>Leukotriene modifier, Theophylline SR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliever</td>
<td>SABA (As and when needed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**d) Asthma control assessment**
   - Daytime symptoms less than twice a week
   - No nocturnal symptoms
   - No activity limitation
   - SABA use less than twice / week
   - Normal PEFR value

**e) Difficult Asthma**
When asthma is not controlled despite adequate ICS/LABA inhaler treatment Suspect-
   - Non compliance of medication
   - Exposure to high allergen concentration
   - Infections-viral/bacterial
   - GERD
   - Post nasal drip
   - Drug induced – beta blockers, aspirin, NSAIDs, ACE inhibitors
ASSESSMENT OF LEARNER – MCQ (10 NO.S)

1. Triggers for bronchial asthma include all EXCEPT?
   a) Allergens  b) Exercise  c) Irritant gases  d) Losartan

2. The following is true about bronchial asthma?
   a) Diagnosis is mainly clinical       b) No genetic predisposition
   c) Stress is not a triggering factor  d) Irreversible

3. Which of the following is not a beta 2 agonist?
   a) Salbutamol  b) Levosalbutamol  c) Ipratropium bromide  d) Salmeterol

4. Which of the following is a Long Acting beta 2 agonist?
   a) Salbutamol  b) Levosalbutamol  c) Ipratropium bromide  d) Formoterol

5. Which of the following is an anti-inflammatory drug used in management of asthma?
   a) Salbutamol  b) Formoterol  c) Ipratropium  d) Monteleukast

6. Which of the following is NOT an adverse effect of theophylline?
   a) Seizure  b) Arrhythmia  c) Insomnia  d) Tremor

Skill development (psychomotor domain)

- Demonstration of patients with varying severity of bronchial asthma
- Use of nebuliser – using nebulising solution/respules
- Use of inhalers-MDI, MDI+Spacer, Powdered dose inhaler
- Use of peak flow meter (if available)

Communication skill development (Affective domain)

- Explaining to patients about triggers of bronchial asthma
- Discussing about non pharmacological management
- Ensuring compliance to treatment
- Educating about complications
Acute Poisoning

“All things are poison and nothing is without poison. The dose is the sole thing that determines that a thing is not a poison” - Paracelsus; Renaissance father of toxicology

Goal
The primary care physician should be able to recognize the clinical presentations of common poisonings, to give the initial care, to identify the red flag signs and promptly refer the patient to higher center

Competencies
Primary care doctor should be able
1) To enumerate common poisonings seen in Kerala.
2) To recognize clinical features of common poisons and understand the possible toxidrome involved.
3) To give initial resuscitation, proper case recording and prompt referral.

Module outline
1) Common poisonings in Kerala.
2) Clinical presentation of common poisoning.
3) Toxidromic approach to symptomatology.
4) Resuscitation and stabilization in poisoning.

Time requirement: 60 minutes (presentation 50 minutes & exercise 10 minutes)

Competency 1
1) To enumerate common poisonings seen in Kerala.

Objective: At the end of the session primary care doctor should be able to
1) Enumerate the common poisonings seen in Kerala.

Time requirement: (Brain storming 10 minutes & podium presentation 10 minutes)

Content
Poisoning, which amounts to 33% of all suicide deaths in India, is ranked first among the different means of suicide. In spite of these, Kerala tops in number of suicides, which comes to about 25.5/lakh, the national average being only 10/lakh

Common poisonings in Kerala
- Organo phosphorous compound (OPC) poisoning
- Paraquat poisoning
- Pyrethroid compounds
- Rodenticide poisoning
- Pharmaceutical products - Paracetamol, Psychotropic drugs.
- Corrosive poisoning
- Plant poison – Cerebra Odollum, Datura.
Competency 2
To recognize clinical features of common poisons and understand the possible toxidrome involved.

Objectives
At the end of the session primary care doctor should be able to
1. Identify the clinical features of common poisons.
2. Recognize the possible toxidrome involved.

Time requirement: (Interactive session, 20 minutes)

Case scenario 1
50 year old male attempted suicide by ingesting unknown substance, and was presented with altered sensorium, sweating and fasciculation all over the body. On arrival, his consciousness level was GCS 3 (E1VTM1), blood pressure 136/86 mmHg, and pulse rate 57/min. His pupils were miotic (1 mm), chest showing crepitation bilaterally.
1) What is your diagnosis?
2) What immediate treatment will you give?

Content
Clinical features of Organophosphorous compound poisoning.

<table>
<thead>
<tr>
<th>Time of manifestation</th>
<th>Mechanism</th>
<th>Manifestation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute (minute to 24 hours)</td>
<td>Nicotinic receptors</td>
<td>Weakness fasciculation, Cramps, paralysis</td>
</tr>
<tr>
<td></td>
<td>Muscarinic receptors</td>
<td>Salivation, lacrimation Urination, defecation, gastric cramps, emesis, bradycardia, hypotension, miosis, Bronchospasm</td>
</tr>
<tr>
<td></td>
<td>Central receptors</td>
<td>Anxiety, restless, convulsion, respiratory depression</td>
</tr>
<tr>
<td>Delayed 24 hrs-2 weeks</td>
<td>Nicotinic receptor action</td>
<td>Intermediate syndrome</td>
</tr>
<tr>
<td></td>
<td>Muscarinic receptor action</td>
<td>Bradycardia, miosis, salivation</td>
</tr>
<tr>
<td></td>
<td>Central receptor actions</td>
<td>Coma, extra pyramidal symptoms.</td>
</tr>
<tr>
<td>Late beyond 2 weeks</td>
<td>Peripheral neuropathy target esterase</td>
<td>Peripheral neuropathy</td>
</tr>
</tbody>
</table>

Paraquat poisoning
Principal manifestations of paraquat poisoning are respiratory distress and cyanosis
Ingestion
Immediate - burning mouth
After 2-5 days - hemoptysis, oliguria, ulceration of the tongue, pharynx, oesophagus
After 5-8 days – jaundice, fever, tachycardia, respiratory distress, cyanosis

**Plant poisoning**
1. Cerebra odollum (othalanga) poisoning

“Othalanga” is a poisonous fruit of a herb (Cerbera odollum) grown widely in marsh and swamp areas. In Alappuzha district several people die by consuming this, either accidently or with the purpose of suicide or homicide.

