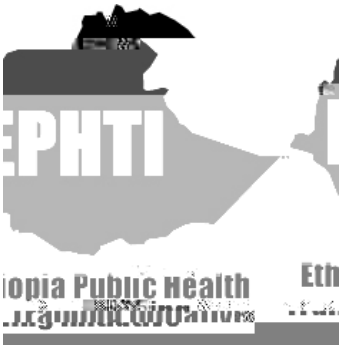
MODULE

Rheumatic Fever and Rheumatic Heart Disease

For the Ethiopian Health Center Team



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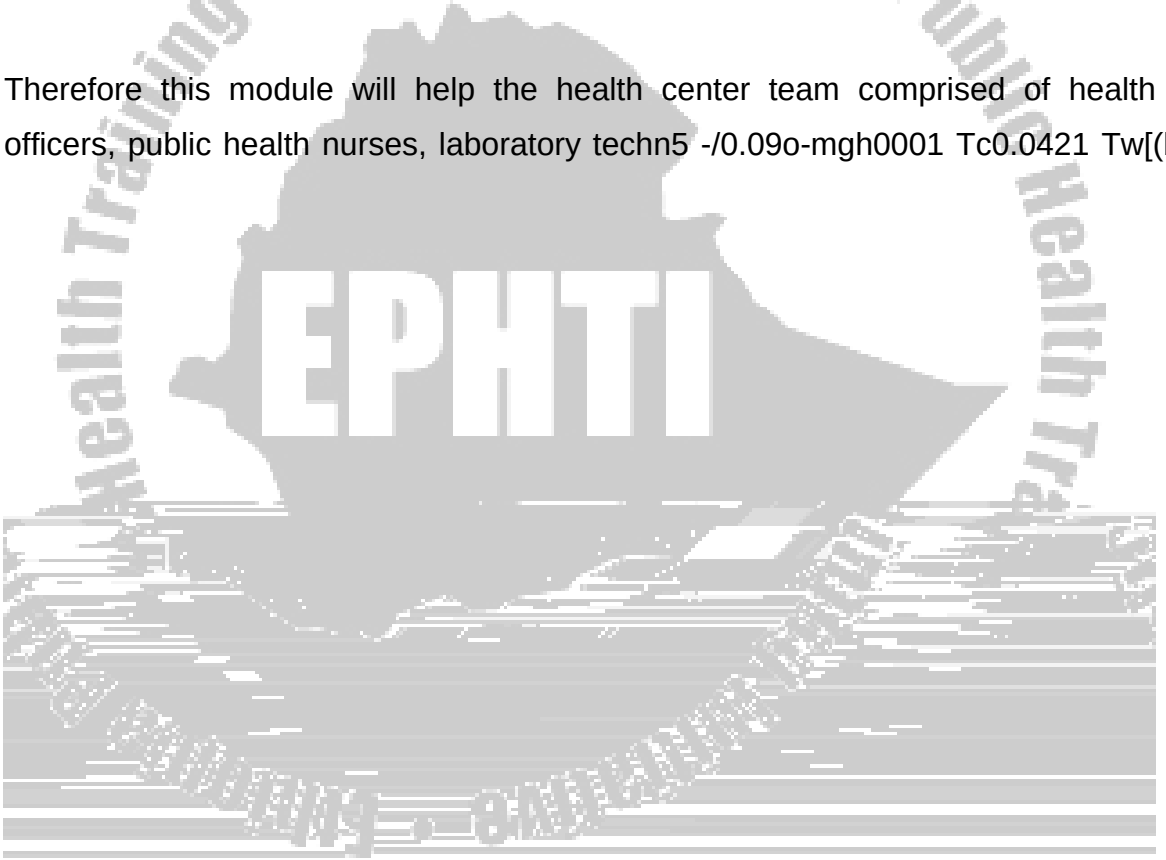
UNIT ONE

INTRODUCTION

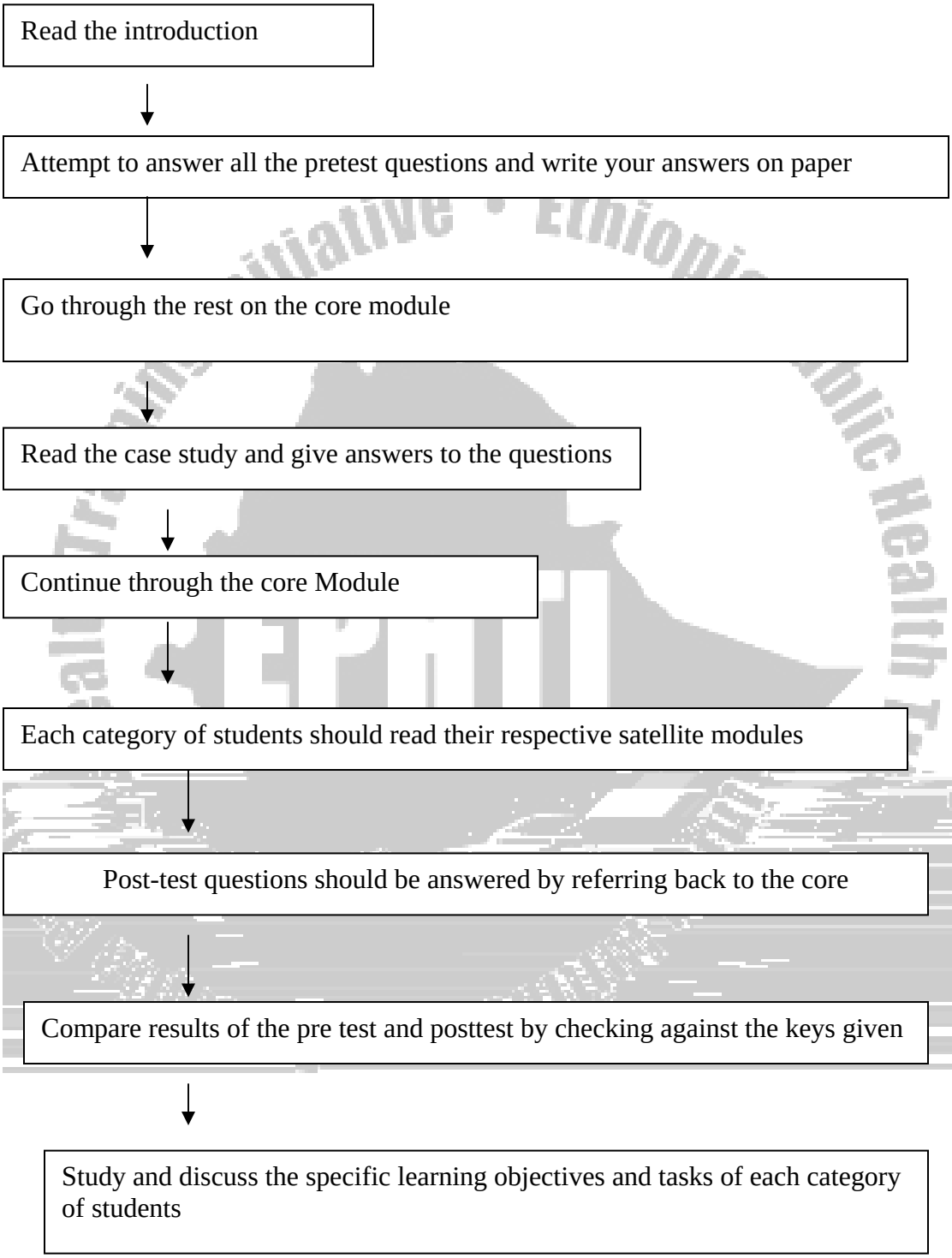
1.1 PURPOSE AND USE OF THE MODULE

The scarcity of relevant teaching and learning materials in the higher training institutions of Ethiopia has been one of the bottlenecks in efficient task oriented and problem solving training. Preparation of teaching materials that will meet the fore mentioned mission is urgently needed.

