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# Implementing a Routine Health Management Information System in South Sudan

## Post-conflict mental health in South Sudan

## Diagnosing and managing asthma

## How to get published

## Dengue fever

# CONTENTS



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**Cover photo** - *Some HMIS tools used in South Sudan – see article on p21 (credit: Edward Luka).*


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*Reviewers are listed on the website*

# New horizons in postgraduate medical training

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Postgraduate medical training has barely existed in South Sudan, causing a stultifying effect on medical services and a lack of opportunity for a generation of doctors. Training in nearby countries or overseas has been the only option, with a patchy uptake and inevitably leading to a substantial brain drain. The problem is compounded by a lack of career structure, properly paid posts and longer term vocational opportunities. This unhappy situation may continue with a demoralised and often inadequately trained workforce, and a service which would collapse entirely if not propped up by NGOs and other bodies. Alternatively, new systems can be devised and emplaced to radically redeem this unacceptable position.

How then to introduce a new structure to embed postgraduate training and continuing professional development? Early progress has stemmed from the St Mary's-Juba Hospitals link, the work of the Harvard group and other international links, and with the strong support of the Ministry of Health. Building on these initiatives is a coordinated drive from within and without the country to establish a training structure for current and future doctors. A Business Case has been drawn up encompassing the many threads which will be woven into the overall strategy. Funding is being sought.

The problem is compounded by a lack of career structure, properly paid posts and longer term vocational opportunities.

In this postgraduate training:

a. All trainees will have a structured training curriculum comprising a modular system enabling the acquisition of basic skills and knowledge. When satisfactorily completed this will allow for safe practice in a district or community setting. For others it will lead to specialty training.

b. A specialty training programme will be delivered by local and visiting trainers. This will be recognised at an equivalent level to the Master of Medicine (MMed) and successful completion will allow appointment as a specialist. Until this programme is established, MMed scholarships abroad will continue and a few trainees will be selected for a two year training period in the UK.

c. Leadership, teaching skills, managerial and organisational techniques will be formally addressed.

d. A College of Physicians and Surgeons of South Sudan will be established to coordinate postgraduate training, set and maintain standards, and oversee postgraduate activity.

With good will and adequate funding, these aims will be achieved. A more detailed account and timetable of these developments will be published in this Journal in due course.

The SSMJ Team welcomes Dr Ayat C Jervase to the Editorial Board.

# Post-conflict mental health in South Sudan: overview of common psychiatric disorders

## Part 1: Depression and post-traumatic stress disorder

**Maithri Ameresekere[a], MD, MSc and David C. Henderson[a], MD**

### Introduction

Mental health is "a state of well-being in which every individual realizes his or her own potential, can work productively and fruitfully, and is able to contribute to her or his community."(1) Mental illness often attracts a lower priority than physical illness in post-conflict and low and middle-income societies but the two are inextricably linked. Untreated and unrecognized mental illness adds substantially to poor health. Neuropsychiatric conditions, such as depression and substance abuse, account for 9.8% of total disease in low and middle income countries, with depression the leading cause of years lived with disability (2). While probably greatly underestimated, more than 800,000 people annually commit suicide with the majority (86%) coming from low and middle-income countries (3). Additionally, untreated mental disorders are associated with heart disease, stroke, injury, and impaired growth and development in children (3). Mental illness has a profound and often underestimated impact on the health and functioning of individuals and communities across post-conflict societies.

Mental health is particularly important for South Sudan as the majority of the population has been exposed to high rates of violence, displacement, and political and social insecurity. Mental health data from South Sudan is limited. One post-conflict study from Juba found that 36% of the sampled population (n=1,242) met criteria for post-traumatic stress disorder (PTSD) and 50% for depression (4). Another study, conducted in northern Uganda and South Sudan, found the prevalence of PTSD was 46% among South Sudanese refugees and 48% among South Sudanese who stayed in the country (5). These studies indicate a high prevalence of mental illness in South Sudan as well as the potential for an increase in psychiatric disease as more refugees and internally displaced persons return home. As South Sudan attempts to reconcile recent memories of war with optimism for the future, we must pay close attention to its citizens' mental health.

Health care providers in South Sudan must become aware of the high prevalence of mental illness, its associated stigma, and know how to screen, diagnose and treat common mental disorders. Part I of this two-part series provides an overview of the common psychiatric conditions seen in post-conflict societies and general medical settings with a focus on depression and PTSD. Part II will focus on anxiety and substance (including alcohol) abuse. Brief explanations, screening questions to assess risk, signs and symptoms, and treatment suggestions are provided for each condition.