**Clinical features are**
- Nausea, vomiting, intense abdominal pain
- Burning sensations in the mouth, diarrhea,
- Cardiac arrhythmias varying from bradycardia to tachycardia, and sudden cardiac death
- Headaches, dilated pupils
- Drowsiness and coma.

**Datura poisoning (Ummathinkaya)**

Typical findings in Datura poisoning include
- Pupillary dilation, flushing, fever,
- Amnesia, urinary retention, decreased salivation,
- In more severe poisoning, active hallucinations, extreme agitation,
- Cardiac arrhythmias, convulsions, delirium, stupor, or coma may occur.

**Paracetamol poisoning**

**Early:** Non specific
- Anorexia
- Vomiting

**24-48 hours:**
- Onset of liver injury
- AST,ALT may exceed 10,000IU
- Renal injury

**2 to 5 days:**
- Liver & Kidney injury resolve in most patients.
- Some patient may develop fulminant liver failure.

**Rat Killer Poisoning**

Rat poison contains zinc phospide and can produce acute liver failure. Symptoms include repeated vomiting, nausea and abdominal pain followed by features of liver failure

**Toxidromic approach to symptomatology:**
5 Basic Toxidromes

**Anticholinergic:**
- “Hot as ahare, Mad as a Hatter, red as a Beet, dry as a bone, blind as a bat”
- Signs due to muscarinic receptor blockade: Delirium, tachycardia, dry flushed skin, dilated pupils, myoclonus, slightly elevated temperature, urinary retention, decreased bowel sounds, seizures, dysrhythmias
- Antihistamines, antiparkinsonians, atropine, scopolamine, amantadine, antipsychotics, antidepressants, muscle relaxants, plants
- Supportive care, intravenous fluids, benzodiazepines, phystostigmine in uncontrollable delirium

**Sympathomimetics**
- Signs due to stimulation of alpha, beta, dopaminergic receptors or indirect catecholamine effects
- Delusions, paranoia, tachycardia, hypertension, hyperpyrexia, seizures, hypotension, and wide complex dysrhythmias in severe cases
- **Causes:** Cocaine, amphetamines, methamphetamines, OTC decongestants

**Differentiation from anticholinergics:**
- Mental status: tend to be more coherent
- Diaphoretic
- Patient with anticholinergics tend to be in urinary retention
Management:

- Supportive care: IV fluids for insensible losses & volume repletion, monitor airway, observe for intracranial haemorrhage or rhabdomyolysis
- Benzodiazepine titration
- Management of blood pressure if severe and symptoms of end organ dysfunction (but do NOT use B-blockers as there is a risk of unopposed a effect)

Cholinergic:

- “SLUDGE”: Salivation, Lacrimation, Urination, Defecation, GI cramping, Emesis + “Killer B’s”: Bronchorrhea, Bradycardia, Bronchospasm
- Signs due to binding and inhibition of plasma cholinesterase, and thus excess acetylcholine (ACh):
  - Confusion, CNS depression, weakness, salivation, lacrimation, urinary/fecal incontinence, GI cramping, emesis, diaphoresis, muscle fasiculations, pulmonary edema, miosis, bradycardia/tachycardia, seizures
- Causes: Organophosphate and carbamate insecticides, physostigmine, edrophonium, some mushrooms

Opioid/Sedative/Ethanol agents:

- Signs: Coma, respiratory depression, miosis, hypotension, bradycardia, hypothermia, pulmonary oedema, decreased bowel sounds, hyporeflexia, needle marks
- Causes: Narcotics, barbiturates, BZDs, Ethanol, clonidine
- Management of Narcotic overdoses:
- Naloxone: competitive opioid antagonist

Serotonin Syndrome:

- “FARM”: Fever, Altered mental status, Rigidity, Myoclonus
- Signs: Altered mental status, fever, agitation, tremor, myoclonus, hyperreflexia, ataxia, poor co-ordination, diaphoresis, shivering
- SSRI interaction or OD
- Management: Supportive- IV fluids to replenish losses from agitation and hyperthermia, benzodiazepines

Competency 3

All primary care doctors should be able to do the initial resuscitation, recording and prompt referral

Objectives: At the end of the session primary care doctor should be able
a) To do the initial management before referral
b) To do the proper documentation

Time requirement: (Podium presentation 15 minutes)
Resuscitation and Stabilization

The aim here is to treat life-threatening problems, a modified ACLS appropriate to the toxin involved with stabilization of the ABCs. Personnel involved in the team should take measures to be adequately protected with gloves, masks, protective suits. The need for decontamination should be considered early. There is a risk of potential secondary exposure to rescuers and healthcare staff. Use of universal precautions is warranted. Repeated frequent assessment and continuous monitoring of vital signs are to be done.

A toxicological diagnosis must be sought. The toxic agent and class of toxin need to be identified. A focused history, the medications and products brought from the scene, electronic medical records and prescription records, contacting primary care physician. History from patient, paramedics, family, friends, circumstantial evidences, vomitus, name of agent and type of formulation, coingestant if any, amount of exposure, time of poisoning, symptoms post exposure, mechanism of exposure to toxin, reason for exposure, AMPLE history- allergies, medications, past medical history, last meal and drink, events associated.