Therefore this module will help the health center team comprised of health officers, public health nurses, laboratory techn5 -/0.09o-mgh0001 Tc0.0421 Tw[(boraif 588.1801



1.2 DIRECTIONS FOR USING THE MODULE



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4. Identify circumstances that foster the transmission of streptococcal throat infection and/or development of ARF

a) Overcrowding
b) Low socio economic status
c) Genetic predisposition
d) Severity, frequency and duration of streptococcal throat infection
e) All

5. Which of the following is not a component of primary prevention of ARF?

a) Avoidance of contact with a person having colds and URTI
b) Prevention of throat infection through facemask
c) Early recognition and prompt treatment of streptococcal infection /sore throat/
d) Improved standard of living and housing conditions
e) Monthly benzanthine penicillin injection

6. Which of the following is true about secondary prophylaxis of ARF?

a) Should be given universally to patients with documented ARF or those with established RHD
b) Is known to be able to prevent subsequent development of established RHD in those with rheumatic carditis
c) Should be administered for life long for those with established RHD
d) It is the most practical and feasible method of prevention of RHD in resource poor countries like Ethiopia
e) All
f) All except d

Short answer questions

Attempt all of the following questions first, go through the whole text and revise them again

1. List down some of the known risks that increase the susceptibility of an individual to ARFand hence RHD

2. Identify possibly modifiable risks and design interventional strategies that can be implemented by the health center team

3. What do you think is the ideal target for community intervention strategies and why?

4. What components should a health education on prevention of ARF or RHD include?

2.1.2 Pre and post test questions for health officer students

I. Choose the letter containing the correct answer. Key answers are found at the last pages of the module.

1. One of the following is true about acute rheumatic fever
   a) Direct tissue damage by the bacteria is responsible for the development of acute rheumatic fever
   b) Genetic predisposition is required for the development of acute rheumatic fever
   c) It is common in females
   d) Immune mediated damage is the most widely accepted theory for the pathogenesis of acute rheumatic fever

2. One of the following is not a clinical feature of acute rheumatic fever
   a) Migratory arthritis
   b) Carditis

II. Answer the following five questions based on the following patients' condition

8. A 14 years old male patient from wenago presented with fever, fatigue, joint pain and palpitation of one week. Physical exam showed flat JVP, tachycardia and soft, grade 2/6 ejection systolic murmur at the base of the heart. Which one of the following is correct?

a) The patient has carditis
b) He has Jones major criteria
c) If ESR is 100mm in the 1st hour, ARF could be diagnosed
d) Blood film to exclude malaria is not indicated
e) None

9. A 12 years old female from anferara developed painful right knee joint swelling which after 4 days started to resolve and spread to involve the left ankle joint. She also had fever, fatigue and dyspnea. Physical exam showed: BP 100/80mmHg, PR 112bpm,T 38.3C axillary and RR of 26/min. has bibasilar crepitation, grade 3/6 holosystolic murmur at the apex. Which one of the following is required for the diagnosis 2a3C

11. The patient became well after 3 weeks of treatment and on discharge she did not have symptoms of congestive heart failure. Physical exam was remarkable for grade 1 systolic murmur. Which one of the following is incorrect?

a) Monthly benzathine penicillin is not needed
b) The Lasix and digoxin should be discontinued on follow up
c) The risk of recurrence of acute rheumatic fever is 10 -100 times more compared to those without previous acute rheumatic fever
d) Follow up visit every six months is needed
e) None

12. A year later she developed painful swelling around carious tooth, which needed extraction. Her course was good without significant symptom. What will be your advice?

a) She can go a head with tooth extraction
b) She needs preoperative antibiotic prophylaxis
c) She needs postoperative antibiotic prophylaxis
d) She needs both pre and post tooth extraction antibiotic prophylaxis
e) For those who were on regular monthly penicillin injection, there is no need for prophylactic antibiotics

2.1.3. Pretest/post test Questions for public health nurses

Instruction: Read carefully and attempt to answer the following questions

1. The nursing intervention for a patient with rheumatic heart disease include all *except:*

a) Check vital signs frequently
b) Maintain proper records
c) Administer drugs properly
d) Give individual and family health education
e) all except c

2. During home visiting to a patient with rheumatic heart disease, the nurse assessment includes.
   a) Ventilation
   b) Any febrile illness in the family
   c) Compliance to secondary prophylaxis

6. While caring for a patient with rheumatic heart disease the role of the nurse includes:

a) Provision of medications
b) Evaluating the patient's progress
c) Reporting unusual conditions
d) All of the above

7. Which one of the following are ways of checking the patients understanding about a prescribed antibiotic?

a) Asking to repeat instructions
b) Asking to demonstrate what the patient observed
c) Asking about the patient's plan to stick to the dosing schedule
d) All of the above

8. Culture and belief have no influence on the control of rheumatic fever & rheumatic heart disease

a) True b) False

9. Nursing care of a patient with rheumatic heart disease focuses on _____

a) Identification of patient's problem
b) Follow up and health education
c) Symptom management
d) b & c
e) All of the above

10. The first line approach in preventing the initial attack of rheumatic fever is

a) Recognizing streptococcal infections
b) Treating streptococcal infection adequately
c) Controlling epidemics in the community
d) All of the above

2.1.4 Pre and posttests for the medical laboratory students

5. Which of the following is/are true about the throat culture?

a) The routinely used media to inoculate the throat swab is a plate of blood agar.
b) Silica gel can be used as a transport media for a throat swab to and from the health center.
c) S. pyogenes is sensitive to bacitracin (0.05 units).
d) All of the above

6. Name the four technical factors affecting the performance of the erythrocyte sedimentation rate (ESR).

2.1.5 Pre and post tests for the environmental health students

Instruction: Read carefully and attempt to answer the following questions

1. Which of the following can be considered a way of preventing rheumatic heart disease: -
   a) Adequate ventilation
   b) Adequate treatment of all upper respiratory infections 0 v0.0025 naheumatic hea1Tiosch

3. What are the major areas of health education topics to the community for prevention of rheumatic heart disease?

a) _____

b) _____

c) _____

d) _____

e) _____

f) _____

4. The following are used in the prevention of rheumatic heart disease except one: -

a) Pasteurization of milk

b) Excluding people with skin lesions from food handing

c) Avoidance of ex

2.2 Significance and brief description of rheumatic heart disease

Although a dramatic decline in the incidence, severity and mortality of acute rheumatic fever and hence rheumatic heart disease has occurred in developed nations since the turn of the 20th century, it's still a major public health problem for most developing countries. According to WHO's report, in 1999 cardiovascular diseases contributed to a third of global deaths of which 78% occurred in low and middle-income countries. Estimates suggest 10 to 20 million new cases per year occur in those developing countries in which 2/3rd of the world's population lives and where it claims the life of more than 400,000 people per annum. Generally rheumatic fever accounts for 1/3rd of cardiovascular diseases in those countries.

The most plausible explanations for this geographic discrepancy of disease pattern are poor socio-economic status; associated over crowding, sub standard housing condition, ineffective case finding and inadequate management of initial bacterial pharyngitis.

In Ethiopia rheumatic heart disease is an important cause of mortality and morbidity. Analysis of medical admissions to different hospitals showed cardiovascular diseases to be responsible for up to 35% all admission of which rheumatic heart disease was the leading cause. Studies done in our country estimated the prevalence of rheumatic heart disease to be in the range of 4 - 6 /1000 school children (Butajira and A/Ababa studies respectively). This is considerably high compared to figures from developed nations (1/100,000)

This shows that our country, still having a very high burden of infectious diseases, is experiencing a double disease burden. Hence appropriate diagnosis, treatment and public health interventions are very important to control the disease. This can be effectively implemented by training the health center team

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2.4 Case Study

Ato Shalemo is a middle-aged farmer living in a small village called Anferara, which is 60 kms from Yirgalem. He is the family head and has five children. The family's income is from subsistence farming and the children look after the goats and sheep. All the family members live in small hut with their cattle, which also serves as a kitchen.

Bisrat, who is 14 years old and the second child of the family, likes playing with her friends. She helps her family by looking after goats and sheep. She was very cheerful and vibrant in the family except occasional attack of sore throat, which disappears by itself after some time. Her families have never been worried about it as it was self limiting and benign in their belief. Years back she once had the usual sore throat, which was un attended. Two weeks later she developed sudden onset of fever, joint pain, on and off joint swelling along with chest pain and easy fatigability. Ato Shalemo thought that this could be malaria and brought her some tablets from near by drug vendor but it was for no avail. Her father then consulted a respected traditional healer who gave him un-identified root and said 'it will vanish after she take this". Bisrat showed some improvement after a while, but since then, she was never healthy and cheerful as she used to be. She repeatedly complained of difficulty of swallowing, fever and headache. However no body in the family took those problems seriously. Her families thought this is just the usual child hood stuff and after all "no child has ever grown with out having cold". She started to have easy fatigability, could not play and run with friends and could not even carry out her routine activities. At that moment, her father also noticed progressive worsening of Bisrat's condition. The child started to have cough and difficulty of breathing especially when lying down and also developed swelling of both legs

Ato Shalemo thought the 'Devil' has possessed his child and took her to holy water. But Bisrat could not get any improvement, rather her symptoms got

worsened. She developed generalized body swelling and turned bed ridden. Her father then took her to nearby clinic from where she was referred to Yirgalem Hospital. There she was admitted, investigated and managed accordingly. When she began to show improvement, she was discharged with advice to come every month to collect medications and get inject

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- Considering RF/RHD as curable illness
- Failure to have trust in health professional's opinion or advice
- Drug withdrawal thinking the body could adapt to it

8. It’s to emphasize that the way people act and respond to a particular problem is mainly dictated by their understanding and level of awareness. So if we need others to do the right thing we have to let them know what is actually right, emphasizing on the importance of health education.

