

**Republic of Sudan  
Federal Ministry of Health  
Directorate of Communicable and Non  
Communicable Disease**

**MALARIA CASE MANAGEMENT  
Training Manual**

**Part II  
Tutor's Guide**

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## CONTENTS

	Contributors	
	Table of Contents	
	Objective	
	Course methodology	
<b>Unit 1</b>	Malaria in Sudan	
<b>Unit 2</b>	Current situation of malaria diagnosis and treatment	
<b>Unit 3</b>	Anti-malarial drugs and its use	
<b>Unit 4</b>	Definition and classification of malaria cases	
<b>Unit 5</b>	What to do when you suspect malaria	
<b>Unit 6</b>	Diagnosis and management of uncomplicated malaria	
<b>Unit 7</b>	Assessment and management of severe malaria	
<b>Unit 8</b>	Follow-up of patient and assessing recovery	
<b>Unit 9</b>	Malaria in pregnancy	
<b>Unit 10</b>	Malaria in children	
<b>Unit 11</b>	Managing malaria cases at home and PHC units	
<b>Unit 12</b>	Malaria prevention and chemoprophylaxis	
<b>Annex 1</b>	Suggested timetable	
<b>Annex 2</b>	Evaluation questionnaire	

## **OBJECTIVES**

### ***General Objective:***

The general objective behind these training materials is to equip all health providers with the essential knowledge and skills necessary for the diagnosis and management of uncomplicated and severe malaria in the health practice, in addition to raise awareness among the community. The target groups include medical officers, pharmacists, medical assistants, nurses and community health Workers.

### ***Specific Training Objectives:***

At the end of this training programme the participants should acquire the skill and competence that will enable them to:

- Define basic concepts regarding malaria situation in areas of practice.
- Describe the national Anti-Malarial Treatment Policy.
- Identify the importance of adherence to the national protocol.
- Take a history and conduct an appropriate physical examination.
- Ask for the relevant investigations necessary for diagnosis and proper management of uncomplicated malaria in children, adults and pregnant ladies,
- Recognize the risk groups for severe malaria.
- Provide emergency care;
- Transfer knowledge to other members of the health team for the appropriate management of malaria.
- Determine malaria chemoprophylaxis for people at risk.
- Advocate for the national strategy for control of malaria according to the catchment area.
- Describe the national system for malaria case report including drug supply.

## **COURSE METHODOLOGY**

### ***How is the training designed?***

A 2-day training course is assigned using a small group discussion, information exchange and clinical rounds. This training course is conceived to stimulate active learning by working through a series of exercises. These exercises will be performed on the basis of the *learner's guide*. It uses a problem-solving approach and should be used as a guide for malaria case management training.

This *tutor's guide* is designed – primarily – to help those responsible for the training of health care providers at national and state levels. It contains factual information, ideal

answers for the *learner's guide* exercises, references to the National Policy and useful information on the organization of training.

Once participants get used to group discussions, the two-way exchange of information between them and the tutors makes this a very effective learning activity. The sessions will give the participants a good opportunity to share their experiences and to develop their own ideas and to learn from each others. Demonstrations and examples are also used to reinforce the learning process. Lectures are kept to the minimum and will be replaced by limited introductory remarks by the tutor at the beginning of each subject.

### ***Who runs the course?***

You - the tutor- is the person who is responsible for running the course. This may be the first time that you have run such a course, or you may be an expert teacher, in either case, we stress the importance of using a copy the National Protocol for Treatment of Malaria and the *tutor's guide* together as you proceed through the Learning Units. The training courses will be organized by a training coordinator.

### ***Tutor responsibilities:***

As overall manager of the training programme, you will be responsible for:

- Explaining the learning tasks to the learners and give the learners whatever help they need.
- Assuring the learners are strict to learning objectives during group work.
- Demonstrating activities to learners.
- Being adhere to the time frame.
- Evaluating the learners' performance and competence.

### ***Coordinator responsibilities:***

The coordinator of the course is responsible for organizing the course through:

- Designing the timetable.
- Preparing the venue.
- Coordinating visit to hospital/health centre.
- Contacting and organizing participants as well as tutors.
- Preparing and distributing training materials.
- Preparing accommodation and all other needs.

### ***How is the course run?***

The learners should be divided into small groups of four to eight persons. This allows greater interaction between the learners and the tutors which results in better learning and understanding. For each group and for each exercise a chair person and reporter should be nominated. The chair person is expected to organize the discussion and to save the time and a report is expected to be presented by the reporter. Tutors should be available all the time to facilitate the group work.

### ***Training facilities***

A number of basic facilities and equipment must be organized before training can begin. In some settings these are readily available but in others the coordinator may need to improvise or to modify existing resources.

Ideally, one large room should be available for presentations and group discussions; pictures projected by the multimedia projectors will be seen more easily if the level of lighting can be controlled. Chairs and small tables or desks will be needed for this room. Whatever the conditions, do your best to ensure that the learners are as comfortable as possible in the circumstances available: you may be surprised how much you can achieve even with relatively few facilities.

### ***Teaching equipment***

For teaching sessions and group discussions:

- Multimedia projector
- Lab top or desk computer
- Screen
- Flip chart's papers, stand and markers
- Blackboard and chalks

For health facilities work:

- Sphygmomanometer (with different cuff sizes)
- Stethoscope
- Thermometer
- Weighing scale
- RDTs
- Glucometer
- Pulse oximeter

### ***Learner's equipment***

- Copies of the Sudan Malaria Treatment protocol.
- Learner's guides.
- Reporting format.
- Notebooks (this should be used only for occasional notes or instructions, as explained earlier, there should normally be no need for notes to be taken during training session)
- Pens.
- Hand bags.

## **INTRODUCTION TO THE COURSE**

Your first session with the learners is an introductory one. Introduce yourself first. Write your name on the board or flipchart and tell the learners a little about your background and your job – the way you introduce your self tells the learners about your personality and the way they should deal with you. Then ask each of the learners to introduce themselves and to show their expectations regarding this training course.

The learners will have been given their copies of the national protocol. Briefly, but carefully, deal with the various topics covered. Explain, for instance, that participants will be working in small groups. Stress that the course will involve a great deal of exercises, since this is the best way to acquire the necessary skills.

Go through the objectives of the various Learning Units and timetable within the Learners' Guide so that the learners understand exactly what they should have achieved by the end of the course. Explain that the learners should keep these objectives in mind throughout the course and always ask for help if they feel uncertain of having achieved them. Each learner is likely to be more aware of how well he or she has understood a particular topic or has mastered a particular skill; it is the job of the tutors to make the learning process as effective as possible.

Finally, talk to the learners about evaluation. Explain that evaluation will be a continuous process throughout the training course. Stress that the pre- and post-tests should be enjoyed rather than feared; they are part of the learning experience. Their purpose is to allow you to assist the learners' starting level and to correct mistakes and clarify misunderstandings. Emphasize the importance of the learners reading all the questions (and any supplementary instructions) very carefully. Explain that everyone will learn at different speeds and that you will make as much allowance for this as possible.

## **TIMETABLE**

A suggested timetable for a 2-days training course is shown in annex 1, but again is provided only as a guide. It is based on a 9-hours working day, but this may not be suitable for your purposes/situation and can be adapted approximately. In planning the timetable, remember to allow time for evaluation both during and after the course, and for the hidden activities, such as getting settled into group work, delays in transportation to the training facility and so on.

## **EVALUATION**

### ***How will you know whether it was a good course?***

Judging whether or not the course was a good one is difficult and involves answering the following questions:

#### *1. How well did the group learn?*

This may be determined by evaluating the learners' performance as they work through the Learning Units and again at the end of the training, by evaluating the level of competence, and knowledge that learners have achieved in this subject. This may be done by the use of a pre-and post-tests. A further evaluation of how well they have retained their knowledge and competence may be necessary 10-12 months later.

#### *2. How did the learners view the training?*

Learners' answers to this question will yield valuable information on how useful they find this type of training (a questionnaire is provided in Annex 2).

Frankness can be encouraged by allowing learners to make their responses anonymously. Feedback provided during the course allows you to assess how well your training is being received and make any improvements that seem necessary. Feedback

received at the end of the course will help you to improve future programmes. If the course has been prepared carefully, feedback is likely to be favourable, which is rewarding both for you and for the coordinator.

Some record of attendance and level of competence reached by each learner should be kept so that details may be checked later.

## **REPORTING**

A registration form and daily attendance sheet has been included with this training guide. As participants arrive at the course have them fill in their name, position, and work place details. The registration form also has spaces for recording pre and post tests scores. The registration form also allows for a summary of the evaluation scores given by the participants.