**Examination:** Look for track marks in cubital fossa and groin- intravenous drug abuse-
Residue deposits around mouth, nose and body surface, unusual colour of vomitus, hyper or hypothermia, sweating etc. Smell for alcohol and other unique odours. Assess ABCDE-

**Airway & Breathing**
- Ability to protect airway.
- Respiratory rate & depth.
- Oxygen saturation.

**Circulation**
- Pulse rate and regularity.
- Blood pressure.

**Disability**
- Glasgow Coma Scale (GCS).
- Pupil size and equality.
- Do random glucose to exclude hypoglycaemia.

**Exposure**
- To look out for external evidence of trauma such as head injury that may provide an alternative explanation for patient’s condition.

**Toxicological Investigations:** the objectives are to assist in confirming the diagnosis, help to predict the severity of the poisoning, determine the level of interventions and intensive care. The scope of investigations at a PHC level may be limited.

**Decontamination**- Removal of toxins from portals of entry before absorption. For inhaled poisons, evacuation from toxic environment and provision of supplemental oxygen. Dermal toxins are removed by shedding contaminated clothing and showers. Oral exposure is removed by inducing emesis, gastric lavage, activated charcoal, whole bowel irrigation, cathartics.

**Single dose activated charcoal:** Indicated as a gastric decontaminant agent if a potentially toxic amount is ingested within 1 hour of contact.
Contraindications:
- Unprotected airway with depressed consciousness without ET intubation.
- Risk of aspiration.
- Risk of gastrointestinal hemorrhage or perforation.
- Activated charcoal in GIT may obscure endoscopic visualizations.
- Struggling patients

Complications: Aspiration, emesis, GI obstruction and perforation, corneal abrasions
Activated charcoal is of no proven use in poisonings with alkali, ethanol, ethylene glycol, fluorides, inorganic salts, iron, lithium, potassium, hydrocarbons, and caustics

Dosage: Children up to 1 year of age: 10-25 g or 0.5 – 1 g/kg.
- Children from 1 to 12 years of age: 25 to 50 g or 0.5 to 1 g/kg.
- Adolescents and adults: 25 to 100 g.

Gastric Lavage (if facilities are available)

Indications:
Gastric lavage should not be employed routinely, if ever, in the management of poisoned patients.

Contraindications:
1. Loss of airway protective reflexes(depressed state of consciousness) - unless intubated tracheally
2. Ingestion of a corrosive substance, such as a strong acid or alkali
3. Ingestion of a hydrocarbon with high aspiration potential
4. Patients who are at risk of hemorrhage or GI perforation due to
5. Pathology, recent surgery or other medical conditions such as coagulopathy

First contact doctor should ideally record the MLC document which includes:
- Address of the patient
- Identification marks
- Brought by whom and his contact number
- Date and Time of incidence
- Place of incident
- Amount and type of poison
- Vitals and clinical examination findings

All poison case should be referred to higher centre immediately after assessment, initial treatment, and proper MLC documentation.

Assessment (5 MCQs): time 10 minutes
1) All are features of OPC poisoning except
   a) Sweating   b) Muscle fasciculations   c) Bradycardia   d) Mydriasis
2) Antidote for OPCl poisoning  
   a) Atropine  
   b) Diazepam  
   c) BAL  
   d) N acetyl cysteine

3) Features of datura poisonings include all except  
   a) Miosis  
   b) Reduced salivation  
   c) Flushing  
   d) Urinary retention

4) Contraindication for gastric lavage include  
   a) Loss of airway protective reflexes, (depressed state of consciousness)  
   b) Ingestion of a corrosive substance, such as a strong acid or alkali.  
   c) Ingestion of a hydrocarbon with high aspiration potential.  
   d) all of the above

5) Which of the following is a feature of odllumpoisoning?  
   a) Miosis  
   b) Renal failure  
   c) Cardiac arrhythmia  
   d) Hepatotoxicity

Answers:  
1) d  
2)  
3) a  
4) d  
5) c
Thyroid Disorders-Hypothyroidism and Hyperthyroidism

Goal:
Primary care doctor should be able to clinically suspect the common thyroid disorders, refer the patient for appropriate management and follow up patients already on treatment.

Competencies
Primary care doctor should be able to
1) Clinically suspect hypothyroidism and hyperthyroidism.
2) Manage hypothyroidism and hyperthyroidism.
3) Follow up of patients already on treatment.

Module outline
1. Classification of hypothyroidism and hyperthyroidism
2. Risk factors for hypothyroidism
3. Clinical features of hypothyroidism and hyperthyroidism
4. Laboratory investigations in thyroid disorders
5. Management of hypothyroidism and hyperthyroidism

Time requirement: 60 minutes (podium presentation 20 Mins & exercise 40 Mins)

Competency 1
Primary care doctor should be able to clinically suspect hypothyroidism and hyperthyroidism.

Objectives:
At the end of the session participant should be able
- To describe the classification of thyroid disorders.
- To identify the clinical features of hypothyroidism and hyperthyroidism.

Time requirement: Brainstorming session 10 Mins, Podium presentation 10 Mins

Content
Classification of Hypothyroidism
- **Primary hypothyroidism (90%)** is characterized by a high serum thyrotropin (TSH) concentration and a low serum free thyroxine (T4) concentration.
- **Subclinical hypothyroidism** is defined biochemically as a normal free T4 concentration in the presence of an elevated TSH concentration.
- **Secondary (central) hypothyroidism** is characterized by a low serum T4 concentration and a serum TSH concentration that is not appropriately elevated.