2.5 Rheumatic heart disease

2.5.1 Definition

2.5.1.1Rheumatic fever:

It is a non-supurative sequela of Group A, ß-hemolytic streptococcal (GABHS) throat infection. The disease involves the joint (hence the word “rheumatic”), heart, skin, subcutaneous tissue and the brain. It is considered as acute when the illness lasts for less than 6 months or chronic, if it is grater than 6 months in duration.

2.5.5.2 Rheumatic Heart Disease

Rheumatic heart disease is the major long-term sequel of acute rheumatic fever, which involves the cardiac valves leading to stenosis or regurgitation with resultant hemodynamic disturbance.

2.5.2 Epidemiology

Rheumatic fever is a major cause of acquired heart disease in children world wide, with the disease occurring most frequently in underdeveloped countries where access to medical care is limited and children live in poverty and unsanitary crowded conditions. For instance, while the incidence of rheumatic fever in developed countries is in the range of 0.2 to 0.5 per 1000 but that for

infection and only 22% were on regular prophylaxis showing low knowledge and level of awareness about the disease. This demands urgent control program that enables active case detection, access to treatment and health education.

The epidemiology of rheumatic fever is identical to that of group A streptococcal upper respiratory tract infection. It is most common in children aged between 5-15 years, which also correlates with peak incidence of streptococcal throat infection. This streptococcal pharyngitis is transmitted through droplet spread and the attack rate of acute rheumatic fever following untreated sporadic and endemic group A streptococcal pharyngitis is 0.3% and 3% respectively. Out of which a good number of them (40-60%) develop rheumatic heart disease.

2.5.3 Risk Factors

1. **Age and sex: -** females and children between 5-15 years of age are affected more commonly. First attack of acute rheumatic fever is rare in children < 3 years and adults older than 40 years.
2. **Housing and socioeconomic status: -** Rheumatic fever is common in areas of high poverty, poor living conditions and poor nutrition, among others. Over crowded and unsanitary living conditions, especially during the rainy seasons in tropics and sub tropics foster transmission of streptococcal infection and hence the development of rheumatic fever.
3. **Season: -** streptococcal throat infection and hence rheumatic fever occur commonly during the rainy season.
4. **Genetic predisposition: -** Rheumatic fever tends to cluster in families. This

2.5.4 Etiology and pathogenesis

2.5.4.1 Etiology of ARF

Rheumatic fever is caused by certain strains of Group A, ß-hemolytic streptococcal throat infection. Rheumatic heart disease is sequelae of rheumatic fever involving the heart. Rheumatic fever doesn't follow GABHS skin infection.

2.5.4.2 Pathogenesis of ARF

The exact mechanism streptococcal throat infection result in rheumatic fever is not known. There is neither direct invasion nor toxin-mediated damage to the tissues involved.

The most popularly accepted theory is immune mediated damage, where antibodies produced against streptococcal antigen cross reacts with host tissue (like cardiac muscles, synovial and brain tissues, among others) .The m-protein is an antigenically variable cell wall component in some of these bacteria. There are more than 80 subtypes but m-subtypes 1,3,5,6 and 18 are most often associated with acute rheumatic fever.

2.5. 5 Clinical Manifestation of ARF

Patients usually present with an 294.187vt]TJ(l c)anifesme/TT4 1 fsme/7.59(sl15 0 TD0.000

arthritis'). Rarely affects fingers, toes or spine. It doesn't result in joint destruction

2) **Heart** – it causes inflammation of the whole layers of the heart (pancarditis)

- This is the most important site, which may result in long-term sequel. May present with palpitation, chest pain, shortness of breathe, leg swelling etc.

3**) Skin and subcutaneous tissues**

- Patients may have non-itching macular rash and painless, mobile nodules often over the joints and spines.

4) **Central Nerves System** – It's usually a late manifestation

- Patients may present with abnormal movements of the limbs with muscle weakness and emotional labiality.

2.5.6 Diagnostic Approach

No specific diagnostic tests are available

It's mainly achieved using clinical criteria with supportive laboratory investigations which may not be found in all health care facilities

Lab evidence for throat infection

- Throat culture
- Serology for streptococcal antigens and antibody

Non specific evidence of inflammation

- ESR
- CRP
- WBC

NB: A typical clinical manifestati

achieved by monthly intramuscular benzathine penicillin injection or daily erythromycin or sufadiazine in case of penicillin allergy.

2.7 Prevention of rheumatic fever and rheumatic heart disease

Rheumatic fever is quite a preventable disease. The following are important ways to prevent acute rheumatic fever and rheumatic heart disease.

The most important determinant of acute rheumatic fever is socioeconomic rather than medical. Crowding is by far the most important risk factor. One has to improve crowding both at household and school level to reduce the incidence of the disease. This is obviously achieved over a long period at the national level through improved economy.

Other more important and practical measures include:

Primary prevention

- Improved environmental and personal hygiene
- Avoidance of contact with individuals having streptococcal throat infection
- Early recognition and treatment of streptococcal upper respiratory tract infection.

Secondary prevention

As is depicted above recurrence is the most important and frequent determinant of disease progression in patients with prior history of ARF/RHD. Hence, monthly benzathine penicillin injection is universally recommended for those with documented history of ARF/RHD and is considered as the single most effective measure.

Health education

Health education should focus on

- The importance of environm
    - Mode of transmisscatio]TJTj/TT15 1 -Tf4cs.5 -1.725 TD0 Tc0 Tw(-)Tj/TT
    - Natural course of the illnessio]TJTj/TT15 1 -Tf4cs.5 -1.725 TD0 Tc0 Tw(
    - Mainusign and symptoms of the diseasesion

UNIT THREE

SATELLITE MODULES

3.1 Satellite Module for Health Officer Students

1. Introduction

1.1 Purpose

This satellite module is prepared for Public Health Officer Students to give emphasis only on specific issues which were not covered by the Core Module

1.2 Instruction for Using the Satellite Module:

You must carefully study the Core Module before reading the Satellite Module

Do the pretest and post tests of the Satellite Module before and after studying the module, respectively and try to appreciate the difference in the results

Refer to the Core Module when indicated

Carefully analyze the expected tasks to be accomplished by you

1.3 Learning Objectives

At the end of the training the health officer students should be able to:

- Discuss the pathogenesis and natural course of rheumatic fever
- List major manifestations of rheumatic fever
- Diagnose rheumatic fever
- Manage rheumatic fever
- Know about the different clinical presentations of rheumatic heart disease
- Manage rheumatic valvular heart disease
- Outline the preventive measurers of rheumatic fever