Fill in the pre and post test scores on the registration sheet and at the end of the course complete the evaluation table. A series of open ended questions are also included for the tutor's feedback on the course.

A copy of the registration form should be sent to the State Malaria Control Program and another one to the Case Management at the CNCD.

## LEARNING UNIT 1

### Malaria in Sudan

#### Learning Objectives:

The learning objectives for this Unit are for the learners to:

- Mention the malaria parasite, vector and their distribution in Sudan
- Describe the stratification of malaria in Sudan, focus on the target area.
- Demonstrate the most recent result of malaria indicator survey
- List the objectives and strategies of malaria control at National and State level
- Provide the reasons for updating the malaria treatment protocol in Sudan

The National Protocol describes the situation of malaria in Sudan. Stimulate discussion on main aspects of malaria distribution, control strategies and changing the national treatment policy. Pre prepared standard power point presentation covering the above mentioned objectives; this will be presented by qualified facilitator in an interactive session.

## LEARNING UNIT 2

### The Current Situation of Malaria Diagnosis and Treatment in the Area

#### Learning Objectives:

The learning objectives for this Unit are for the learners to:

- Assess the current situation of their knowledge and skills related to malaria diagnosis and treatment
- List the commonest anti-malarial drugs currently used in their areas.
- Identify the reasons of prohibition of certain antimalarial drugs (Artemether injection) and the restriction for the use of artesunate injection.
- Tell about the access to free of charge anti-malarial drugs
- Describe the treatment seeking behaviour in their areas
- Visualize the current common mistakes among health workers dealing with malaria patients at various levels .

Learners should answer the following questions. Emphasize that the results of this exercise will not be made public. Make it clear to the participants that this unit is not an examination but is designed to make the learners think about the situation of malaria in their own areas or place of work. They will also have to think about how malaria is being managed. This is a subjective question and some have no definite answer. Through this process and with your subsequent help as a tutor, they will understand and recognize the areas that need improvement. Encourage participants to answer the questions as precisely and briefly as possible.

No.	Questions
1	What is malaria?
2	What is the commonest parasite species in the area, and other less common species in Sudan?
3	When does malaria incidence increases in this area?
4	On average, how many episodes of malaria do you think a child may have in a year, in your area?
5	On average, how many episodes of malaria do you think an adult may have in a year, in your area?
6	How many severe malaria cases you have seen in the last month?
7	How many malaria deaths you have seen in the last month?
8	Who is more at risk to malaria in the area?
9	What is the commonest malaria presentation in the area?
10	What are the other diseases that lead to such presentation in the area?
11	Fever...is a common presenting symptom in the area?
12	How do you confirm malaria in the area?
13	Malaria microscopic and RDTs diagnosis...what do you think about it?
14	What do you use to treat uncomplicated malaria? include ( prescription based on clinical base, medication not specific for uncomplicated malaria, reliance on patient preference.
15	What do you use to treat severe malaria?
16	How do you treat uncomplicated malaria in pregnancy?
17	What anti-malarial drugs are available at your facility?
18	Who provides antimalarial drugs in the area?
19	What do you think about the cost of anti-malarial drugs here?
20	Have you ever observed severe side effect from antimalarial drugs? If yes which drug/s?
21	Which form of anti-malarial drugs do you usually use?
22	Have you heard about the new treatment protocol?
23	What are the recommended drugs for UM?
24	What are the recommended drugs for SM?
25	What are the recommended drugs for malaria in pregnancy?
26	What are the recommended drugs for prophylaxis?
27	Do patients generally consult you early in the course of malaria?
28	Do people in your area have any negative ideas about any anti-malarial drugs? Which drugs?
29	Do people here have any preference to any anti-malarial drugs? Which drugs?

30	What do you think about treatment of malaria cases using AS+SP?
31	What are the reasons of drug resistance or treatment failure?

## LEARNING UNIT 3

### Antimalarial Drugs and Their Use

#### Learning Objectives:

The learning objectives for this Unit are for the learners to:

- List and classify antimalarial drugs recommended for use in Sudan.
- Prescribe anti-malarial drugs according to the type of malaria (uncomplicated, severe) and relevant to the age and weight.
- Recognize treatment failure and common side effects of antimalarial drugs and how to deal with them.
- Prescribe antimalarial drugs in special situations (G6PD).
- Tell about basic pharmacokinetics of ACT and their stability.
- Identify methods of monitoring of antimalarial drugs ..
- Avail antimalarial drugs, storage, dispense, and report them correctly at your unit.

Learners should get information about the National Antimalarial Treatment Policy. Pre prepared standard power point presentation covering the above mentioned objectives, will be presented by a qualified facilitator in an interactive session.

Make sure in this plenary session the following issues are discussed:

1. Efficacy of various antimalarial drugs in use in the Sudan
2. Criteria used for selection of antimalarial drugs to be used in the treatment of malaria
3. Antimalarial drugs: ACT (artesunate injection), quinine
4. ACT pharmacokinetics and stability
5. How to avail, store, distribute and report ACT
6. How to write a prescription?
7. Principles of efficacy studies
8. Drugs recommended for malaria: UM, SM, MIP, chemoprophylaxis.

## LEARNING UNIT 4

### Definition and Classification of Malaria Cases

#### Learning Objectives:

The learning objectives for this Unit are for the learners to:

- Define a malaria case (proper case definition).
- Classify malaria cases as uncomplicated and severe.
- Describe the laboratory methods for diagnosis of malaria.
- Read correctly the lab results and take the correct decision accordingly.
- Supervise the laboratory work carried out for diagnosis of malaria at health facility level.

The national protocol lists the features of both uncomplicated and severe malaria. Stimulate a discussion on each of these features and other possible diagnoses that may have to be considered. Be particularly careful to explain why some people are at risk and others are not. Pre prepared standard power point presentation covering the above mentioned objectives. This will be presented by a qualified facilitator in an interactive session.

#### Patient 1.a:

Dr Omer, a medical doctor working in Sudan, has been call to see a 20 years old patient presenting with fever, nausea and vomiting for 2 days. On examination h

1. What conditions lead to such presentations?

**Answer:** *Malaria – Acute viral infection - UTI – Otitis media-pneumonia*

2. Could it be malaria? Why? What is malaria then?

**Answer:** *Yes, it could be malaria. Any case of fever (or history of fever) is suspected to be malaria. This should be confirmed laboratory.*

**Patient 1.b:**

Dr Omer mainly suspect malaria, although he is in doubt about other diseases, he asked the permission from the patient to do some investigations

3. What investigations should he perform?

**Answer:** *Blood film for malaria*

*Urine Analysis*

4. What are the investigations needed to **confirm** malaria?

**Answer:** *Thick and thin blood film (thin film needed to identify malaria species),*

*Rapid Diagnostic Test (RDTs)*

5. What are the **basic** supplies and equipment needed for malaria diagnosis?

**Answer:** *microscope, slides, geimsa stain, & trained personnel ....etc.*

**Patient 1.c:**

Dr Omer received the following result: (Malaria parasite seen with ++) and accordingly he treated the patient.

6. Is this information enough?

**Answer:** *No, species and stage are not identified.*

7. What alternative test/s can help Dr Omer to confirm malaria?

**Answer:** *RDTs*

8. How to improve the malaria lab diagnosis in your facility?

**Answer:** *Well trained personnel, lab facilities and quality control microscopy.*

9. Is it uncomplicated or severe malaria? Justify your answer?

**Answer:** *It is uncomplicated malaria, because the patient presented with no symptoms or signs of severe malaria.*

10. Could you list some criteria for severe malaria?

**Answer** *e.g. impaired level of consciousness, respiratory distress, repetitive convulsions, circulatory collapse, pulmonary oedema, abnormal bleeding, jaundice, haemoglobinuria, prostration*

11. Define a case of malaria? (Suspected case? confirmed case?)

**Answer:** Suspected case: if there is fever (or history of fever) ± symptoms &/or signs suggestive of malaria (e.g. headache, vomiting, sweating...etc.)

**Malaria is confirmed by demonstration of asexual stages (e.g. ring stage) of the parasite by microscopy or by detection of the parasite antigens using rapid diagnostic tests (RDTs) in suspected cases.**

12. What is clinical malaria and what is IMCI malaria?

**Answer:** clinical malaria: for >5 years old and adults, in a malaria risk areas and no lab facilities the patient can managed as having malaria after exclusion of other obvious causes of fever.

IMCI malaria: any febrile <5 child in any area should be managed as having malaria after exclusion of other obvious causes of fever. According to the national malaria treatment protocol, diagnosis of malaria must base on the laboratory confirmation of malaria.