Hyperthyroidism- classification
- Primary
Secondary
Thyrotoxicosis without hyperthyroidism

**Risk factors of hypothyroidism**
Although anyone can develop hypothyroidism, increased risk if
- Female older than 60 yrs
- Family history of thyroid disease
- History of other autoimmune diseases, such as rheumatoid arthritis or lupus, a chronic inflammatory condition
- H/o treatment with radioactive iodine or anti-thyroid medications
- H/o irradiation to neck or upper chest
- H/o thyroid surgery (partial thyroidectomy)
- Pregnancy or up to six months post partum

**Clinical features:**

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue , Forgetfulness</td>
<td>Sinus bradycardia</td>
</tr>
<tr>
<td>Intolerance to cold, Constipation</td>
<td>Dry skin</td>
</tr>
<tr>
<td>Weight gain, Dyspnoea</td>
<td>Thinning of hair</td>
</tr>
<tr>
<td>Muscle weakness</td>
<td>Hoarseness of voice</td>
</tr>
<tr>
<td>Irregular menstruation,menorrhagia</td>
<td>Peri orbital puffiness</td>
</tr>
<tr>
<td>Pain or stiffness of joints</td>
<td>Dull facial expression</td>
</tr>
<tr>
<td>Depression</td>
<td>Oedema</td>
</tr>
<tr>
<td>Impaired fertility</td>
<td>Hyporeflexia with delayed relaxation</td>
</tr>
</tbody>
</table>

**Hyperthyroidism**

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperactivity, irritability, altered mood, insomnia, anxiety</td>
<td>Sinus tachycardia, atrial fibrillation (rare in children), supraventricular</td>
</tr>
<tr>
<td>Heat intolerance, increased sweating</td>
<td>Tachycardia</td>
</tr>
<tr>
<td>Palpitations</td>
<td>Fine tremor, hyperkinesis, hyperreflexia</td>
</tr>
<tr>
<td>Fatigue, weakness</td>
<td>Warm, moist skin</td>
</tr>
<tr>
<td>Dyspnoea</td>
<td>Palmar erythema, onycholysis</td>
</tr>
<tr>
<td>Weight loss with increased appetite (weight gain in 10% of patients)</td>
<td>Hair loss</td>
</tr>
<tr>
<td>Pruritus</td>
<td>Osteoporosis</td>
</tr>
<tr>
<td>Increased stool frequency</td>
<td>Muscle weakness and wasting</td>
</tr>
<tr>
<td>Thirst and polyuria</td>
<td>High-output heart failure</td>
</tr>
<tr>
<td>Oligomenorrhea or amenorrhea</td>
<td>Chorea, Periodic (hypokalemic) paralysis and Psychosis.</td>
</tr>
</tbody>
</table>

**Thyroid crisis, or thyroid storm**, is a form of hyperthyroidism manifested by an acute onset, hyperthermia, severe tachycardia, heart failure, and restlessness. There may be
rapid progression to delirium, coma, and death. Precipitating events include trauma infection, radioactive iodine treatment, or surgery.

**Apathetic, or masked, hyperthyroidism is another variety of hyperthyroidism** characterized by extreme listlessness, apathy, and cachexia.

**Competency 2**
Primary care doctor should be able to manage hypothyroidism and hyperthyroidism at PHC level

**Objectives:** At the end of the session participant should be able to
1) Enlist the investigations in thyroid disorders.
2) Do the initial investigation in thyroid disorders (if available) and to interpret the result.
3) Give the initial treatment

**Time requirement:** Podium presentation interactive - 15+5 mts

**Content**

**Laboratory Evaluation:**

**Thyroid Function Tests:**
- Total T4 (thyroxine),
- Total T3 (triiodothyronine)
- Free T4, Free T3
- TSH
- T3 -Uptake
- Free T4 Index, Free T3 Index
- Anti-Thyroid Antibodies (Anti Microsomal (TM ) Antibodies,
- Anti Thyroglobulin (TG) Antibodies ,
- Anti Thyroperoxidase (TPO) Ab ,
- Anti Thyroxine antibodies ,
- Thyroid Stimulating (TSA) Antibodies)
- Nuclear Scintigraphy
- FNAC of nodule

**What tests should the medical officer order ?**
As per the Guidelines of the AACE and ATA, ITS:

- TSH and Free T4 alone if Hypothyroidism is suspected or for routine evaluation.
- TSH and Free T4 only if Hyperthyroidism is suspected or for routine evaluation.
- Free T3 if T3 toxicosis is suspected.
- Don’t order for Total T4 or Total T3.
Treatment of hypothyroidism

- Treatment of choice is thyroxin.
- Single daily dose of levothyroxine has half life of 7 days.
- Always take on empty stomach.
- TSH should be measured at 6 to 8 weeks after any change in L-thyroxin brand or dose.
- Age, severity and duration of hypothyroidism, weight, malabsorption, pregnancy, presence of cardiac disease and concomitant drug therapy are some factors determining the thyroxin requirements.
- Starting dose for healthy patients <50 years should be at 1.6 μg/kg/day.
- Starting dose for healthy patients >50 years should be <50 μg/day. Dose should be increased by 12.5-25 μg/day, if needed, at 6 to 8 weeks intervals. (Start low and go slow)
- Starting dose for patients with heart disease should be 12.5 to 25 μg/day and increase by 12.5 to 25 μg/day, if needed, at 6 to 8 weeks intervals.
- If there is no residual thyroid function, the daily replacement dose of levothyroxine is usually 1.6 μg/kg body weight (typically 100–150 μg). In many patients, however, lower doses suffice until residual thyroid tissue is destroyed.
• TSH responses are gradual and should be measured about two months after instituting treatment or after any subsequent change in levothyroxine dosage. The clinical effects of levothyroxine replacement are slow to appear.
• Patients may not experience full relief from symptoms until 3–6 months after normal TSH levels are restored. Because T4 has a long half-life (7 days), patients who miss a dose can be advised to take two doses of the skipped tablets at once.