Rheumatic fever and rheumatic heart disease

1.1 Rheumatic fever

1.1.1 Definition: -

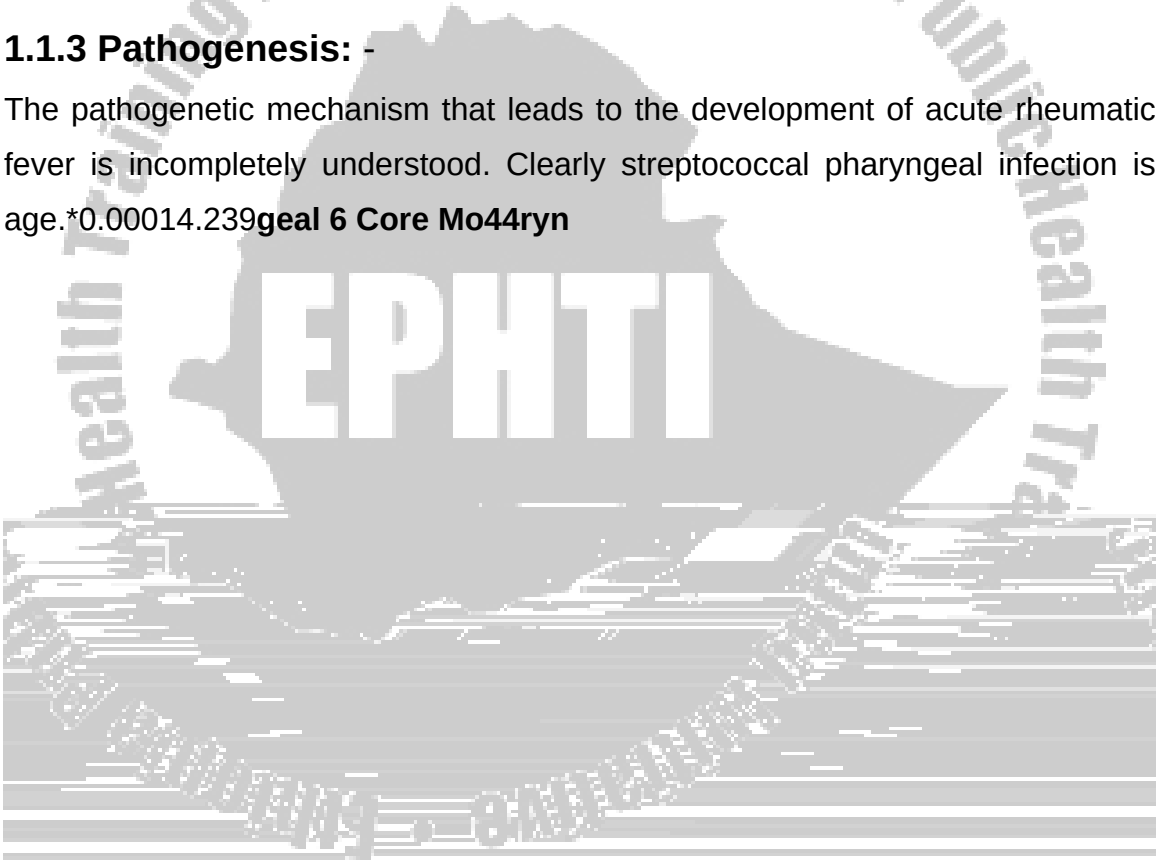
See the Core Module

1.1.2 Epidemiology

See the Core Module

1.1.3 Pathogenesis: -

The pathogenetic mechanism that leads to the development of acute rheumatic fever is incompletely understood. Clearly streptococcal pharyngeal infection is age.*0.00014.239**geal 6 Core Mo44ryn**



which eventually brings about stenosis (narrowing) and/or insufficiency of the valves.

These degenerative changes often develop over the span of decades. However, when there is a severe primary rheumatic insult with intense inflammation, as is seen in some developing countries, commissural adhesion could lead to mitral stenosis in younger patients before the actual degenerative changes occur.

Streptococcal pharyngitis , Overcrows,	Genetic susceptibility	Poor nutrition and housing conditions,

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1.1.6 Diagnosis

Revised Jones criteria

Major criteria	**Minor criteria**
Carditis	***1. Clinical***
Arthritis (Migratory polyarthritis)	Fever
Sydenham's chorea	Arthralgia*
Subcutaneous nodules	

To diagnose recurrence only one major criterion or two minor criteria with evidence of recent streptococcal infection may be used.

1.1.7 Differential diagnosis

- Rheumatoid arthritis
- Septic arthritis
- Infective endocarditis
- Viral myocarditis
- Huntington's Chorea

1.1.8 Management

1.1.8.1 Control of acute manifestations / symptomatic relief/

I. Supportive:

- Bed rest
- High caloric diet
- Management of congestive heart failure state (see management of congestive heart failure)

II. Anti inflammatory agents:

They are important to control symptoms but don't change the future development of valvular heart disease.

The main stay of treatment for acute rheumatic fever remains anti-inflammatory agents most commonly aspirin.

Arthritis and mild to moderate carditis

Aspirin 80 – 100 mg/kg/24hr (up to maximum of 1-2 gm) taken every six hours for 4-6 weeks

Severe carditis (those in congestive heart failure)

Predinisolone 1-2 mg/kg/day up to a maximum dose of 60 mg/day for 2 weeks then taper the dose over the coming 2-4 weeks depending on the clinical and laboratory response. In the mean time, aspirin should be started at the recommended dose mentioned above.

1.1.8.2 Eradication of streptococcal pharyngitis.

Antibiotic should be universally given for those with acute rheumatic fever regardless of evidence of throat infection. The drug of choice is Penicillin. The following is the dosage regimen of benzanthine penicillin

-below 3 years 300,000 IU IM stat

-3 to 6 years 600,000 IU IM stat

-7 to 9 years 900,000 IU IM stat

- above 9 years 1.2 Mill IU IM stat

For those with penicillin allergy

- Erythromycin 40 mg/kg/24hr (up to a maximum of 1000 mg/day) in 2 to 4 divided doses for a total of 10 days is given. Sulfadiazine is also another alternative in patients with penicillin allergy.

1.1.8.3 Prevention of recurrence (2^0 prophylaxis)

- Benzanthine penicillin every 3 to 4 weeks intramuscular
- For those with penicillin allergy sulfadiazine 1 gm daily can be given

1.2 Rheumatic Heart Disease (Rheumatic Carditis): -

As already mentioned the only feature of acute rheumatic fever, which has a late sequela, is carditis. Carditis can occur in the acute form of rheumatic fever.

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1.2.1.2 Summary of pathophysiology and complications of mitral stenosis.

I. Elevated left atrial pressure, hence pulmonary venous, and pulmonary capillary pressure loads to:

- Exercise intolerance
- Dyspnea
- Orthopnea
- Pulmonary edema
- Hemoptysis and pulmonary hemorrhage
- Recurrent pulmonary infections

II. Dilated left atrium leads to

- Cardiomegally
- Atrial fibrillation
- Systemic embolism

III. Pulmonary hypertension leads to

- Right ventricular failure with right ventricular and atrial dilatation, which may be complicated by pulmonary embolism.

IV. Abnormal valvular structure with roughened surface together with abnormal hemodynamics leads to infective endocarditis.

1.2.1.3 Symptoms and signs

Symptoms

- Symptoms related to pulmonary congestion
  - Dyspnea
  - Orthopnea
  - Paroxysmal nocturnal dyspnea
  - Hemoptysis
- Symptoms of right sided heart failure
  - Right upper quadrant discomfort
  - Leg swelling
- Symptoms of low cardiac out put

N.B: Symptoms of pulmonary congestion improves when right heart fails (because of decreased pulmonary perfusion)

Signs (physical findings)

- Distended neck vein
- Silent precordium with epigastric pulsation
- Apical impulse is often localized
- Palpable p_2
- Left parasternal heave
- Diastolic thrill at apex
- S_1 accentuation,
- Opening snap of the mitral valve
- Loud P_2
- Mid diastolic rumbling murmur best heard at the apex with presystolic accentuation

1.2.2. Mitral regurgitation (MR)

The immune response in rheumatic fever leads to structural changes in the valves with thickening and shortening of the chordea tendinea. As a result there will be regurgitation of blood to the left atrium during ventricular systole. This leads to enlargement of the left atrium as well as left ventricle.

Clinical presentations depend on the severity of the valvular lesion. If mild, signs of heart failure will not be present and precordium will be quiet. There will be a holosystolic murmur at the apex, radiating to the left axillia. With severe insufficiency, features of heart failure may be present. This includes easy fatigability, body swelling, and dyspnea of variable degrees.

Physical examination reveals

- Variable degrees of respiratory distress
- Active precordium with displaced apical impulse and point of maximal impulse (PMI)

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-If refractory referral for mechanical removal of fluid

(Paracentesis, thoracentesis)

Diuretics

1.3.3.2. Increasing inotropic state (cardiac contractility)

a) Digitalis

Digoxin

Digitalization = achieving maintenance therapeutic serum level

1. Slow digitalization takes 5 days (starting with maintenance dose)

2. Rapid digitalization – over one day

Digoxin:	Dosage
►Digitalization po (1/2 initially, followed by 1/4th every 8-12 hours, 12X2)	premature: 20µg/kg Full term neonate: 20-30µg/kg Infant/child: 25-40µg/kg Adolescent/adult: 0.5-1mg
►Maintenance	5-10µg/kg/day, divided every 12 hours

NB. IV-dose is 75% of po dose

Indications

- Systolic dysfunction
- Hypertensive heart disease (if systolic failure)
- Dilated cardiomyopathy
- Arrhythmia (Supraventricular)

Side effects

Digitalis toxicity

Predisposing conditions – hypoxia, Hypokalemia, renal failure

Manifestations: Nausea, vomiting, arrhythmia

Treatment

- Discontinue the drug
- Treatment of Hypokalemia and other precipitating causes
- Refer if patient has arrhythmia

1.3.3.3. Reducing after load

- Decreasing work load, stress (emotional and physical)
- Bed rest (until the acute situation subsides)

- Weight decrement should be Individualized
- Vasodilators

I. Vasodilators

-Usually given for refractory heart failure

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3.2. Satellite Module for Public Health Nurses

1.0 Introduction

1.1 Purpose

This satellite module is prepared for public health nurse students to help them manage, control and prevent rheumatic fever and rheumatic heart disease.