## LEARNING UNIT 5

### What to do when You Suspect Malaria?

#### Learning Objectives:

The learning objectives for this Unit are for the learners to get the knowledge and skills that enable them to:

- Take appropriate and complete history.
- Perform a thorough clinical examination.
- Identify the clinical manifestations of severe malaria.
- Ask for appropriate investigations and interpret them so as to manage the patient accordingly.

The venue of this unit is the hospital outpatient or health centre. A group of 5-7 participants will conduct the following work under your supervision.

You should spend a few minutes asking questions to the whole group in order to ascertain their overall understanding of the subject and to identify any serious misconceptions or gaps.

Questions you may pose might be:

- What is the purpose of taking a history?
- What are the elements of a history?
- What are symptoms, findings in the history suggested other differential diagnoses?
- What are the clinical manifestations of severe malaria?
- What important laboratory investigations should be carried out to confirm the diagnosis?

**History taking:**

One of the participants will take a thorough history from a febrile patient trying to exclude common causes of fever. The other participants will observe him. The tutor leads the discussion guided by the following questions:

Is he taking the proper history?

What did he/she miss?

What is the appropriate way of history taking from such patient?

What are the possible causes of fever in the area? Is it possible to exclude some causes from the history?

What is your provisional diagnosis?

**Clinical examination:**

One of the participants examines the patient trying to exclude or prove common causes of fever. The other participants observe him. The tutor leads the discussion guided by the following questions:

- Did he/she examine the patient properly ?
- What did he miss?
- What is the proper way of clinical examination?
- What is your provisional diagnosis?
- Are there any clinical manifestations of severe malaria?

**Laboratory investigations:**

- What are the relevant investigations?

Ask the patient to have them done. Wait for the result and then:

- Do you need to go back to the patient for detailed history or examination?  
Why?

- How do you interpret the results?
- What is your diagnosis?
- What is the suitable treatment?

## LEARNING UNIT 6

### Diagnosis and Management of Uncomplicated Malaria

#### Learning Objectives:

The learning objectives for this Unit are for the learners to acquire knowledge and skills that enable them to:

- Diagnose cases of uncomplicated malaria
- Differentiate clinically and laboratory between malaria and other common causes of fever in their areas.
- Describe antimalarial drugs used as first, second and 2<sup>nd</sup> alternative line treatment for UM and describe when to give and how?
- Identify and deal with causes of treatment failure after using 1st line drugs.
- Recognize the importance of early diagnosis and treatment of UM.
- Detect cases that can progress to severe malaria
- Use the diagnosis and treatment chart for UM

#### Refer to Sudan Malaria *Treatment Protocol*

You as the tutor must make sure that the learners have understood that malaria should be treated early and promptly.

Discuss the lines of treatment that are recommended according to the Sudan Malaria Treatment Protocol and the criteria for treatment failure.

**Patient 2.1:**

Dr Omer is a medical officer at a hospital outpatient department (OPD). Fatima, a 4-year-old girl, was brought by her mother to the OPD with fever for the last 6 hours. Fatima is from a village 80 Km from Dr Omer clinic. There were no health facilities in her residential area. She reached the clinic with difficulty.

**If you were Dr Omer,**

- List the possible causes of Fatima's fever that Dr Omer might think about?

**Answer:** *Malaria, cold, tonsillitis, otitis media, pneumonia, UTI, measles, abscess.*

- What are the main questions to the mother that might assist you in differentiating between the causes of fever that mentioned above?

**Answer:** *if the patient had: fast breathing, runny nose, sore throat, cough, ear pain or discharge, burning maturation, rash.*

- If the answer to your questions does not support any obvious cause...what other things can be excluded? What is the strongest cause/s left?

**Answer:** *Strongest malaria, UTI, abscess*

**Patient 2.2:**

Apart from axillary temperature of 38.5<sup>0</sup> C, the rest of the clinical examination conducted by Dr Omer were normal.

- While you assessing the patient clinically, what are the main signs that might assist you to differentiate between the causes you have mentioned above?

**Answer:** *Skin rash, ear discharge, examination of temponic membrane, tonsils, chest examination and respiratory rate.*

- As seen, apart from fever, no detectable sign, what causes could be excluded at this stage?

**Answer:** *tonsillitis, otitis media, pneumonia, measles.*

- What investigations would you ask for to reach a final diagnosis?

**Answer:** *Blood film (thick & thin) or RDTs for malaria and urine general.*

**Patient 2.3:**

Blood film for malaria was found to be positive for *P. falciparum* ring stage with ++++. The other investigations were normal.

- What is your final diagnosis? Why?

**Answer:** *Uncomplicated malaria. Fever plus (+ve) BFFM*

- Is there any finding that may alert you about Fatima's condition?

**Answer:** *Parasite count.*

- If BFFM was found to be negative...does this exclude malaria?

**Answer:** *Yes, no antimalarial drugs prescribed unless it is confirmed.*

**Patient 2.4:**

Dr Omer gave the mother the prescription. The mother went to the pharmacy and, she got the drug and left.

- What did he write for her? Which anti-malarial? How it is prescribing?

**Answer:** *Anti-malaria and paracetamol for fever. First line: AL*

- Are you happy about treating her as an outpatient? Tell why?

**Answer:** *No, because she lives far away and had high parasite count which may develop severe malaria . Therefore, she has to admitted for one day for observation*

- What might be expected?

**Answer:** *manifestations of severe malaria: hypoglycaemia, fits, respiratory distress, anaemia...etc.*

- What are the laboratory results required to alter the diagnosis to severe malaria?

**Answer:** *Hb <5g/dl, B. glucose <40mg/dl.*

**Patient 3:**

Tarig is a worker in a sugar cane company. A week ago he got tired by the end of the day. At home he developed fever associated with sweating and he vomited twice. He diagnosed himself as having malaria and he asked his son to buy anti-malarial drug from a nearby pharmacy. He took the drug for 2 days. Five days later he developed fever, headache and nausea. This time he decided to go to the company clinic.

1. Is it common to see such cases or have you heard about such practices?

**Answer:** Yes.

2. Why did his condition deteriorate? What are the other possible causes?

**Answer:** *May be not malaria. If we assume that it was malaria, it was not correctly treated according to the protocol (drug and dose), so we should investigate the patient for malaria and other causes of fever.*

3. How do you exclude each cause in your process towards diagnosis?

**Answer:** *Proper history, clinical examination and investigations.*

4. What is the treatment if it is malaria?

**Answer:** *Accurate dose of first line treatment for uncomplicated malaria (Artemether –Lumfantrine),*

5. What are the most important messages you need to convey to such patients? (acted as a role play) (with life scenario)(annex)

**Answer:** *to consult his doctor or the nearby health facilities in case that he feels unwell, and to educate him about the complications that might develop if the antimalarial drugs has been taken partially, incorrectly, or if the drug is expired.*

### **Diagnosis and treatment chart:**

Charts are very helpful in organizing your thinking to reach the diagnosis. They are also extremely useful in directing you towards the main line of patient management.

*For this exercise the tutor is going to discuss with the learners the flow chart for diagnosis of UM*

1. What is the starting point?
2. Where will you go next?
3. Can you start from any point in the chart? Try to do that.
4. Is it practical to use the chart? If yes/no explain why?

## Exercise

1. What is the main symptom of malaria?

**Answer:** fever

2. List some of the clinical features of uncomplicated malaria.

**Answer:** headache, vomiting, sweating

3. Do you need a laboratory investigation to make a diagnosis of uncomplicated malaria? Why?

**Answer:** yes, to confirm the diagnosis (RDTs are available everywhere even for home base management)

Who should receive antimalarial treatment?

4. **Answer:** patient with confirmed malaria–

Read the following patient profile and answer the questions below

### Patient 4

A 36-month old female is brought to you with a history of fever for 2 days and ear pain of 1 day. On examination she looks well, weighs 14 kg, temperature is 39.2<sup>0</sup> C and discharge of pus from the left ear. Other clinical examinations were normal. A blood slide reveals plasmodium falciparum ring stage ++ .

- a. What is your diagnosis?

**Answer:** Un complicated malaria with otitis media

- b. What is the treatment?

**Answer:** antimalarial (AL) + antibiotic + paracetamol

- c. What have you learnt from this patient concerning malaria?

**Answer:** malaria, with co infection

- d. If the malaria slide were negative, would you give antimalarial drugs?

**Answer:** no, only antibiotics for otitis media.

**Patient 5:**

Sami, is 18-years old, developed fever over the last 3 days. He consulted a nearby health centre and the doctor suspect malaria and he asked for blood film for malaria. Results showed *P. vivax*.

1. Is it common to see vivax malaria in this area? To what extent?
2. **Answer:** Yes, according to MIS, Vivax is present in all states except 0 prevalence in Red Sea, white Nile & Northern state , where as it is >20% in River Nile & West Darfur and >10% in Khartoum, West Darfur & South Darfur When do you suspect vivax malaria?