### Depression

Depression is a common condition world-wide and particularly in post-conflict settings. Studies from post-conflict South Sudan found rates of depression as high as 50% (4). Untreated depression often results in neglect of personal and professional responsibilities and significantly impacts daily life. It also negatively affects the lives of families. Severe depression may lead to suicide. A study of South Sudanese ex-combatants found that 15% reported wishing they were dead, or had thoughts of self harm (6). The main symptoms of depression include low mood (sadness) or loss of interest in usually enjoyed activities (anhedonia) every day, most of the day for at least two weeks plus four additional symptoms listed in table 1.

Screening: The following questions help to assess for depression (see table 2). The first two are adapted from the Patient Health Questionnaire (PHQ-2) screening tool, which is used to assess frequency of depressed mood and low interest in the past month. Each question is scored as 0 (NO feelings of sadness or hopelessness or continued interest in enjoyable activities in the past month) or 3 (feelings of sadness or hopelessness or disinterest in enjoyable activities nearly every day for the past month). A total score of greater than or equal to 3 is 83% sensitive and 92% specific for detecting depression (8). Risk of suicide is a serious concern so one should always ask if someone has thoughts of killing him or herself when screening for depression.

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**Table 1. Diagnostic criteria for depression**

| | |
|---|---|
| Symptoms | • Sad or low mood OR<br>• Loss of interest in usually enjoyed activities + 4 or more of the symptoms included below:<br>• Feelings of guilt (feeling worthless/ hopeless)<br>• Decreased energy<br>• Motor slowing or agitation<br>• Poor concentration<br>• Disturbed sleep (too much or too little sleep)<br>• Excessively increased/decreased appetite<br>• Thoughts of harming/killing oneself or actions that result in death or harm to oneself |
| Severe depressive episode with psychotic symptoms | Severe symptoms of depression include:<br>• Psychosis (loss of contact with reality):<br>a. Hallucinations (seeing or hearing things other people do not see or hear)<br>b. Delusions (beliefs that are firmly held despite being contradicted by what is generally accepted as reality<br>• Activity level so low that daily functioning is impossible (Severely sad mood that results in lack of desire to eat or drink or tend to personal hygiene)<br>• Suicide |

**Table 2. Screening questions for depression**

| | |
|---|---|
| Depression Risk | 1. During the past month, have you often been bothered by feeling sad, or hopeless?<br>2. During the past month, have you often felt little interest or pleasure in doing things?<br>• Not at all (0 points).<br>• Nearly every day (3 points). |
| Suicide Risk | 1. Have you had thoughts of hurting or killing yourself? If yes, when, how often etc?<br>2. Do you have a plan to kill yourself? What is your plan? (This will indicate likely risk). Do you have the means (methods) to do so?<br>3. Have you ever tried to kill yourself? If yes, when and how? (This will give you an indication of the severity of prior attempts). |

## Post-Traumatic Stress Disorder (PTSD)

PTSD may result from exposure to a stressful situation of an exceptional nature (e.g. being the victim of torture, rapes or beatings, observing or acting in armed conflict, or witnessing the violent death of relatives or friends) (9). PTSD is a common disorder in individuals exposed to armed conflict and is common in South Sudan (4, 5, 10). Individuals with PTSD may experience physical symptoms associated with their stress. An example is a Sudanese refugee who presented with chronic abdominal and back pain. Medical causes were excluded and it was realized that his pain was part of his PTSD which improved with antidepressant medication (11). Depression and PTSD frequently occur together so one must screen for both conditions. Someone exposed to a traumatic event has PTSD if they experience at least one symptom from cluster B, at least 3 symptoms from cluster C, and at least 2 symptoms from cluster D consistently for at least one month and their symptoms cause significant disruption to their personal and professional life. (See tables 3 and 4)

## Treatment Approach to Patients with Common Mental Disorders

As some medical conditions can present with or imitate psychiatric symptoms, it is important to first exclude common medical causes such as infection (malaria, typhoid, HIV), medication reactions, and toxic/metabolic or endocrine abnormalities (13). Once a psychiatric diagnosis is confirmed, you can consider treatment possibilities that typically include a combination of medications and most importantly psychological and social interventions. Medications may help but require close monitoring for side effects. (see table 5)