1.2 Instruction for Using the Satellite Module:

- Students must read the core module before going in to the satellite module. . They are also advised to refer to the core module wherever indicated

  - The following points are explained in detailed in the core module

Definition
Epidemiology
Etiology and pathogenesis
Clinical feature
Diagnosis
Case management
Prevention and control

1.3 Learning objectives

Up on completion of the satellite module you will be able to

1. Discuss the methods used to assess a patient with rheumatic fever and rheumatic heart disease

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The patient's cardiac function

Tolerance to activities; activity limitations

Patient knowledge about the nature and possible intervention for rheumatic fever and rheumatic heart disease.

1.5. Nursing Diagnosis

- the diagnosis common to patients with rheumatic fever and rheumatic heart disease derived from these data are as follow :

1. Decreased cardiac out put related to cardiac valve dysfunction due to established rheumatic heart disease as manifested by a decreased in blood pressure, tachycardia, and fatigue
2. Potential for injury from the risk of arterial embolization related to the presence of valvular vegetations and thrombi predisposing to risk of embolization
3. Potential knowledge deficit regarding the disease process of rheumatic fever and rheumatic heart disease
4. Anxiety related to diagnosis of heart disease and fear of death

1.6. Nursing plan

(Give priority for life threatening conditions)

1. To restore and maintain the hemodynamic status
2. To detect early the signs and symptoms of streptococcal throat infection
3. To evaluate frequently for rapid pulse, dyspnea, fatigue, and other signs of heart failure
4. To detect early signs of embolism
5. To prevent complications including venous thrombosis
6. To give health education about the cause, complications and prevention of rheumatic fever and to provide the necessary information treatment for rheumatic fever and rheumatic heart disease.

1.7. Nursing Intervention

1. Hospitalize the patient (if sings of heart failure, or sever carditis present) until features of heart failure improve.

   Evaluate frequently for

   Rapid pulse

   Dyspnea

   Fatigue

   Sign of heart failure (like body swelling, basal crepitation on the chest together with orthopnea)

   And give proper nursing care

2. Detect early signs and symptoms of infection

   Recording temperature at least twice daily on a graph to identify any patterns of elevation

   Taking vital sign at least twice daily to detect widening pulse pressure and hemodynamic changes

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- Importance of personal and environmental hygiene as well as adequate ventilation in disease prevention
- Follow up on defaulters who don't get their monthly benzathin penicillin

1.8 Evaluation

Should address the following questions

- Dose the patient show hemodynamic stability by having a stable blood pressure and pulse, being mentally alert and oriented, and having adequate urine out put and no new heart murmur development?
- Are there signs of resolutions of thromboembolisms?
- Can the patient accurately discuss the nature of rheumatic heart disease, identify situations requiring prophylactic antibiotics, and demonstrate the correct method of oral hygiene?
- Can the patient carry out activities of daily living with out fatigue or dyspnea?
- Can the patient able to verbalize relief of anxiety and health status information with out fear?

N.B If the above questions are answered negatively, go back through all the steps again checking where the problems are.

1.9 Nursing process at home and school level

School health service is an important part of prevention of rheumatic fever. School health provides the target population in one accessible area. Hence, screening and management of pharyngitis, which is common during school years, is cost effective way of promoting primary and secondary prevention. Besides maintenance of healthy school environment in terms of student density, aeration, and illumination in collaboration with school administrative provides one of the best way to prevent not only rheumatic heart disease but also other communicable diseases.

1.9.1 Plan a home visit to follow up on the patient's condition after discharge (if possible)

1.9.2. Establish rapport

1.9.2.1- assess: -

1. the presence of similar or febrile illness in other family members
2. Culture and beliefs of the family related to rheumatic fever
3. The traditional treatment and supportive health practices for rheumatic fever
4. The nutritional status
5. Immunization status
6. Ventilation of the house
7. Educational status of the family
8. Income of the family
9. Mortality & survival of children in the family

1.9.2.2. Identify the most important problems for the family (family focused nursing diagnosis)

1.9.2.3 Set your objectives and prioritize the problem using the nursing measure to address the problem

1.9.2.4 Nursing intervention

Provide health education on: -

- Rheumatic fever and rheumatic heart disease: How it is caused, early signs & symptoms and complications
- Importance of early treatment and visits to health workers
- Ventilation
- Immunization
- Prophylaxis :monthly or daily antibiotic

1.10. Methods used

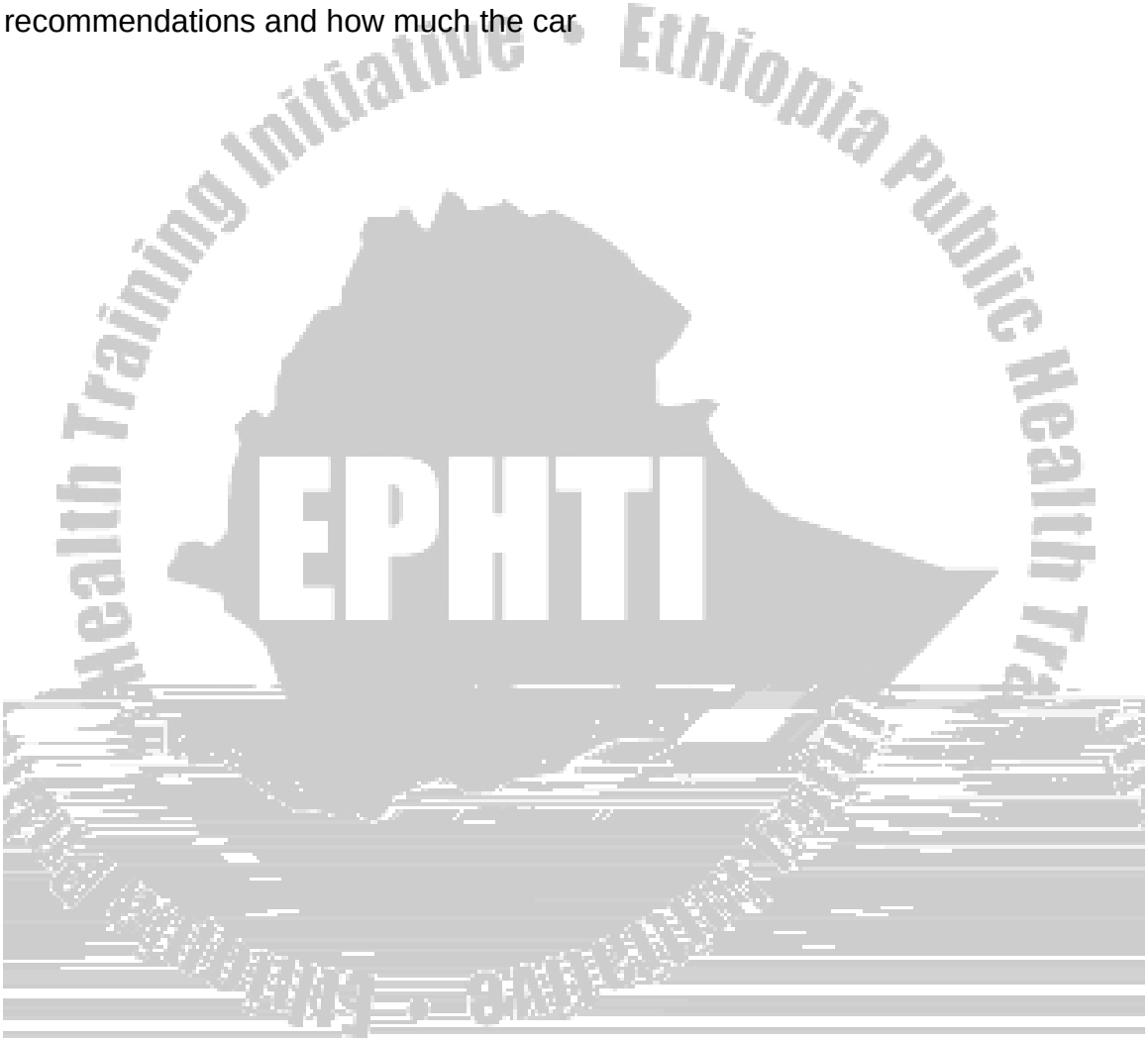
- Health talk and discussion
- Home visit and discussion about proper ventilation
- Home care of upper respiratory tract infection

1.11 Evaluation at home level

- Check whether the patient and family have an understanding of what you have discussed able to demonstrate what they have observed
- Asking questions

Note: - Plan to revisit home

E.g. Check whether the medications are being taken based on recommendations and how much the car



3.3 Satellite Module for Medical Laboratory Technician

1. Introduction

1.1. Purpose and use of the module

This section of the module on rheumatic fever and rheumatic heart disease is believed to give basic theoretical and practical skills that need to be acquired by Medical Laboratory Technology students that are in the actual training or those already in service for diagnosis of rheumatic fever. After going through this module, we believe, Medical Laboratory Technicians will have the appropriate knowledge to help diagnose patients with rheumatic fever and rheumatic heart disease. It is also believed that the readers will be provided with valuable skills that can be utilized locally in the Ethiopian system.