Treatment of hyperthyroidism:

1. Antithyroid drugs
   • 1. Propylthiouracil (PTU) and Methimazole.
   • Both compounds inhibit incorporation of trapped inorganic iodide into organic compounds, and they might also suppress TRSAble levels by directly affecting intrathyroidal autoimmunity.
   • Methimazole is at least 10 times more potent than PTU, longer serum half-life (6-8 hr vs 0.5 hr); PTU generally is administered 3 times daily, but methimazole can be given once daily.
   • Unlike methimazole, PTU is heavily protein bound and has a lesser ability to cross the placenta and to pass into breast milk; theoretically, PTU is the preferred drug during pregnancy and for nursing mothers.
   • Due to reports of severe liver disease in patients treated with PTU, with some patients requiring liver transplant or potentially suffering a fatal outcome, the consensus is to use only methimazole to treat children with Graves disease.
   • The initial dosage of methimazoleis 0.25-1.0 mg/kg/24 hr given once or twice daily. Smaller initial dosages should be used in early childhood.
   • Transient granulocytopenia (<2,000/mm3) is common; it is asymptomatic. Transient urticarial rashes are common. They may be managed by a short period off therapy, and then restarting the antithyroid drug.
   • The most severe reactions are hypersensitive and include agranulocytosis (0.1-0.5%), hepatitis (0.2-1%), a lupus-like polyarthritis syndrome, glomerulonephritis, and an ANCA-positive vasculitis involving the skin and other organs.
   • A β-adrenergic blocking agent such as propranolol (0.5-2.0 mg/kg/24 hr orally, divided 3 times daily) or atenolol (1-2 mg/kg orally given once daily) is a useful supplement to antithyroid drugs in the management of severely toxic patients.

Competency 3
Primary care doctor should be able to follow up of patients already on treatment

Objectives: Primary care doctor should be able to
1) Recognize the red flag signs in thyroid disorders and early referral.
2) Titration of medication of hypothyroidism or hyperthyroidism on treatment.

Time requirement
Podium presentation 15+5 minutes
Content:

Red flag signs for early referral
- Features of heart failure
- Altered sensorium
- Hypothermia
- Severe bradycardia, tachycardia, hypotension
- Pain, rapid increase in size of thyroid swelling, cervical lymphadenopathy
- Features of agranulocytosis (oral ulcers, cytopenias)

At Follow – Up :

For hypothyroidism

Patient education
- Stress importance of compliance with thyroid replacement therapy
- Explain need for life long therapy
- Instruct to report if any signs of infection or heart problems.
- Describe signs of thyrotoxicosis.
  - Monitor TSH every 6-8 weeks until stabilize then 3-6 monthly.
  - Follow cardiac status closely in elderly
  - Check TSH more frequently in pregnancy

If TSH is> 4.0 mU/L: Increase daily thyroxine dose by 12.5-25 μg/d & repeat TSH in 6 to 8 week.
0.3 to 4.0 mU/L: Continue dose; repeat TSH in 6 months and then annually.

If TSH <0.4 mU/L: Decrease daily thyroxine dose by 12.5 to 25 μg/d and repeat in 6 to 8 weeks.

In pregnancy: The levothyroxine dose may be needed to be increased by up to 50% with a goal of maintaining TSH levels less than 2.5 mU/L in the first trimester, 3 mU/L in the second trimester and 3 mU/L in the last trimester.

Conditions in which routine referral is indicated for evaluation
- Central hypothyroidism with both TSH and T4 low.
- Hypothyroidism unresponsive to treatment.
- Serum TSH remains elevated despite full treatment with levothyroxine.

For hyperthyroidism
- Rising serum levels of TSH to greater than normal indicates overtreatment and leads to increased size of the goiter.
- Clinical response becomes apparent in 3-6 wk, and adequate control is evident in 3-4 months.
- The dose is decreased to the minimal level required to maintain a euthyroid state.
- Recognize the side effects of antithyroid drugs and prompt referral.

**Referral for Radioiodine treatment or surgery is indicated:**
- When adequate cooperation for medical management is not possible,
- When adequate trial of medical management has failed to result in permanent remission.
- When severe side effects preclude further use of antithyroid drugs.

**Assessment (MCQ 5)**

1) All are clinical features of hypothyroidism except
   a) Fatigue  b) weight gain c) constipation d) hyper reflexia

2) All are features of hyperthyroidism except
   a) Tachycardia b) Weight loss c) Constipation d) Heat intolerance

3) Follow up in hypothyroidism is based on level of
   a) TSH b) T3 c) T4 d) Anti Tpo

4) Red flag signs in thyroid disorders
   a) Features of heart failure b) Altered sensorium c) Hypothermia d) all of the above

5) Which of the following is a side effect of carbimazole
   a) Agranulocytosis b) palpitation c) oedema d) renal calculi

**Answers**

1) d  2) c  3) a  4) d  5) a
Ophthalmology

Goal
All primary care doctors should be able to appropriately evaluate and give preliminary treatment for patients with minor ophthalmology problems and to identify the red flag signs for emergency care and early referral.

Competencies
Primary care doctors should be able to
1. Recognize the common ocular conditions and provide empiric therapy for common ocular conditions.
2. Identify red flag signs and early referral.

Module outline
1. Symptoms and signs of common ophthalmological conditions
2. Empirical treatment of common ophthalmological conditions
3. Red flag signs in ophthalmology
4. Eye donation

Time requirement: Total session 60 (presentation 40 minutes & exercise 20 minutes)

Competency 1
Primary care doctors should be able to recognize the common ocular conditions.