**Community and Psychosocial Interventions:** Psychosocial interventions in the form of religious groups, friends, family and tribal structures, are some of the most important tools to help patients with depression and PTSD feel better. A review article on the mental health of South Sudanese refugees in the Diaspora found that mechanisms of coping with emotional distress, including encouraging connections with others, group social support and sharing experiences, helped to ease emotional difficulties (14). Health care providers can help patients feel better by (14):

- Focusing attention on positive things in the future and away from negative situations
- Helping patients accept difficulties in life
- Helping patients create meaning from suffering
- Focusing patients on productive activities

**Table 3. Diagnostic Criteria for PTSD**

| | |
|---|---|
| Symptoms | CLUSTER B –**1 or more** of the following symptoms for at least **one month**<br>• Recurrent distressing memories of the event, including images or thoughts<br>• Recurrent distressing dreams of the event<br>• Acting or feeling as if the trauma was recurring (includes a sense of actually re-living the event)<br>• Intense emotional distress when exposed to something that reminds you of the trauma<br>• Physical symptoms like rapid heart rate, sweating, and tremors when exposed to something that reminds you of the trauma |
| | CLUSTER C – **3 or more** of the following symptoms for at least **one month**<br>• Avoiding thoughts, feelings, or conversations associated with the trauma<br>• Avoiding activities, places, or people that cause you to remember the trauma<br>• Inability to recall an important part of the trauma<br>• Decreased interest or participation in usually important activities<br>• Feeling disconnected from others or feeling alone when surrounded by family or friends<br>• Limited range of emotions (rarely able to laugh or smile)<br>• Sense of no hope for the future (e.g., does not expect to have a job, marriage, children) |
| | CLUSTER D: **2 or more** of the following symptoms for at least **one month**<br>• Hypervigilance (always on guard for threats)<br>• Easily startled or scared<br>• Difficulty falling asleep or staying asleep<br>• Irritability or outbursts of anger<br>• Difficulty concentrating |

**Table 4. Screening Questions for PTSD**

If willing, encourage the patient to talk about the trauma. Some people are not ready to share their story immediately. If this is the case, it is not recommended to force a person to tell their story. The patient may begin to feel more comfortable with time and eventually be ready to discuss their experience. Start by asking questions like:

*"Some people have difficult experiences like being attacked or threatened with a weapon; being raped; or seeing someone being badly injured or killed. Has anything like this ever happened to you?"*

IF YES:

*"In the past 3 months, have you had recurrent dreams or nightmares about this experience, or recurrent thoughts or times when you felt as though it was happening again, even though it wasn't?"*

- Helping patients compare themselves with those who are less fortunate

**Pharmacologic Interventions (15):** There are few psychiatric medications available in South Sudan. Health care workers can use the following medications to treat depression and PTSD – which should be used in combination with community and psychosocial interventions., as shown in table 6.

## Depression Treatment

Refer to table 7.

## PTSD Treatment

Refer to table 8.

## Conclusion

Exposure to prolonged violence, displacement, and hardship has put the people of South Sudan at risk of emotional distress. Therefore, it is essential for health care providers in South Sudan to focus on both physical and mental well-being. Advocacy, training, and research are desperately needed. Broad recommendations to strengthen mental health service provision are discussed in Part II.

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**Table 5. Treatment Algorithm**

- EVALUATE presence of symptoms
- EXCLUDE common medical disorders that may cause psychiatric symptoms
- CONSIDER the differential diagnoses for mental disorders based on the symptoms mentioned above
- START MEDICATION/PSYCHOSOCIAL INTERVENTION depending on the psychiatric illness
- ASSESS RESPONSE: See the patient back in clinic > assess presence of symptoms and response to medication.
- If complete resolution of symptoms > continue treatment at current dose
- If partial or no improvement > increase dose based on guidelines and reassess symptoms
- REASSESS RESPONSE frequently at the beginning of treatment:

a. If complete resolution of symptoms > continue medication at therapeutic dose for the recommended time frame depending on the condition (please see table below).

b. If no response, worsening thoughts of self-harm, or new psychotic symptoms > seek consultation with mental health expert by any means necessary (including phone or internet)