1.2. Directions to use this module

Attempt the pre-test questions in section 2.1,page 9 of the core module and evaluate your knowledge on rheumatic fever and rheumatic heart disease before going through the module

Try to understand the learning objectives

Read the case studies presented

Go through the details under each of the subtopics

Work on the post-test questions and re-evaluate your knowledge again

To substantiate your understanding of RHD refer to the listed references at the end of the core module

1.3 Learning Objectives

At the end of reading this module, the Medical Laboratory Technician will be able to:

Identify laboratory tests that contribute to the correct diagnosis of RF

Properly collect specimens used for diagnosis of RF

Describe methods of performing tests used for the diagnosis of RF diagnosis

Discuss the principles of those tests used for diagnosis of RF

List factors affecting the accuracy of the tests

Follow the standard procedures to carry out tests for diagnosis of RF

Take responsibility for maintaining the integrity of the tests by controlling the conditions affecting each test

Perform the tests and diagnose cases of RF

Record the results of each test used for diagnosis of RF

1.4 Laboratory Tests Used to Diagnose RHD

RF/RHD is one of the post- complications. The common tests used for detection of GABHS infection and hence for the diagnoses of rheumatic fever use the interaction of the extracellular products of Streptococcus pyogenes & antibodies produced against those products (hemolysins).

Moreover, tests for DNAse B antibody, Streptozyme test can serve as indirect evidence of infection; and throat culture can be used for direct detection of S. pyogenes.

1.4.1. Tests for ASO

ASO is an antibody produced against the toxins called Streptolysin O of S.pyogenes.

Properties of Streptolysin O (SLO)

It is oxygen-labile unlike Streptolysin S (SLS)

It is antigenic; that is it elicits the production of an antibody

It is haemolytically active in its reduced state

Its biologic activity is completely inhibited by low concentrations (1.0µg/ml) of cholesterol & certain related sterols

It is cardiotoxic

Estimation of ASO titer is very important in the investigation of RF/RHD since this complication develops at the stage when it is not possible to isolate S.pyogenes in throat culture.

1.4.1.1. ASO microtitration or Tube Hemolysis Test

It is one of the commercially available tests for the investigation of raised ASO antibody levels.

Principle:

In the titration test, a constant amount of streptolysin O antigen reagent (reduced form) is added to a series of dilutions of the patient's serum. Following a period of incubation, Group O washed human or rabbit red cells (not supplied with the kit) are added. The tubes are then examined for lyses of the red cells. Hemolysis occurs in those tubes in which there are insufficient antibodies to neutralize the antigen.

The highest dilution of serum showing no hemolysis is the ASO titer (the titer of ASO antibody in the serum is directly proportional to reciprocal of the serum dilution). In most titration tests, ASO titer is expressed in Todd Units. For example, 512 Todd units are equivalent to an ASO titer of 512 (1 in 512 serum dilution).

Advantages:

Small amount of serum can be used

Commercially available

Disadvantages:

Once reconstituted, the SLO antigen reagent must be

False-positive results may be seen with rheumatoid arthritis, pneumococcus pneumonia, gonorrhea, tuberculosis, hepatitis, lipaemic serum, bacterially contaminated serum or reagents, or oxidized SLO antigen

Materials Required

1. Saline – 0.85 percent
2. Streptolysin O buffer – this is commercially available from a number of supply houses. It is prepared as follows:
   7.4 gm sodium chloride
   3.17 gm potassium phosphate
   1.081 gm sodium phosphate
   Add to 1,000 ml of distilled water. The final pH should be between 6.5 and 6.7. The buffer may be stored at 4^0 c for up to 1 week.
3. Streptolysin O - this is available in dehydrated form from commercial supply houses and should be rehydrated just prior to use. Once rehydrated, the solution should not be subjected to vigorous shaking, and it must be used within 1 hour or discarded, because the active reagent is subject to inactivation by oxidation.
4. Red blood cells - a 5 percent suspension of fresh (not more than 1 week old) human red blood cells (group O) is most commonly used in this test, although rabbit red blood cells and equally sensitive to SLO. The cells must be washed three times in diluent, and the buffy coat (white blood cells) must be removed. The final centrifugation should be at 1,500 rpm for 10 minutes, following which the packed red cells may be measured to achieve a 5 percent suspension. Prepare the final suspension in SLO buffer.
5. Test tubes - 12X100 mm are commonly used (round bottom).

Procedure

1. Prepare dilutions of fresh or inactivated serum as follows, using SLO buffer as a diluent:

1:10 - 0.5 ml of serum+ 4.5ml of buffer

1:100 - 1.0 ml of 1:0 serum dilution +9.0ml of buffer

1:500 - 2.0 ml of 1:100 serum dilution + 8.0 ml of buffer

The first two serum dilutions are usually sufficient for preliminary titrations.

2. Set up the test according to the protocol given in Table 1 below:

Interpretation

In the latex test, the patient's serum is first incubated with streptolysin O reagent (reduced form) containing 200 IU antigen/ml. One drop of latex suspension (latex particles coated with streptolysin O antigen) is then mixed on a slide with the serum-streptolysin O reagent and the preparation examined for agglutination.

If the patient's serum contains more than 200 IU ASO antibody, the excess antibody will agglutinate the antigen in the latex reagent. If no agglutination occurs, the antibody level is below 200IU/ml. When the antibody level is greater than 200IU/ml further testing is required to estimate the approximate titer of the antibody.

Advantages:

Once reconstituted, the latex reduced Streptolysin O antigen reagent can be used for up to 5 days.

Lipoproteins, oxidized SLO or bacterial growth products do not interfere with this test

Disadvantages:

Generally less frequently used

Screens for ASO antibody levels over 200 IU/ml

Non-specific reactions can be seen withy bacterial contamination of the specimen, with lipemic serum or plasma or if the reaction is observed after 3 minutes

A titer of 200 U/ml or greater may be associated with rheumatic fever (RF) or glomerulonephritis

Materials Required

The kit contains:

1. ASO latex reagent coated with streptolysin O. Store at 2^0 to 8^0C. Mix well before use.
2. 0.9 percent NaCl solution. This is a saline solution containing sodium azide as a preservative.

3. Positive control serum. A prediluted serum containing at least 200 U/ml of ASO. This control should exhibit visible agglutination at the end of the 3-minute test period.
4. Negative control should exhibit a smooth or slightly granular appearance at the end of the 3-minute test period.
5. Glass slides with 6 wells. Use only the glass slide provided. The slide should be rinsed in distilled water and thoroughly dried with a soft cloth or tissue after each use.

Additional materials required but not provided in the kit:

1. Applicator sticks
2. Timer
3. 12X75 mm test tubes
4. Pasteur pipettes and rubber bulb
5. Serologic pipettes and safety bulb
6. 50 µl disposable pipettes and safety bulb

8. Rotate the slide for exactly 3 minutes
9. Examine immediately with a bright source of direct light.

Note: All reagents and specimens should be at room temperature before testing

Interpretation

Agglutination indicates a positive result and no agglutination indicates a negative result, provided that the controls have given the expected results,

Agglutination demonstrates 200U/ml or more of ASO. Positive results should be retested quantitatively. In semi quantitative testing, the U/ml of the highest dilution of serum to produce visible agglutination is the reported value.

The patient's serum should be prepared as follows:

Dilution	U/ml
1:30	300
1:40	400
1:60	600
1:80	800
1:100	1,000

Discussion

False-positive reactions can result from bacterial contamination of the specimen or if the reaction is observed after 3 minutes. Markedly lipaemi

cMot

1.4.1.3. Estimation of DNAse B antibodies

This test is useful for diagnosis of rheumatic fever and rheumatic heart disease in a minority of patients who don't show rise in ASO antibody titer. The rise in DNaseB antibody usually occurs later than the ASO antibody.

Advantages:

More sensitive than ASO antibody test

Disadvantages:

Once reconstituted the antigen (Streptococcal DnaseB) should be used with in a few hours.