**Answer:** when there is relapse of symptoms of malaria and was laboratory confirmed.

3. How do you treat vivax malaria?

**Answer:** Artemether Lumfantirine for three days, and should be followed by primaquine daily for 14 days.

4. Is the 1<sup>st</sup> and 2<sup>nd</sup> line going to work?

**Answer:** Yes AL is effective,

Who is eligible for primaquine? What is the dose and how?

**Answer:** Patient with vivax and ovale malaria (except when primaquine is contraindicated). Primaquine is given in a dose of 15mg/kg daily for 14 days. Look for G6PD deficiency.

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## LEARNING UNIT 7

### Assessment and Management of Severe Malaria

#### Learning Objectives:

The learning objectives for this Unit are for the learners to:

- Diagnose and define SM.
- Recognize the groups at risk for severe malaria.
- List the immediate actions to be taken for any suspected SM cases.
- Identify and deal with malaria complications.
- Follow-up of the complications and conduct necessary measures.
- Give the suitable drug/s correctly.
- Deal with SM cases outside the hospital and at PHC units.
- Provide pre-referral treatment for SM cases at PHC units.
- Use the diagnosis and treatment chart for SM.

You, as the tutor must ascertain that the learners have understood that severe malaria caused by *P. falciparum* or *P. Vivax* are an emergency and urgent treatment is required. Discuss with the group the various steps of treatment that should it be followed and explain the value of each recommended treatment . Explain the importance of administration of complete course of management. It is recommended to use a pre prepared standard power point presentation presented by qualified facilitator in an interactive session to show the treatment/progress/observation chart highlighting the importance of its correct compilation. Note that the appropriate coma scale must be chosen for the admission assessment, and that the same scale must then be used for all observations of the patient. A discussion in plenary must precede the presentation of the treatments that are not usually recommended or are contraindicated. This will allow you to clear misconceptions that the learners may have on this matter.

Finally remind the learners that the use of paracetamol is suggested as an antipyretic in preference to aspirin, due to its adverse effects, especially in children, i.e. bleeding, Reye's syndrome. Nevertheless, if aspirin is the only choice then it must be used unless clearly contra-indicated.

Provide copies of the treatment progress/observation charts to the learners, in order to allow working groups to discuss and familiarize themselves with the various sections.

**Patient 6:**

Mariam, a 4-year-old girl from an area with stable malaria transmission, develops fever and brief convulsion. She lives in a remote community away from the city.

Later, on the evening of the same day, Mariam's speech became less comprehensible and shortly she became not responding to any call.

The mother took 4 hours to get to the nearest hospital and the child remained unconscious when they got there.

On examination, she was unconscious, severely pale and a temperature was 38.5<sup>0</sup> C.

1. What key information is provided in this scenario?

**Answer:** *Under 5 years, child, with fever, deterioration in level of consciousness, convulsions, pallor, and in remote area with limited facilities.*

2. Is it severe malaria?

**Answer:** *Yes, because of deterioration in level of consciousness and convulsions.*

3. Who are at high risk of severe malaria?

**Answer:** *a) Children especially in high endemic area.*

*b) Pregnant women especially prim gravidae.*

*c) People of all age in low endemic area.*

*d) People returning to endemic area after a few year absences.*

*e) Visitors (of any age) from non- endemic area.*

*f) immunocompromised group (HIV, nephrotic syndrome,*

*splenectomised patients)*

*Note; Most of Sudan is hypo endemic*

4. What features of severe disease can you identify?

**Answer:** *deterioration in level of consciousness and convulsion.*

5. Could you mention other features of severe malaria, patients in her age may present with?

**Answer:** *Features of severe malaria:*

- (i) *Repetitive convulsions.*
- (ii) *Cerebral malaria*
- (iii) *Anaemia*
- (iv) *Anaemic heart failure*
- (v) *Hypoglycaemia*
- (vi) *Respiratory distress (acidotic breathing).*

6. What are the important guides you should consider when dealing with such conditions?

**Answer:** *History, examination and plan of management.*

7. What immediate actions are needed?

**Answer:** *(8 immediate measures)*

- (i) *Resuscitation*
- (ii) *IV line*
- (iii) *BFFM / RDT*
- (iv) *Asses dehydration & treat*
- (v) *Control fever*
- (vi) *Control convulsions*
- (vii) *Detect & treat hypoglycaemia*
- (viii) *Start Quinine or intravenous Artesunate injection.*

8. What complications should you look for and deal with if present?

**Answer:** *(6 Complications)*

- (i) *Shock / algid malaria*
- (ii) *Anaemia*
- (iii) *Metabolic acidosis (respiratory distress)*
- (iv) *Bleeding*
- (v) *Renal failure*

(vi) Exclude common condition that present like malaria

9. How do you follow this patient? What should you consider?

**Answer:** (4 points)

(i) Level of consciousness

(ii) Fluid input/out put

(iii) Vital signs

(iv) Level of parasitaemia

10. Mention four important laboratory tests to be done.

**Answer:** BFFM, blood sugar, Hb% and lumber puncture.

11. What is the best place to deal with such cases? Why?

**Answer:** Intensive care unit Good set up for close monitoring

12. What specific treatment is needed?

**Answer:** Quinine infusion or intravenous Artesunate injection.

### **Patient 7**

Samia, a woman aged 25 years was complaining of chills, sweating and headaches five days ago. She received antibiotics and oral anti-malaria drug prescribed in the nearby health centre. Later on, she developed rigors and persistent vomiting. She was deteriorated and brought back to the health centre . A blood film revealed malaria plasmodium falciparum ring stage (++++), and oral quinine (600 mg every 8 hours) was prescribed. She took two doses with no improvement.

Her family started worry as she became confused. The doctor in duty referred her to your hospital.

Examination reveals a semi-conscious woman, who is unable to talk. There is no neck stiffness, jaundice, pallor or rash. Axillary temperature is 39<sup>0</sup> C, pulse 90 beats/min, blood pressure 110/70 mmHg.

1. What are key information provided here?

**Answer:** very ill lady, high fever, high parasitaemia, deterioration in level of consciousness

2. What criteria of severe disease can you identify?

**Answer:** *Confusion, deterioration in level of consciousness, hyperparasitemia*

3. What immediate actions needed at the hospital?

**Answer:** *admission in the ICU, and apply the 8 immediate actions mentioned above*

4. If you were at the local clinic, what treatment would you offer her?

**Answer:** *administer, diluted i.m. quinine or artesunate suppositories (recto caps) for children or a as a pre-referral treatment then refer the patient to nearby hospital.*

5. Is there any possibility of death? How can you avoid that?

**Answer:** *yes. Through early pre-referral treatment & appropriate management of SM cases at hospital.*

**Patient 8:**

Halima, a four-year-old girl, is brought to the outpatient's department of your hospital by her mother, late in the evening. She was complaining of fever for three days, and refusal of food and drinks. This was followed by convulsions as the mother said and regain consciousness immediately. For the past few hours the child has been increasingly drowsy, and for the last hour has been unconscious. On examination the child is well nourished, unconscious and not dehydrated. The axillary temperature is 40.2<sup>0</sup> C; pulse 120 beats/min, regular; blood pressure 90/70 mmHg. No neck stiffness. Some yellowish sticky fluid is seen filling the external part of the left ear. There was no rash.

1. What essential laboratory tests will you perform to guide your management of the patient?

**Answer:** *BFFM, B. Glucose, CBC, lumber puncture,*

2. Why does the blood glucose test have priority in this case?

**Answer:** *Hypoglycaemia may complicate any childhood fever including malaria. Hypoglycaemia cannot be easily recognized clinically, so must be*

*tested for; immediate correction can reverse coma and prevent cerebral damage.*

3. Should you wait for the blood glucose test if it will take more than 2 hours?  
If not, what should you do?

**Answer:** *No. correct hypoglycaemia at once.*

4. What is the other serious complication threatening Halima's life? And how you should manage?

Answer: Convulsions

- a. Resuscitation (ABCDE)
- b. Rectal diazepam
- c. If convulsions continue follow the chart of management below of status epilepticus protocol

5. **Consider the flow chart for treatment of SM to discuss the following:**

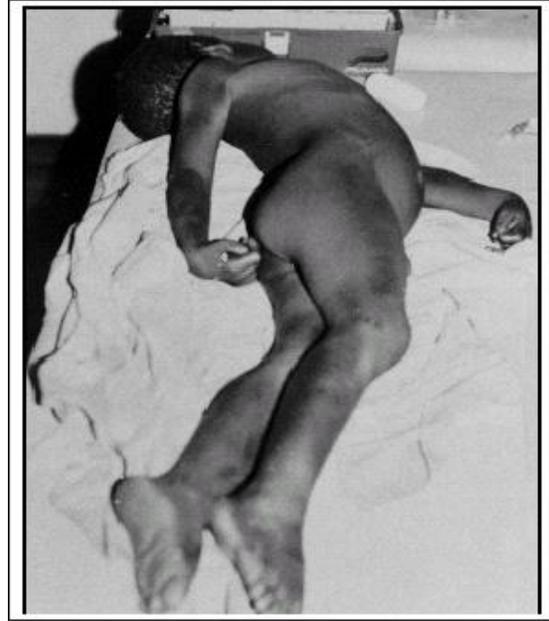
1. What is the starting point on the flow chart?
2. Where will you go next?
3. Can you start from any point in the chart? Try to do that.
4. Is it practical to use the chart? If yes/no tell why?