Session objectives: At the end of this session, the primary care doctor should be able to:
1. Enlist the common ophthalmological conditions
2. Identify the clinical signs to differentiate the causes of red eye
3. Differentiate between vision threatening and non-vision threatening causes of red eye

Time requirement: (Brain storming 10 minutes Podium & presentation 20 minutes)

Content
Common ophthalmological conditions
1. Red eye
Red eye is a common complaint of a patient seeking ophthalmological care. Due to its association with the several vision threatening diseases, it is essential to recognize the qualifying symptoms of red eye that make it more typical of vision threatening diseases than of those which are not vision threatening.

Common causes:
- Conjunctivitis:
  - Bacterial, Viral
  - Allergic
- Keratitis
- Acute anterior uveitis
• Acute glaucoma
  ➢ Angle closure
  ➢ Lens induced
• Scleritis, Episcleritis
• Foreign body
• Subconjunctival hemorrhage
• Trauma

Symptoms

• **Acute conjunctivitis:**

  **Bacterial:**
  ➢ Minimal lid edema
  ➢ Mucopurulent discharge
  ➢ Watering
  ➢ Conjunctival congestion
  ➢ Foreign Body sensation
  ➢ Minimal pain
  ➢ Clear cornea.

Treat with topical antibiotics, never use steroid drops.

**Viral:**
Same clinical features except discharge which is watery, tender preauricular lymphadenopathy. Selflimiting
Topical antibiotics to prevent secondary bacterial infection, lubricant drops.

If cornea involved refer.

**Allergic conjunctivitis:**
Severe itching, watering, ropy discharge, minimal congestion. Treat with antihistaminics drops, if not responding refer:

• **Keratitis:**
  Circum corneal congestion with corneal lesion and defective vision.

All cases have to be referred.
• **Acute iridocyclitis**
  Severe pain, defective vision, lid edema, circum corneal congestion, minimal corneal haziness, hypopyon may or may not be present, miotic sluggish pupil, tenderness over eye ball present, refer.

• **Acute glaucomas:**
  *Acute angle closure glaucoma*: severe pain, headache, nausea, vomiting. O/E: Lid edema, circumcorneal congestion, hazy cornea, shallow anterior chamber, vertically oval nonreacting pupil, other eye also shallow anterior chamber. Immediate referral.

Scleritis, episcleritis:
Pain, redness, localised or diffuse congestion with chemosis, tenderness and painful extrocular movement. Refer.

- **Foreign body:**
  Conjunctival FB can be removed with sterile cotton bud and prescribe topical antibiotics. Corneal FB has to be referred.

- **Trauma:** Refer all cases of trauma after giving sterile pad.

- **Sub-conjunctival hemorrhage:** If spontaneous treat with placebo drops and find out the cause. If recurring refer
2. Lid conditions:
   - **Blepharitis:** itching and scaly lesions on lid margin  
     Treat with Azithromycin eye ointment, if not responding refer.
   - **Lid swelling**  
     **Hordeolum:** Painful lid margin swelling  
     **Chalazion:** Painless lid margin swelling  
     Treat with antibiotic eye ointment and hot fomentation. If not responding refer.

3. **Cellulitis**

   **Preseptal cellulitis:** Pain, lid edema, periorbital edema, cornea clear, pupil brisk, vision normal, no proptosis, extracocular movement full. Treat with systemic antibiotics.

   **Orbital cellulitis:** Severe pain, proptosis, extraocular movement restriction, impaired vision, sluggish pupil. Refer
4. **Dry eye**: Treat with lubricants

5. **Itching**: Treat with antihistaminic drops

**Competency 2:**
Primary care doctor should recognize red flag signs before referral to higher centre.

**Objectives:** At the end of the session a primary care doctor should be able
1. To recognize the red flag signs for early referral.
2. To recognize the conditions requiring referral for further care on non emergency or routine basis
3. To counsel about steps in eye donation
   Total time requirement (Brain storming session. 10 minutes & power point 20 minutes)

**Content**

**Red flag signs**

- Circum corneal congestion
- Corneal involvement
- Miotic pupil
- Sluggish pupil
- Hypopyon
- Raised intra ocular pressure
- Sudden Visual loss
- **Post cataract surgery:**
  Refer patients with pain, congestion, corneal haziness, hypopyon, sudden marked loss of vision.
Routine referral – non emergency basis

1) Presbyopia to prescribe glass if optometrist is not available.
2) Refer all diabetic patients at least once yearly for detailed fundus evaluation for diabetic retinopathy (Type 2 from diagnosis and Type 1 diabetes from 5 years onwards from diagnosis)
3) Refer elderly patients with gradual painless loss of vision with cataract for surgery and those with frequent change in spectacles for glaucoma evaluation.
4) Paediatric patient – Squint, Refractive error (optometrist not available)

Eye donation

Eye donation has to be promoted at the base level. Cadaver eye has to be enucleated within 6 hours of death. Except very old and very young everybody can donate eye if the cause of death is known and is noncontageous. After death head end of the body has to be elevated, the eyes closed and wet cotton has to be placed over the eyelids and inform the nearest eyebank as early as possible.

FAQs of post operative patients

1. Can I take bath? Yes, without allowing water to enter eye.
2. Can I read/ watch TV? Yes.
3. Can I use old spectacle for reading? Yes (usually spectacles are prescribed after 6 weeks so he can use old spectacles before prescription if he is comfortable.)
4. Is it necessary to use medication in both eyes after surgery in one eye? No.
5. Can I use medication after 6’O clock? Yes use medicines upto bedtime.

Dos and Don’ts in Eye care

- Antibiotics can be given for infective ocular conditions.
- Use steroid drops judiciously.
- Patients on steroids have to be advised to get ophthalmologist’s opinion for further treatment.
- Advice glaucoma patients to have regular ophthalmology consultation.
- Give sterile eye pad for trauma cases before referral.