It is done in the Microbiology Reference Laboratory

More expensive than the ASO titration test kits

Requires experts to perform the test

1.4.1.4. Streptozyme test

Facilities for these procedures are not available in a health center set up and detailed account on each is beyond the scope of this module.

1.4.1.5. Tests for C-Reactive Proteins (CRP)

CRPs are proteins not found in normal human serum. They are found in sera of patients in the acute phase of various infections as well as with inflammation. They can be precipitated with nitrogenous polysaccharides, the C-substance, from rough pneumococcus with light dilutions of the sera of patients during the acute phase of pneumonic infections. They appear in less than 24hrs after the onset of symptoms of pneumonia, remain at a high-level during the disease and decrease sharply in 3 days after the disease when the temperature returns to normal. It is not type-specific and agglutinins do not appear in patient's sera until the crises and persisted thereafter during convalescence, after disappearance of the reactive protein. Sera of patients with streptococcal and staphylococcal infections, acute rheumatic fevers, and other diseases confer some abnormal protein capable of precipitating with the pneumococcal C-substance. It has been

isolated and crystallized and found to migrate electrophoretically as a β– or γ-globulin.

The amount of increased C-reactive protein implies non-specific disease or the presence or inflammation.

Application:

To evaluate a disease condition & response to treatment. We can use CRP to diagnose patients if disease is inflammatory or not. CRP can be detected after about 24 hrs of infection.

The increased CRP is correlated with increased ESR and it has practical value. There is demarcation of ESR in normal & abnormal conditions. Detecting any amount of CRP in patients is indicative of an abnormal condition. CRP appears in patients earlier than ESR. Therefore, we can know the infection early.

We can evaluate ESR by testing for CRP.

Note: There may be increased ESR in normal conditions like pregnancy but this is evaluated by testing for CRP. ESR can also be seen in anemic patients but we can evaluate by testing for CRP.

Serological Tests to detect CRP

1. Precipitation test with purified pneumococcal C-polysaccharide

This is a tube precipitin test which is not convenient & is difficult to perform

There may be a false positive reaction if there is antibody against C-polysaccharide (but our aim is to look for CRP). So, it is not used in most labs now.

Requires 1 to 3 days & is time consuming

2. Hemagglutination test for CRP

The red blood cells coated with CRP (Ag) or anti-RBC antibody is used

It can be passive or active

This test is more specific than the precipitation test using polysaccharides

3. Precipitation test for CRP

This test is rapid, passive, & is more sensitive

The latex suspension contains dyes, which color the reaction so that the agglutination will be more visible.

Reagent: Anti-CRP latex reagent (Antibody coated on latex particle is used as a reagent)

Together with the reagent, the positive and negative controls are included. The positive control contains anti–CRP antibody & the negative control contains no CRP.

Sample: Serum is sample of choice. If the serum has been kept at 2-8^{0}C the reagent has to reach the room temperature.

4. A. Qualitative Slide Agglutination test

Used to detect the presence or absence of CRP in patients' serum.

Procedure:

1. Place 1 drop of the positive control (0.050µl) on the card.
2. Place 1 drop of patient's serum on a card & add one drop or 1 ml of mixed anti- CRP reagent to both.
3. Mix the preparation using different applicator sticks. Rotate the card.
4. Observe for agglutination within 3 to 5 minutes. If delayed the part of the reagent may evaporate and dry and give false positive results. Therefore keeping time of reading is very important.

Reporting:

Report as negative if no agglutination is & as positive if there is agglutination

Note: The negative result could be due to the prozone effect. Therefore, we have to dilute the serum (1:10 or 1:20) and retest the preparation. If no agglutination in the diluted serum it is a true negative.

4. B. Semi-quantitative slide test

Used to quantify the amount of CRP

Procedure:

1. Add 1 drop of 10µl serum & 50µl successively on a card.
2. Add 1 drop of anti-CRP latex reagent to each card & mix using a stick.
3. Rotate the card & read within 3 to 5 minutes.

Reading:

If there is no reaction in the 10µl serum & 50µlcompared to the control serum, the CRP is supposed to be less than 7 plus or minus 1mg/l.

If there is no reaction in the 10µl serum & reaction in the 50µl serum, the CRP is supposed to be in between 7 & 20 and is considered as positive test result.

In the 10µl serum we have low concentration of CRP, if present, & the anti-CRP is high (prozone effect). Therefore, the result may not be visible consequently showing negative result.

If there is reaction in the 10µl serum & no reaction in the 50µl serum, the CRP is supposed to be approximately equal to 20-200mg/l.

If there is reaction in both serums, the concentration of CRP is supposed to be greater than 200mg/l.

When it is negative in the 50µl serum the concentration of CRP is very high (post zone effect) i.e., the antigen is high. We can also do serial dilution to quantity the amount of CRP in serum. We interpret as negative in the 10µl & 50µl serums because less than 7 pl

Interpretation:

Normal adults have less than or equal to 5mg/l of CRP in serum.

The concentration increases in inflammatory and malignant diseases (cancer).

Rheumatoid factor may cause a false positive test result but the probability of being FP in this case is only about 2%.

The quantification of CRP depends up on the manufacturer, which has its own standard concentration to the sensitivity of the test.

1.4.1.6. Throat Culture

Culture of throat swabs is used to isolate pathogens in the upper respiratory tract such as GAßHS.

Collection of throat swabs:

1. In a good light & using the handle of a spoon to depress the tongue, examine the inside of the mouth.

With a streptococcal sore throat, the tonsils are inflamed & often covered in whitish or yellow spots.

2. Swab the affected area using a sterile cotton or alginate wool swab. Taking care not to contaminate the swab with the saliva, return it to its sterile container.

Note: For 8 hours before swabbing, the patient must not be treated with antibiotics or antiseptic mouth-washes (gargles).

3. Within two hours of collection, send the swab with a request form to the laboratory or store the swabs in tubes containing 3-5 g of dried silica gel & send to the Microbiology Laboratory within 3 days.

Culture of the Specimen

The routinely used media to inoculate the throat swab is a plate of blood agar.

If the swab is received in silica gel (e.g. from a health center), moisten it first with sterile nutrient broth and then inoculate the plate.

Sheep, goat, or horse blood but not human blood should be used in preparing plates.

Add a bacitracin disc (0.05 units) to the plate to help identify S. pyogenes, which is sensitive.

Incubate the plate preferably anaerobically or in a CO_2 enriched atmosphere overnight at 35-37^{0}C.

S. Pyogenes show beta-hemolysis with larger zones when incubated anaerobically.

Reporting of throat swab cultures: if a beta-hemolytic Streptococcus sensitive to bacitracin is isolated, report the culture as 'S. pyogenes presumptive Group A isolated, Lance-field group to be confirmed'.

1.4.1.7. Erythrocyte Sedimentation Rate (ESR)

The ESR, also known as the sedimentation rate is a nonspecific laboratory test that determines the rate at which erythrocytes separate from plasma & settle to the bottom of a tube.

Its results don't show a specific disease but they indicate a general condition such as the presence of acute or chronic inflammation.

A series of sedimentation rates allow the physician to evaluate a course of treatment by following the progress of an inflammatory condition.

The speed at which the erythrocytes settle out of plasma in a blood sample depends on four factortes6megb13T2 1 Tf.405 -19725 TD0 Tc0 T<.008>6

Uses a Wintrobe sedimentation tube & a long-stemmed Pasteur Pipette. A Wintrobe tube is a glass cylinder, 1mm in diameter, with a capacity of 1mL. It is graduated from 0 to 100mm from top to bottom on one side of the scale & from bottom to top on the other side. The system includes a special rack that holds the tube in a vertical position.

Procedure:

1. Collect a venous whole blood sa

Technical Factors Affecting the ESR

The slightest variation from a vertical position in the sedimentation tube can increase the ESR. A variation as small as a 3^0 angle can increase the ESR by 30%.

Taking the reading before or after the specified time gives a result that is too low or too high.

Any movement of the sample during the test period can increase the ESR.

Do not jar or move the rack holding the sedimentation tube.

Blood that has been drawn more than 2 hours before the test or blood that has not been properly mixed with the correct anticoagulant will not yield a true ESR.

Change in environmental temperature can cause changes in ESR.

The rate of sedimentation will vary with any change in the size, shape, or dimensions of the sedimentation tube.

Even a small variance in volume affects the measurement of the ESR.

Reference Values for the ESR

ESR reference values vary with age, sex, & method of testing. Elderly patients & pregnant women often show an elevated ESR.

Table 2: Reference Values for ESR

Wintrobe	Westergren
(mm/hr)	((((((((((())34(m(/h))34\)

3.4. Satellite Module for Environmental Health Technician

1.3 Learning objectives

At the end of the session the students should be able to

Identify the role of environmental health technician in the control and prevention of rheumatic fever and rheumatic heart disease.