6. **Picture quiz**

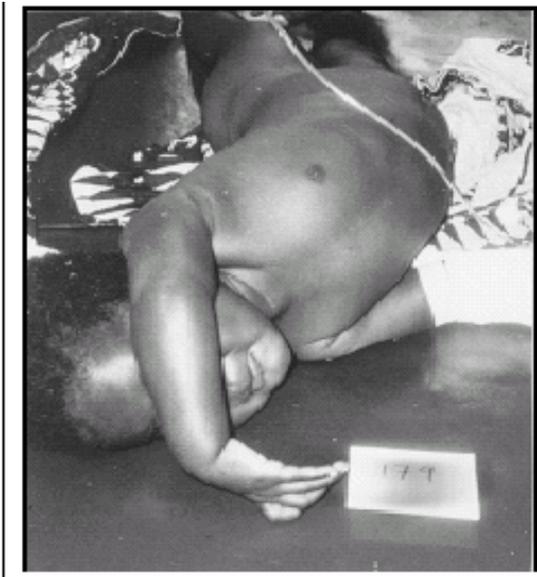
You as the tutor should make this quiz as enjoyable as possible. Working in small groups, participants should answer each set of questions, then in plenary the results of the group work can be compared and this can be done by projecting the pictures one by one and at the same time having a participant at the flip-chart noting the different answers of the groups. This should be followed by discussion and consensus regarding the correct interpretation.



**Figure 1**



**Figure 2**



**Figure 3**

The children seen in Figures 1, 2 and 3 were all brought to a clinic in an area where *P. falciparum* is hyper endemic (MIS table). Each child is unconscious and has a heavy *P. falciparum* parasitaemia. The children are 3 to 5 years old. They are febrile (38°C-40°C). They have been immunized against measles, diphtheria, tetanus, whooping-cough through the EPI programme.

1. What do pictures 1-3 show?

**Answer:** *Opisthosomas position. There is also posturing of the arms in various positions.*

*These features indicate severe cerebral dysfunction.*

2. What is the important differential diagnosis?

**Answer:** All these features may be due to cerebral malaria. The most important differential diagnosis is meningitis; hypoglycaemia due to any cause, one of which is malaria, may also present with this clinical picture

3. What tests would you undertake?

**Answer:** Blood glucose; lumbar puncture; other tests depend on the particular circumstances and response to treatment.

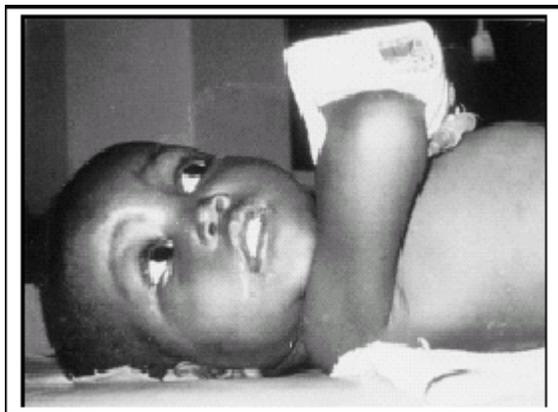


Figure 4

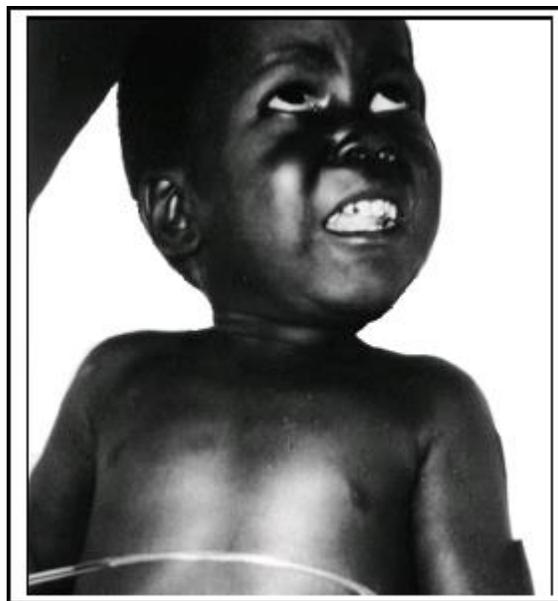


Figure 5

The children seen in Figures 4 and 5 each have a short history of fever followed by progressive loss of consciousness. Both are in deep coma and have a heavy *P. falciparum* parasitaemia. They are 3 and 4 years old. Neither has been immunized against the common childhood diseases.

1. What do the pictures show?

**Answer:** Conjugate deviation of the eyes to the left (Figure 4) or upwards (Figure 5). The patient in Figure 4 also has a sustained posture of the right arm, and the child in Figure 5 appears to have contraction of lower facial muscles, causing a grimace.

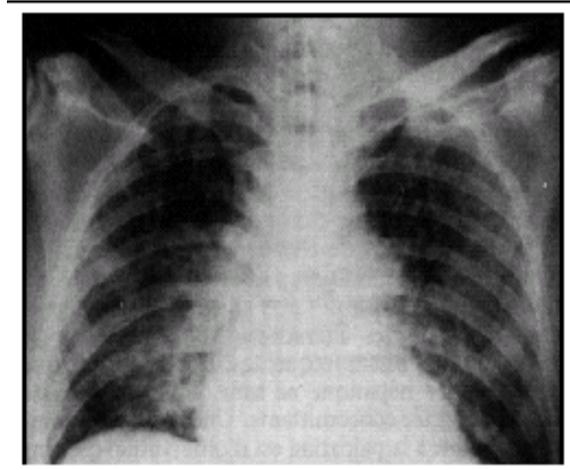
2. What could be the explanation for this?

**Answer:** These features, like those of Figures 1 to 3 indicate a cerebral disorder. They may also be part of, or follow immediately, a convulsion of any cause. All the conditions discussed under questions 2 and 3 must be considered in these patients, and the same tests should be

done.



**Fig 6**



**Fig 7**

Figures 6 and 7 refer to the clinical and radiological presentation of a woman soon after labour. She has severe falciparum malaria with hyperparasitaemia and the condition shown in Figures 6 and 7 was preceded by difficulty in breathing with an increased respiratory rate.

1. What is the condition suggested by these pictures?

**Answer:** *Acute pulmonary oedema. Figure 7 is the radiographic appearance.*

2. What is the differential diagnosis for this condition?

**Answer:** *Aspiration bronchopneumonia and metabolic acidosis. Without good facilities for emergency radiography it may be difficult to differentiate acute pulmonary oedema from aspiration bronchopneumonia and metabolic acidosis although, in the latter, examination of the chest is usually normal.*

### **Exercise homework to be delivered as printed material to the participants**

1. What is "severe falciparum malaria"?

**Answer:** *defined as malaria due to *P. falciparum* or *P. vivax* infection that is sufficiently serious to be an immediate threat to life.*

2. What forms may malarial illness take? What makes it "severe"?

**Answer:** *UM or SM. UM may progress to SM if treatment delayed.*

3. Severe malaria can present with many complications. In your place of work (you as the tutor, discuss with the learners the following):
- a. Which complications are most common?
  - b. Which complications are most serious?
  - c. How do you manage these complications?
4. Who gets severe falciparum malaria?