Assessement: Diagnose each case

Figure 1 Figure 2
Answers

1. Conjunctivitis
2. Keratitis
3. Acute anterior uveitis
4. Acute angle closure glaucoma
5. Post operative endophthalmitis
6. Orbital cellulitis
MCQs

1. Most common cause of painless progressive defective vision in elderly is
   a) Cataract  b) Glaucoma  c) Scleritis  d) Retinopathy

2. Follow up protocol for Type II diabetes mellitus is
   a) yearly from time of diagnosis   b) yearly after 5 yrs from diagnosis
   c) 2 yearly after 3 yrs from diagnosis d) none of the above

3. One common cause for frequent change in presbyopic spectacle in adult is
   a) Glaucoma  b) Diabetes  c) Cataract  d) Retinopathy

4. Chronic painless lesion of eyelid is
   a) chalazion b) hypopyon c) hordeolum internum d) pterygium

5. Cadaver enucleation has to be done within ------------ hours of death
   a) 6 hrs b) 10 hrs c) 12 hrs d) 24 hrs.

Answers

1) a 2) a 3) b 4) a 5) a)
Abdominal pain

Goal
All Primary care doctors should be able to appropriately assess and give preliminary treatment for a patient who complains of abdominal pain.

Competencies
Primary care doctors should be able to
1. Identify probable causes of abdominal pain and differentiate it as serious or trivial abdominal pain.
2. Do the necessary investigations (wherever it is available) and administer the initial management

Module outline
1) Common causes of abdominal pain
2) Common presentation of different etiologies of abdominal pain
3) Relevant investigations
4) Initial management of abdominal pain
5) Red flag signs for early referral

Time requirements
Total time 60 minutes (presentation 40mins& exercise 20 mins)

Competency - 1
Primary care doctor should be able to identify probable causes of abdominal pain and differentiate it as serious or trivial abdominal pain

Session objectives:
1. To differentiate between life threatening and non life threatening causes of abdominal pain.
2. To identify the clinical signs to differentiate between the different causes of abdominal pain

Time requirements: (Brain storming session: 10 mins & Podium presentation 20 mins)

Content
Acute Abdomen means patient experience abdominal symptoms that suggest a disease, which definitely or possibly threatens life and demands immediate intervention either surgical or medical. There are many causes of abdominal pain- surgical, gynecological and non-surgical causes. They are arranged based on location of pain that patient present with. In Primary care set up identifying the presence of acute abdomen is the important deciding factor rather than its exact cause. Delay in the diagnosis may be catastrophic and should be avoided.
Common causes of abdominal pain

Life threatening or need IP care are
- Appendicitis
- Peritonitis
- Bowel Perforation
- Pancreatitis
- Abdominal Aortic Aneurysm
- Ruptured Ectopic Pregnancy
- Intussusception
- Mesenteric infarction
- Torsion testis
- Tubo-ovarian abscess

Non-life threatening
- Ureteric colic, urinary tract infection, Pyelonephritis
- Gastritis/peptic ulcer disease
- Mesenteric adenitis,
- Gastroenteritis
- Pelvic Inflammatory Disease
- Mittelschmerz, Endometriosis
- Ruptured or hemorrhagic ovarian cyst
- Psychogenic

Symptoms:

Pain
i) Mode of onset- Sudden onset in colic, perforation, volvulus. Patient usually wakes up with pain in acute appendicitis, peptic ulcer or urinary tract infection.
ii) Site of pain- Site usually coincides with the position of the affected organ.

Pointing test - Patient is asked to indicate the site of pain with tip of one finger

Cough test - Patient is asked to cough; if pain is felt in the abdomen it suggests an inflammatory process at the site of the pain.

iii) Character of pain-
   a) Colicky pain – Sharp, griping pain which comes on suddenly and disappear spontaneously. It is intermittent in character and indicates obstruction to a hollow organ e.g. Intestinal colic, biliary colic, ureteric colic
   b) Constant burning pain is a feature of peritonitis.
   c) Severe agonizing pain is a feature of pancreatitis or bowel ischemia.
   d) Throbbing pain is a feature of inflammation e.g. cholecystitis

- Appendicitis – nausea, vomiting, anorexia, fever. Tenderness in RIF, rebound tenderness, roving sign
- Acute gastritis - Sudden onset of epigastric pain, may be associated with retrosternal burning sensation, relieved with antacid, aggravated by food.
- Acute pancreatitis - h/o alcohol intake or gall stone disease. Dull aching pain radiating to back, associated nausea, vomiting.
Acute cholecystitis - Colicky pain associated with nausea, vomiting, tenderness in right hypochondrium.

Intestinal obstruction – periumbilical abdominal pain, with vomiting, constipation, and abdominal distension.

Renal colic – severe agonizing pain, with loin to groin radiation and in between normal abdomen.

Ectopic pregnancy – abdominal pain in gestational age group with h/o missed period. UPT may be positive. Tender fornix. Ultrasound may reveal – free fluid and evidence of pregnancy.

Acute Myocardial infarction - a screening ECG should be taken for patients above 40 years with upper abdominal pain.

Physical examination
Inspection
In acute abdomen either the affected area or the entire abdomen is kept immobile to reduce the pain.
Visible peristalsis indicates intestinal obstruction. Hernial orifices are inspected to exclude irreducible hernia.