Describe the ways of prevention and control of rheumatic fever and rheumatic heart disease

Be able to give health education for the patients, public and health worker as a whole.

1.4 Ways of prevention and control of rheumatic fever and rheumatic heart disease

1.4.1 The fundamental aims are:

1. Environment control:

To improve housing & homes following the principles of healthful housing:

Providing adequate illumination

Providing adequate ventilation

Maintain the recommended size of house for the family to:

* avoid over crowding

* to increase privacy

The house should be constructed in such a way that it should avoid-

* in door air pollution

* Injuries

Provide recommended sanitary facilities.

- Safe & adequate water supply
- Safe disposal of wastes (solid and/or liquid wastes)

Avoid noise pollution to provide sufficient bed rest for the patients

Avoidance of exposure to bad weather

Avoidance of over heating or chilling

2. Diet: Good nutrition is important for the prevention of rheumatic fever

3. *Primary prophylaxis*: to detect and threat symptomatic S.Pyogenes sore throat with either Benzedrine penicillin 1.2

mega units, penicillin V for 10 days or benzyl penicillin.

All upper respiratory infections and attacks of acute tonsillitis should be given adequate treatment.

The early use of penicillin in all streptococcal infection

4. *Secondary prophylaxis*

1.5 Health education:

To the patients

Explain all tests and treatments to the patients.

Improving environmental condition

Healthful housing

Proper nutrition

Sufficient rest

- Importance of early treatment of the disease and follow up
- The proper use of the prescribed antibiotics
- The need to report the recurrence of the disease

Refer to the Case Study on in section 2.3 of the Core Module and discuss the following questions.

1. What do you think are the predisposing factors for Bisrat's illness?
   A) _____
   B) _____
   C) _____

2. List the methods to prevent recurrences of Bisrat's illness.
   A) _____
   B) _____
   C) _____

3. Which ones should be focus areas for health education to Bisrat's family?
   A) _____
   B) _____
   C) _____
   D) _____

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Principal signs (usually only 3 or 4 of these signs are present):

Fever

Joint pain, especially in the wrists and ankles, later the knees and elbows as well. Joints become swollen, and often tender.

Lumps under the skin

In more serious cases, weakness, shortness of breathe and perhaps heart pain.

N.B. Rheumatic fever often causes scarring of the heart valves and is a very common of heart disease in children and adults in Ethiopia. Some studies show that over half of the heart disease in Ethiopia is caused by rheumatic fever.

Treatment:

If you suspect rheumatic fever, refer to a health center. There is a risk that the heart may become damaged.

Take Aspirin in large doses (100mg/kg/24hours) in four divided doses.

Give Ampcillin/Amoxicillin 50mg/kg/24hours 3-4X/day for ten days or a single dose of benzathin pencillin IM

Prevention:

To prevent rheumatic fever, treat streptococci sore throat early.

To prevent return of rheumatic fever and added heart damage, a child who has once had rheumatic fever should take penicillin at the firs sign of sore throat. If he already had heart damage, he should take penicillin on a regular basis or has monthly benzathin pencillin injection, perhaps for the rest of his/her life.

Follow the advice of an experienced health worker or a doctor.

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5	Describe the principles of management acute rheumatic fever and its complications	Describe the management of a patient with acute rheumatic fever and rheumatic heart disease	Explain the methods of prevention and control	Understand the principles of management of rheumatic fever	Explain the methods of prevention and control
6	Explain ways of prevention of acute rheumatic fever and rheumatic heart disease	Explain ways of prevention of acute rheumatic fever and rheumatic heart disease		Explain different methods of prevention for rheumatic fever & rheumatic heart disease	

Table 2. Attitude objectives and activities professional students

S.N	Learning objective	Public Health officer	Environmental Health Technician	Public Health Nursing	Medical Laboratory Technician
1	Be encouraged to know about rheumatic fever and rheumatic heart disease	Be encouraged to know about rheumatic fever and rheumatic heart disease	Be encouraged to know about rheumatic fever and rheumatic heart disease	Be encouraged to know about rheumatic fever and rheumatic heart disease	Be encouraged to know about rheumatic fever and rheumatic heart disease
2	Believe on the importance of the epidemiology of rheumatic heart disease	Discuss the difference between the epidemiology of rheumatic heart disease in developed and developing nation	Discuss the role of risk factors in prevention of the disease	Discuss the role of risk factors in prevention of the disease	Discuss the role of risk factors in prevention of the disease
3	Give value to the pathogenesis of acute rheumatic fever	Discuss the pathogenesis of acute rheumatic fever and rheumatic heart disease		Give value to the pathogenesis of acute rheumatic fever	Give value to the pathogenesis of acute rheumatic fever
4	Give emphasis about the clinical manifestation ad diagnostic approach about acute rheumatic fever ad rheumatic heart disease	Give emphasis about the clinical manifestation ad diagnostic approach about acute rheumatic fever ad rheumatic heart disease	Give emphasis about the clinical manifestation ad diagnostic approach about acute rheumatic fever ad rheumatic heart disease	Promote treatment seeking behavior of the patient and family when sign and symptoms of acute rheumatic fever and rheumatic hear disease are observed	Justify on the importance of the collection of blood & throat specimens for diagnosis of acute rheumatic fever
5	Give value to the principles of management acute rheumatic fever and its complication	Give value to the principles of management Acute rheumatic fever and its complication		Believe in the care of a patient with rheumatic fever and rheumatic heart disease and its complication	
6	Accept the importance of ways of prevention of acute rheumatic fever and rheumatic heart disease	Verify ways of prevention of acute rheumatic fever and rheumatic heart disease	Believe in importance of contacts and the immediate environments in the control of the disease	Accept the importance of ways of prevention of acute rheumatic fever and rheumatic heart disease	Accept the importance of ways of prevention of acute rheumatic fever and rheumatic heart disease

Table 3. Practice objective and activities professional students

s. N	Learning objective	Health officer	Environmental health technician	Public health Nurse	Medical laboratory technician
1	Define rheumatic fever and rheumatic heart disease				
2	Show why rheumatic fever and rheumatic heart disease are prevalent in developing nation	Carry out a small scale research to show why rheumatic fever and rheumatic heart disease are prevalent in your area of working	Coordinate with the health team in Showing why rheumatic fever and rheumatic heart disease are prevalent in developing nation	Coordinate with the health team in showing why rheumatic fever and rheumatic heart disease are prevalent in developing nation	Coordinate with the health team in showing why rheumatic fever and rheumatic heart disease are prevalent in developing nation
3	Draw the summary of the pathogenesis of acute rheumatic fever	Draw the summary of pathogenesis of acute rheumatic fever		Draw the summary of pathogenesis of acute rheumatic fever	Draw the summary of pathogenesis of acute rheumatic fever
4	Draw the summary of the clinical manifestation ad diagnostic approach about acute rheumatic fever ad rheumatic heart disease	Draw the summary of the clinical manifestation and diagnostic approach about acute rheumatic fever and rheumatic heart disease		Practice different ways of	

				-Follow up the patient -Make home visiting	
6	Explain ways of prevention of acute rheumatic fever and rheumatic heart disease	Plan, organize, coordinate and supervise preventive activities of acute rheumatic fever and rheumatic heart disease	Teach and provide technical support for the communities about the importance of improving housing condition in the prevention of rheumatic heart disease.	Teach patients the preventive aspects of rheumatic fever and rheumatic heart disease	Teach patients the preventive aspects of rheumatic fever and rheumatic heart disease

ANNEX II

GLOSSARY

2. **Nursing process** is a short hand term used to convey a systematic process of recognizing and acting on those human needs with which nurses can help
3. **Nursing assessment**

17. **EDTA:** is an anticoagulant used in collection of venous blood
18. **Hemolysins:** substances causing lyses of red and white blood cells
19. **Hemolysis:** lyses of red and white blood cells
20. **Streptolysin O**: is a bacterial toxin produced by virtually all strains of S.Pyogenes.
21. **Titration:** is an addition of a constant amount of streptolysin O antigen to a series of dilutions of the patients serum
22. **Todd Unit:** is a minimal hemolytic dose of SLO as that amount of toxin that will completely hemolyse 0.5ml of the 0.5%suspension of rabbit red blood cells.

ANNEX III

ABBREVIATIONS

RHD: Rheumatic Heart Disease

RF: Rheumatic Fever

ARF: Acute Rheumatic Fever

SLO: Streptolysin O

ASO: Antistreptolysin O

DNAaseB: Deoxyribonuclease B

IU/ml:

ANNEX IV

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