**Answer:**

*Children (6/12 – 6 y) especially in high transmission area*

*Pregnant (especially prim gravidae)*

*People of all ages in low endemic areas*

*People returning to endemic areas after a few years' absence*

*Visitors from non-endemic area*

*Immunocompromised patients*

5. Why does severe falciparum malaria need special attention?

**Answer:** *because it is a medical emergency and is life threatening*

6. How is severe malaria suspected?

**Answer:** *fever suggestive of malaria plus any of the clinical manifestations of severe malaria, and the diagnosis should be confirmed by BFFM.or RDTs*

## LEARNING UNIT 8

### Follow-up of Patient and Assessing Recovery

#### Learning Objectives:

The learning objectives for this Unit are for the learners to:

- Record the important information in registers at outpatient.
- Fill and use correctly the patient file and follow-up card.
- List the clinical and laboratory investigations needed for patient follow-up.
- Monitor the vital signs.
- Use Glasgow coma scale or Blantyre coma scale.
- Ask for relevant investigations.
- Arrange for patient follow-up after discharge

This is an important unit. A brief structured presentation and discussion session must highlight the sequelae of severe malaria and the importance of adequate follow-up. Ideally, follow-up should continue until a patient is completely well. Participants are expected to revise and be familiar with the use of the following tools which are used for malaria and other patients:

1. Outpatient register (*important in identifying morbidity*)
2. Laboratory register ( )
3. Patient file (*stress on the importance of discharge sheet "outcome"*)
4. follow-up card (referred clinics)
5. Glasgow coma scale
6. Blantyre coma scale
7. Expected residual sequel following severe malaria and how to identify these problems?
8. Lab investigations / frequency
9. Frequency of follow-up
10. Messages to be conveyed to the patient and his relatives

## LEARNING UNIT 9

### Malaria in Pregnancy (MIP)

#### Learning Objectives:

The learning objectives for this Unit are for the learners to:

- List the technical strategies to control malaria in pregnancy.
- Mention symptoms and signs of malaria in pregnancy.
- Recognize and deal with complications and sequelae of MIP and its relations to transmission level.
- Manage MIP.
- 

#### Refer to *Sudan Malaria Treatment Protocol*

The *Sudan Malaria Treatment* protocol describes the main features of malaria in pregnancy and the plan of management according to gestational age. Make sure that all the learners have carefully read the relevant chapter, and stimulate discussion.

Be particularly careful to explain the malaria prophylaxis during pregnancy in targeted areas.

#### Patient 9:

Suad, a 35 year old woman, is brought to the outpatient department . She is a local resident, and is pregnant (20 week's gestational age).

The patient became ill two days ago, with fever, chills, sweating and headaches. A blood film at the local clinic revealed malaria falciparum ring stage ++.

1. Straight forward this is UN malaria...you prescribe for her oral anti-malarial drugs and ask her to go home...Discuss

**Discussion:** *Since she is in her second trimester and this is uncomplicated malaria, so she needs oral antimalarial drugs, an antipyretic drug and health education.*

- *no nausea or vomiting , oral drugs are recommended*
- *fever is a risk for preterm labour so antipyretic drugs are recommended*
- *Advised patient to return back to hospital if no response to treatment after 48hrs, or at any time if she develops new symptoms.*

2. What are the common presenting symptoms and signs for malaria in pregnancy?

**Answer:**

1. *Fever*
2. *Anaemia*
3. *Splenomegaly*
4. *Acute pulmonary oedema*
5. *Hypoglycaemia*

3. What are the expected consequences of malaria in pregnancy?

**Answer:**

*During pregnancy:*

- *Frequency and severity are greater than in non-pregnant*
- *Severe anaemia is common*
- *Hyperpyrexia leading to abortion, preterm labour, intra-uterine foetal death and macerated stillbirth*
- *Hypoglycaemia*
- *Trans placental infection leading to congenital malaria and neonatal death.*
- *Spontaneous abortion, premature birth, stillbirth, placental insufficiency and intrauterine growth retardation (IUGR), low birth weight and foetal distress*

*During labour:*

- *Precipitated labour*
- *Postpartum haemorrhage*

*During puerperium:*

- Puerperal pyrexia
- Difficulty in lactation.

Risks to the foetus:

High grade fever, placental insufficiency, hypoglycaemia, anaemia and other complications can adversely affect the foetus.

Spontaneous abortions (miscarriage), premature birth, stillbirth, IUGR, low birth weight, and foetal distress are problems observed during foetal growth.

Congenital malaria is very rare. All four species can cause congenital malaria.

The new-born can present with fever, irritability, feeding problems, hepatosplenomegaly, anaemia, and jaundice. The diagnosis can be confirmed by smear for malaria parasite.

4. What is the suitable anti-malarial drug/s for her?

*In the first trimester only Quinine both oral and infusion.*

*Since the patient is in her second trimester the recommended treatment could be one of the following:*

*AL, is safe as 1st line, DHA/P as 2<sup>ND</sup> line and quinine*

*As third line treatment for UM.*

5. If she came for antenatal follow-up with no such presentation...what would you offer to her related to malaria? Why?

**Answer:** *Health education regarding the prevention of malaria.*

*Using Long Lasting insecticide treated bed nets (LLINs). (Facilitators inform the participants about the routine distribution of LLINS through ANC.*

**Patient 10:**

Suzan, a 25 year old woman, pregnant in her 28<sup>th</sup> week's gestation is brought to the outpatient department . She is a local resident, her husband is a business executive, .

The patient became ill five days ago, with fever, chills, sweating and headaches. An antibiotic was prescribed and her condition seemed to be improved. Then a day before she developed rigors and persistent vomiting. A blood film at the local clinic revealed malaria plasmodium falciparum ring stage, and oral quinine (600 mg every 8 hours) was prescribed. She took two doses.

A day after she has been referred to your hospital because of confusion. Examination reveals a semiconscious woman, who is unable to talk. She withdraws her hand from a painful stimulus but cannot localise a stimulus applied to the sternum or forehead. There is no neck stiffness, jaundice, pallor or rash. Axillary temperature is 39<sup>o</sup>c, pulse 90 beats/min, blood pressure 110/70 mmHg. The uterine fundus is palpable (26 - 28 weeks) and the fetal heart sound can be heard.

1- What tests are urgently required?

**Answer:** *BFFM, CBC, random blood glucose, urine general, serum creatinine /blood urea and electrolytes, LFTs, CSF, abdominal ultrasound for assessing the foetal wellbeing.*

2- If the random blood glucose is 1.2 mmol/l (21.6mg/dl), what treatment will you give?

**Answer:** *10% dextrose, 50 -100 ml i.v. (1ml/kg) followed by 10% dextrose as a continuous infusion. Blood sugar should be monitored every 4 -6 hours where possible.*

3- If the blood film shows *P. falciparum* ring stage “++++”, and the cerebrospinal fluid is normal except for low glucose, then:

a. What antimalarial drug will you administer and by what route?

**Answer:** *(++++)* Means hyperparasitaemia which is indicative of severe malaria. The patient therefore needs parenteral route for antimalarial drug administration. Quinine is the only treatment in the first trimester of pregnancy 8-hourly for 7 days. In the 2<sup>nd</sup> and 3<sup>d</sup> trimester Quinine or artesunate infusion. Or Quinine 10 mg/Kg body weight 8 hourly for at least 3 days (IV or IM) and shift to oral quinine as soon as the patient can

*take orally; this is of course in the second and third trimesters.*

b. What alternative is there to quinine?

**Answer:** *Intravenous artesunate for at least 24 hours and until the patient tolerate oral dose of ACT. The dose of artesunate is 2.4 mg/ kg body weight per dose.*

*When you shift to oral dose of AL give a 3 days' treatment.*

c. What nursing procedures are important during this treatment?

**Answer:**

- *Close monitoring of vital signs and assessment of the level of consciousness.*
- *Urinary catheter input-output fluids.*
- *Nasogastric tube for feeding and suction.*
- *Suction for mouth, nose, and stomach secretions.*
- *intravenous cannula should be inserted*
- *Airway*
- *Mobilization and powdering the patient to avoid bed sores.*
- *Sterile eye drops to protect eyes from ulcers.*

4- After 6 hours the patient becomes increasingly restless. The respiratory rate increases to 40/min. The blood glucose level is normal. Under these conditions, what special observations would you make?

**Answer:** *The patient needs to be transferred to the intensive care unit because of possibility of pulmonary oedema.*

## LEARNING UNIT 10

# Malaria in Children

### Learning objectives:

The learning objectives for this Unit are for the learners to acquire the knowledge and skills that enable them to:

- Diagnose and treat malaria in children
- List the commonest malaria complication in children
- Follow-up the patient and prevent occurrence of complications during and after treatment
- Equip mothers with knowledge and skills that prevent malaria and mitigate its effect

### Refer to *Sudan Malaria Treatment Protocol*

Unit    pages

Stimulate a discussion on the main features of malaria in children. Go through the various elements carefully allowing plenty of time for discussion and feedback.

Stress the importance of educating the mother/caregiver about compliance with treatment and use of protective measures.

### Patient 11:

Working in a remote health unit, Rashid, a 4 years' boy, was brought for you with fever. No other symptoms are given by the mother and clinical examination did not reveal any sign suggestive of other diseases.