Palpation
Palpating finger will elicit any evidence of tenderness, rebound tenderness or rigidity

Percussion
Obliteration of liver dullness – liver dullness is replaced by a resonant note indicating presence of free gas under diaphragm

Competency - 2
All primary care doctors should be able to do the necessary investigations (wherever it is available) and administer the initial management

Session objectives
1) To do necessary investigation
2) To administer the initial management

Time requirements: Total time (podium presentation 15 minutes)

Content
Investigations
Blood examination – leucocytosis in infection, anemia in ectopic pregnancy
Urine examination – Pus cells in UTI/ pyelonephritis, RBCs in ureteric colic
X ray abdomen (if available) – gas under diaphragm in perforation, air fluid levels in intestinal obstruction, omega sign in volvulus.
Ultrasound abdomen (if available) – to exclude stone disease (biliary/urinary), pancreatitis, appendicitis, pelvic inflammatory disease, ectopic pregnancy.
Treatment

Patients who need IP care / surgical care, may be referred after stabilization with IV fluids, analgesics and if needed antibiotics.

1. Appendicitis – antibiotics, analgesics, keep nil per oral.
2. Perforation – Analgesics
   - IV fluids,
   - NPO
4. Ureteric colic – Analgesics (IV/ rectal suppository)

Assessment (MCQs 5)

1) Twenty four year old married girl c/o abdominal pain with h/o missed period, UPT positive, tender fornix, most probable diagnosis is?
   a) Pancreatitis b) Ureteric colic c) UTI d) Ectopic pregnancy

2) Which of the following is a non life threatening cause of abdominal pain?
   a) UTI b) Appendicitis c) Peritonitis d) Bowel Perforation

3) Which of the following is a lifethreatening cause of abdominal pain?
   a) Gastritis b) Mesenteric adenitis c) Gastroenteritis d) Ovarian torsion

4) Constant burning pain is a feature of
   a) Ureteric colic b) Intestinal colic c) Cholecystitis d) Peritonitis

5) Omega sign in x-ray abdomen is seen in?
   a) Appendicitis b) Cholecystitis c) Torsion testis d) Sigmoid volvulus

Answers

1) d 2) a 3) d 4) d 5) d
Trauma and Burns

Goal
All primary care doctors should be able to recognize trauma related injuries and burns, to do proper assessment, and provide first aid measures before referral.

Competencies
All primary care doctors should be able to
1) Recognize trauma related injuries and provide ATLS steps
2) Provide first aid measures to the trauma and burns patients
3) Identify the red flag signs and early referral to higher centers.

Module outlines
1) ATLS steps
2) Assessment of burns
3) Initial treatment for burns
4) Red flag signs for early referral

Time requirements: 60 minutes (presentation 40 minutes & exercises 20 minutes)

Competency 1
All primary care doctors should be able to recognize trauma injuries and provide ATLS steps

Session objectives
1) To recognize trauma related injuries
2) To provide ATLS steps
3) To do relevant investigations and provide initial treatments

Time requirements: 30 Mins (Podium presentation 20 minutes & discussion 10 minutes)

Content
Trauma
History – Ask mechanism of injury and details of incident; ask for other comorbidities and treatment history.
ATLS steps

1. **Primary survey with simultaneous resuscitation**
   - **A** - Airway with cervical spine protection – check for vocal response, clear mouth of any foreign bodies/secretions, jaw thrust & chin life, consider airway if GCS <8
   - **B** - Breathing and ventilation – inspect, percuss auscultate for air entry – look for bony crepitus, surgical emphysema
   - **C** - Circulation with control of haemorrhage – check pulse and BP, insert to large bore cannula and commence volume resuscitation -crystalloids/colloids/ whole blood.
   - **D** - Disability, neurological status – GCS, pupils, Mobility of all 4 limbs
   - **E** - Exposure and examination

   **Adjuncts to Primary survey –**
   - Blood routine – look for anemia
   - Pulse oximetry
   - Xray – chest, cervical spine and pelvis (if available)

2. **Secondary survey** – head to toe examination and identification of all other injuries

**Patient should be promptly referred to higher center**

**Competency 2**

All primary care doctors should be able to recognize and do a proper assessment of burn case and to do the initial management.

**Session objectives**

1) To do initial assessment of burns case.
2) To provide initial treatment.
3) Referral to higher centres

**Time requirements:** **30 Mins** (presentation 20 minutes & discussion 10 minutes)

**Content**

**Burns**

**Assessing depth of the burn**

- Superficial burns – have capillary filling
- Deep partial thickness – does not blanch but have sensation
- Deep full thickness burns – no sensation
Calculating extent of burns – Rule of nine

- Exposure of upper respiratory tract to hot gasses / smoke may result in airway edema, securing an airway may be considered.
- Fluid resuscitation – RL is fluid of choice, amount of fluid resuscitation can be rapidly calculated by parkland formula (4ml/kg per % TBSA burn).
- Patients who may need IP care and referral may be resuscitated adequately (ABCDEF) before transportation, and may be given analgesics and antibiotics / Tetanus toxoid injection.

Red flag signs for early referral

- Burns with > 15 % total body surface area,
- Chemical/electrical burns,
- Burns in extremes of age,
- Burns involving airway,
- Head and neck and perineal area,
- Deep burns,

Assessment (MCQs 5)

1) Fluid of choice in burns case
   a) DNS b) Hypertonic saline c) 5% dextrose d) Ringer lactate

2) Fluid correction in burns case is calculated by
   a) Westmark formula b) Geneva formula c) Parkland formula d) all of the above

3) Assessment of extent of burns by
   A) Rule of five b) Rule of seven c) Rule of 9 d) Rule of 10

4) Consider airway in trauma if GCS score is less than
   a) 12 b) 10 c) 11 d) 8

5) Patients with burns need early referral in
   a) Burns with > 15 % total body surface area b) Chemical/electrical burns
   c) Burns in extremes of age d) Burns involving airway e) All of the above

Answers: 1) d 2) c 3) c 4) d 5) e

SHSRC-K