1. What is your diagnosis?

**Answer:** *Malaria (suspected)*

2. How do you reach that?

**Answer:** *With referred to Sudan Malaria Treatment Protocol*

3. Malaria in children is a serious condition...discuss

**Answer:** *it can lead to death rapidly through complication which occur more frequent than adult especially anaemia and convulsion.*

4. What clinical manifestations would you expect if this child presented with severe malaria?

**Answer:** *Manifestations of severe malaria:*

- (i) Severe anaemia*
- (ii) Anaemic heart failure*
- (iii) Cerebral malaria*
- (iv) Repetitive convulsions*
- (v) Hypoglycaemia*
- (vi) Respiratory distress (acidotic breathing)*

5. How are you going to treat such a child for malaria?

**Answer:**

*The recommended treatment for uncomplicated malaria in children is AL (Table ) as first line, DHA/P (Table ) as a second line and quinine as third line (Table ).*

**Patient 12:**

Hamid, a child aged 20 months, became febrile two days ago and has vomited several times today. One hour ago the child had a convulsion, described by the mother as a repetitive twitching of limbs and mouth, followed by unresponsiveness for a few minutes. The child is now febrile (39<sup>0</sup> C), conscious, withdraws promptly from any painful stimulus. A thick blood film shows *P. falciparum ring stage +*. The child repeatedly vomits any anti-malarial drug given by mouth.

1. Does the child have cerebral malaria? Why?

**Answer:** *No. Convulsion occur in cerebral malaria `but they are not followed by rapid recovery of consciousness " at least 30min'. As the child*

*is now fully conscious this suggest febrile convulsion rather than a manifestation of cerebral malaria.*

2. What immediate general measures should you do for the child? What are the important investigations you are going to request?

**Answer:**

- *Admit the child,*
- *Reduce temperature,*
- *Be ready to abort convulsions if develop: i.v. cannula, diazepam at bed side, the dose should be calculated and known, and the instruction written in the file*
- *Order for blood sugar level, otherwise give glucose,*
- *Exclude other causes: CBC, urine general.*

3. What treatment options do you have? What treatment will you give? How?

**Answer:** *Since the child have SM and is persistently vomits, then the first dose of anti-malaria should be given parenterally; Quinine i.m., or Artesunate IV. If the vomiting stopped, you continue on oral 1<sup>st</sup> line antimalarial treatment*

4. What should you do about the convulsion?

**Answer:** *Refer to status epilepticus chart*

- *Make sure that the risk of further convulsion is minimized by reducing the child temperature ( paracetamol, tepid sponging, and fanning),*
- *Be ready to abort convulsions if develop: i.v. cannula, diazepam at bed side, the dose should be calculated and known, and the instruction written in the file*
- *If repeated treat the patient as SM; consider meningitis*

5. How do you evaluate his condition and how do you will follow the child?

**Answer:**

- *Level of consciousness*
- *Rate & depth of respiration*
- *Presence of anaemia*

- *Vital signs*
- *State of hydration*
- *Temperature*

## LEARNING UNIT 11

### Managing Malaria Cases at Home and PHC Units

#### Learning Objectives:

The learning objectives for this Unit are for the learners to:

- Define the principles of malaria home-based management.
- To equip the mother with the required behavioural impact related to malaria case management at home level.
- Establish the pre-referral management for severe cases.

Pre prepared standard power point presentation covering the principals of home based management presented by qualified facilitator in an interactive session.

Remind the learners of the importance of provision of pre referral treatment for severe cases and health education to the mothers.

#### Patient 13:

Hadia, a child aged 2 years, lives with her mother and father in a village.

Yesterday afternoon after a rainy day, her mother noticed that Hadia feels hot and vomited twice. A nurse told her to cool her with tepid sponging and to take the child to the dispensary 7 Km away. She did not agree with the nurse, she thought the child's problem was related to rains and she decided to get for her one tab from a nearby shop and to use "Garad, kamoona with Sesame oil" at night.

1. Is it common to hear about such practices?

**Answer:** Yes.

2. List the factors that affect treatment seeking behaviour?

**Answer:**

- *Wrong believes*
- *Accessibility*

- *Affordability*
- *Availability of health services ...etc...*

3. Could you improve the mother practice at home? How?

**Answer:** yes.

*Health education to the mothers:*

- *How to reduce temperature and correct dehydration at home*
  - *Seek advice early*
  - *How to give anti-malaria at home properly*
  - *Identify manifestation of severe malaria*
4. "Home is the first hospital"... so it is better to equip mothers with the necessary knowledge and skills and with anti-malarial drugs to deal with the child at home...Discuss

**Discussion:**

- *most of malaria cases treated at home*
  - *many areas are remote and have no access to health facilities*
  - *many malaria cases became isolated from health services during rainy season*
  - *many malaria cases present with SM because of late presentation and not taken pre-referral treatment*
5. What are the messages/ skills that you think mothers should know to improve the management of malaria at home?

**Answer:**

- *How to reduce temperature and correct dehydration at home?*
- *Seek advice early*
- *How to give anti-malaria at home properly*
- *How to identify danger signs?*

## LEARNING UNIT 12

# Malaria Prevention and Chemoprophylaxis

### Learning Objectives:

The learning objectives for this Unit are for the learners to:

- List the methods and tools used currently for malaria prevention
- Identify target groups for chemoprophylaxis and prescribe correctly for them

### Refer Sudan Malaria Treatment Protocol

Unit            pages

In plenary session open a discussion between the participants regarding malaria prophylaxis and prevention. Pay particular attention to identifying targeted groups for prophylaxis.

### Patient 14:

Adil, a 38-year old economist, was born in a hyper endemic malaria area in Sudan. He is working for the last 10 years in Saudi Arabia. He returned home last month.

One week ago he developed fever. He took antibiotics. Two days later his condition worsened and they brought him to you.

1. Have you faced such a situation before?

**Answer:** yes.

2. What is your diagnosis?

**Answer:** malaria (suspected)

3. By living in an endemic area, does this offer him any protection from malaria?

**Answer:** No.

4. what advice would you offer him before travelling Sudan?

**Answer:** advice to:

- *Malaria chemoprophylaxis*
  - *Use of LLINs*
  - *Seek for medical advice early if he developed fever.*
5. Who is eligible for chemoprophylaxis? What drugs are you going to give?  
How?

**Answer:** *the high risk group:*

- *Travellers from malaria free areas*
- *People with sickle cell disease*
- *Splenectomised individuals*
- *Immunocompromised individuals*
- *Expatriates and Sudanese returning from non-malarious area*
  - *mefloquine 250mg (5mg/kg for children) weekly starting one week before entering & continue for four weeks after leaving the endemic area; or atovaquone-proguanil (malarone) 250/100mg daily beginning one day before entering & continue for seven days after leaving the endemic area.*

## ANNEX (1)

**Proposed Training Timetable:**

Day	Time	Topic	Training methods	Venue	Tutor
Day 1	08:30-09:15	Opening session and introduction	Official talks	Main Hall	All
	09:15-10:00	Pre-test	Written test	Main Hall	Malariologist
	10:00-11:00	Unit 1: Malaria in Sudan	Presentation	Main Hall	Malariologist
	11:00-11:30	Breakfast	-	-	-
	11:30-12:30	Unit 2: Current situation of malaria diagnosis and treatment	Presentation & demonstration	Main Hall	Pharmacist
	12:30-01:30	Unit 3: Anti-malarial drugs and its use	Presentation	Main Hall	Pharmacist
	01:30-02:00	Coffee break and praying	-	-	-
	02:00-03:00	Unit 4: Definition and classification of malaria cases	Presentation & demonstration	Main Hall	Physician
	03:00-05:00	Unit 5: What to do when you suspect malaria	Demonstration	Outpatient Dept./ HC	Physician/ Paediatrician
	05:00-06:00	Unit 6: Diagnosis and management of uncomplicated malaria	Presentation & group work	Main Hall	Physician
Day 2	08:30-11:00	Unit 7: Assessment and management of severe malaria	Presentation & group work	Main Hall	Physician
	11:00-11:30	Breakfast	-	-	-
	11:30-12:15	Unit 8: Follow-up of patients and assessing recovery	Presentation & group work	Main Hall	Physician
	12:15-01:30	Unit 9: Malaria in pregnancy	Presentation & group work	Main Hall	Obstetrician
	01:30-02:00	Coffee break and praying	-	-	-
	02:00-02:30	Unit 10: Malaria in children	Presentation & group work	Main Hall	Paediatrician
	02:30-03:15	Unit 11: Managing malaria at home and at PHC units	Open discussion	Main Hall	Paediatrician
	03:15-04:00	Unit 12: Malaria prevention and chemoprophylaxis	Presentation	Main Hall	Paediatrician
	04:00-05:00	Post-test and course evaluation	Written test	Main Hall	Malariologist
	05:00-05:30	Closing session		Main Hall	All

ANNEX (2)

**Questionnaire for evaluation of training**

**Instructions for completion of questionnaire**

Use a circle to mark the following code to indicate the extent to which you agree or disagree with each of the statements made in the questionnaire:

**1 Strongly Disagree**

**2 Disagree**

**4 Agree**

**5 Strongly Agree**

These numbers are printed alongside each question. You should circle the number that corresponds most closely to your opinion.

The difference between options 1 and 2 and between options 4 and 5 is one of degree only. To oblige you to express a definite opinion, no code 3 has been included (except for question 12); this allows a "satisfaction index" to be calculated for each question.

Take your time over completing the questionnaire. You do not have to put your name on it if you would rather not, but please answer the questions as frankly as possible.

**Section I. Overall assessment of the training activity**

1. Overall the organization of the training programme was satisfactory. 1 2 4 5
2. The training programme covered all the subject matter in adequate detail. 1 2 4 5 (If you disagree with this, state which subjects should have been given greater coverage.)

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3. The tutors for this training course had sufficient knowledge and teaching ability to provide you with the necessary skills and competence .1 2 4 5

*Comments:*

4. The time allocated to each part of the training was adequate relative to the total time available. 1 2 4 5 (If you disagree with this, state which particular topic should have been allotted more or less time. )

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**Section II. Relevance and usefulness of the different teaching methods**

5. Overall, the teaching methods used in this training course were effective .1 2 4 5

**The use of the various teaching methods listed below was quite appropriate:**

6. Large group presentations 1 2 4 5
7. Practical demonstrations 1 2 4 5
8. Hospital visits 1 2 4 5
9. Small group discussions 1 2 4 5
10. Self-study 1 2 4 5
11. Quizzes, tests and other evaluation exercises 1 2 4 5

**Section III. Assessment of teaching materials**

12. The audio-visual materials (slides, overhead projection transparencies) used in the training were very helpful. 1 2 4 5

13. The teaching materials provided were satisfactory in all respects. 1 2 4 5

**Section IV. Implementation of training; attitude of tutors**

14. The general atmosphere of the training course made this a good learning experience 1 2 4 5

15. Every effort was made to help you achieve the learning objectives 1 2 4 5

16. You were able to achieve all the learning objectives of the training programme 1 2 4 5

**Section V. Overall evaluation of the training**

17. What overall rating would you give to this training programme?

Lowest 1 2 4 5 Highest

**With regard to this training experience, state the following giving actual examples):**

18. The three aspects that impressed you *most favourably*

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19. The three aspects that impressed you *least favourably*

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20. Do you have any additional comments regarding any aspect of the training programme?

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### Analyzing the responses to the questionnaire.

The following method will allow you to analyse the responses to the questionnaire quite simply and quickly. Take a fresh (uncompleted) copy of the questionnaire; against each question, mark the learners' responses. For example:

5. Overall, the teaching methods used in this training course were effective.

1	2	4	5

This shows that two learners considered the teaching methods were not effective while 28 agreed that they were effective.

Now multiply the number of answers by the corresponding coefficient:

$$(0 \times 1) + (2 \times 2) + (10 \times 4) + (18 \times 5) = 0 + 4 + 40 + 90 = \mathbf{134}$$

The "satisfactory index" is calculated as a percentage. For the above example, the number 134 is multiplied by 20 (i.e. 100 divided by the maximum coefficient, 5) and divided by the number of learners (30 in this example):

$$\frac{134 \times 20}{30} = 89.3\%$$

Since the satisfaction index is calculated in such a way that 60% represents "average" satisfaction, you should make a note of any questions for which the index is below 60% (if there is none, identify the five questions for which the index is lowest and the five for which it is highest). Let the learners know the results of this questionnaire at the final evaluation session on the last day of the training programme.

### **Annex (3)**

## **National Malaria Control Programme The ongoing training programme on the national guideline for malaria treatment**

### **Pre-/Post-test IDEAL ANSWERS**

**The grand total mark for the test is 45 degrees**

#### **Section one: (15 degrees total)**

**Put ( ✓ ) on the correct answer/s (more than one answer may be correct):**

- 1/ Un- complicated malaria in Sudan is suspected when there is: -
  - a. Fever
  - b. Fever with exclusion of other diseases
  - c. An afebrile patient presented with vomiting
  - d. Fever associated with repeated convulsions
  
- 2/ To confirm malaria, the laboratory staff need to prepare: -
  - a. Thick blood film
  - b. Thick blood film stained with Giemsa
  - c. Thin blood film
  - d. Thick and thin blood film
  
- 3/ The combination of (Artemether Lumefantrine) is appropriate treatment in case of:-
  - a. Severe malaria
  - b. Malaria during pregnancy in the first trimester
  - c. Uncomplicated Malaria
  - d. Malaria associated with repeated vomiting
  
- 4/ The advantages of Rapid Diagnostic test is increasing in following conditions:-
  - a. Areas where is microscopic diagnosis is not available
  - b. Cities located in agricultural scheme such as Wad Medani.
  - c. Low transmission areas of malaria
  - d. In case of epidemics and emergencies
  
- 5/ The combination of Artemether Lumefantrine existing in the market contains Artemether in concentration of:-
  - a. 50 mg per tab
  - b. 20 mg per tab
  - c. 80 mg per tab
  - d. 200 mg per tab

6/ The blood film result of a patient showed that (malaria parasite seen P Falciparum ring stage ++)... that means the number of parasite is equal to:-

- a. 1 - 10 parasite in (100) microscopic field
- b. 1 - 10 parasite microscopic field
- c. 11 - 100 parasite in (100) microscopic field
- d. 11 - 100 parasite in one field

7/ The (DHAP) combination could be prescribed for the treatment of

- a. The pregnant in the 2<sup>nd</sup> and 3<sup>rd</sup> trimester
- b. Any child with weight less than 5kg
- c. The patient couldn't take the first line treatment orally
- d. Severe malarial patient at peripheral health care facilities

8/ One of the best indicators for measuring the prompt treatment at hospital level is:-

- a. Crude death rate
- b. The severe malaria infections rate out of the total admission
- c. Hospital occupancy rate
- d. Case fatality rate.

9/ The most important issues need urgent treatment in pregnant women with severe Malaria are

- a. Hypoglycemia
- b. Hyperparasitemia
- c. Fever
- d. Fetus status

10/ In Sudan Malaria Treatment Protocol the pre referral management recommended for severe malaria are-

- a. 1M Quinine
- b. Artesunate
- c. Coartem
- d. Artesunate suppositories

11/ Hypoglycemia could be induced by treatment with:-

- a. Artemether injection
- b. Artesunate suppositories
- c. 1V Quinine
- d. 1M Quinine

12/ The most appropriate treatments for Plasmodium vivax are:-

- a. Quinine
- b. (Artemether Lumefantrine) +Primaquine
- c. DHAP
- d. Primaquine

**Section (2): (7 degrees in total)**

There are (3) Scenarios in which the main actors are the health workers at various health facilities levels. Some mistakes has been under taken while dealing with malaria patient. Identify the mistakes (average 1 – 3 in each scenario)

13/ At 9 o'clock a medical assistant in a dispensary has received a patient. The case has been diagnosed as severe malaria. The combination of (Artemether Lumfantrine) therapy has been given, with the promise to visit the patient afternoon at home.

3

a).....  
.....  
.....

b)  
.....  
.....  
.....

c)  
.....  
.....  
.....

14/ A married woman had came to see a doctor in a rural hospital complaining of fever and headache..... Lab investigation showed trophozoite stage in blood sample .....When she asked wether she is pregnant or not, she answered, that the LMP was two months ago, and when she inquired if she had taken any ant malarial drugs, she replied that she had taken the combination (Artemether Lumfantrine) within (10) days ago..... She has diagnosed as first line TREATMENT FAILURE and DHAP has been prescribed

a) .....  
b) .....  
c)  
.....  
.....

15/ Dr . Ahamed received a phone call from one of his relatives living in Saudi Arabia telling him that he will come to Sudan within 2 weeks. Dr. Ahamed advised him and his family to take as prophylaxis Artemether Lumfantrine tab (according to the weight) once per week before arriving to Sudan

.....

**Section (3): (13 degrees in total)**

**Fill the space with appropriate word(s) (may be more than one)**

16/ The most common severe malaria symptoms and signs among children are

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....

17/ Coartem doses are recommended to be taken with .....

18/ Following up of severe malaria patient could be done through

- 1)                      2)                      3)
- 4)

19/ Once that more than 8% of malaria infection in Sudan caused by plasmodium vivax, so the .....blood film is necessary