**Table 6. Pharmacologic Treatment for Depression and PTSD**

| | **Fluoxetine** | **Amitriptyline** | **Diazepam** | **Chlorpromazine** |
|---|---|---|---|---|
| Uses | Depression, PTSD | Depression, PTSD | PTSD | Severe Depression, PTSD |
| Common Side effects | Occurs when starting (typically improves):<br>•Nausea, diarrhea, constipation<br>•Poor sleep<br>•Tiredness, anxiety<br>Long-term:<br>•Sexual dysfunction (Treat by lowering dose) | •Dry mouth, constipation, blurred vision, urinary retention<br>•Fatigue, weakness, dizziness, sedation •Sexual dysfunction<br>•Weight gain and increased appetite | •Sedation, fatigue, depression<br>•Dizziness, ataxia, slurred speech, weakness<br>•Forgetfulness, confusion | •Sexual Dysfunction<br>•Dry mouth, constipation, urinary retention<br>•Weight gain<br>•Sedation<br>•Low blood pressure, tachycardia<br>• Photosensitivity |
| Risks of Medication | •Skin rash (should stop the drug) | •Heart problems (QTc prolongation, arrhythmias)<br>•Seizures<br>•Liver failure | •Dependence/abuse<br>Overdose > respiratory depression > coma<br>• Withdrawal syndrome > irritability, tremor, hallucinations, seizures | •Involuntary movements<br>• Heat stroke<br>•Bone marrow suppression<br>• Rare seizures •Neuroleptic malignant syndrome (*Temperature >38°C, delirium, sweating, rigid muscles, autonomic imbalance*) |
| Reassess | •Assess symptoms/ side effects every 2 weeks initially<br>•Increase by 20mg to MAX dose every 3-4 weeks if no improvement | •Assess symptoms/ side effects every week initially<br>•Increase by 25mg every 3-7 days to reach MAX dose if no improvement | •Assess symptoms/ side effects every 2-3 days initially<br>•Increase by 1-2mg every 2-3 days up to MAX dose if no improvement<br>•Should be used for (no longer than 12-16 weeks) given high abuse/ dependence potential<br>•Taper by 1-2mg every 3-7 days as withdrawal/ seizures can occur if stopped abruptly | •Assess symptoms and side effects every 1-2 days initially<br>•Increase by 20-50 mg/ day every 3-4 days<br>•Start lower/titrate slower in older patients<br>•Taper over 6-8 weeks to avoid rebound psychosis |
| | •Clinical response may be delayed up to several weeks after initiation<br>•Taper medication over >4 weeks) as withdrawal syndrome can occur if stopped abruptly | | | |

*All medications should be used with caution in women of childbearing age given possible teratogenic effects during pregnancy and lactation. The listed side effects are not exhaustive and all medications should be monitored closely.

**Table 7: Depression Treatment**

| | Medications | Starting Dose | Effective Dose Range |
|---|---|---|---|
| Depressed Mood | Amitriptyline | 25 mg/day / by mouth | 50 – 150mg/day At night or in divided doses. |
| | Fluoxetine (Clinical response may be delayed) | 20 mg/day / by mouth | 20 – 80mg/ day (20mg -40mg usually) In the morning. |
| | •Fluoxetine is safer with fewer side effects than amitriptyline<br>•If improvement in symptoms treat at same dose for 6-12 months<br>•Consider maintenance (long-term) treatment in patients with >3 episodes of depression | | |
| Psychosis | Chlorpromazine | 30 – 75mg/ daily by mouth | 200 – 800mg/day At night or divided doses |
| | •Increase dose until psychotic symptoms are controlled; after two weeks reduce to lowest effective dose (25 – 50mg IM can be used as needed for severe agitation) | | |


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**Table 8: PTSD treatment**

| Target Symptoms | Medications | Starting Dose | Effective Dose Range |
|---|---|---|---|
| Angry outbursts<br>Disturbing imagery<br>Severe agitation | Chlorpromazine | 30 – 75mg/daily<br>By mouth | 200 – 800mg/day<br>At night or in divided doses.<br>Can be used IM as needed for severe agitation/violence |
| Depression<br>Nightmares<br>Flashbacks | Fluoxetine | 10 – 20mg/day<br>By mouth | 10 – 80mg/day<br>In morning<br>(Can start with 20mg every other day) |
| | Amitriptyline | 10– 25 mg/day<br>By mouth | 10– 150 mg/day<br>At night or in divided doses |
| Irritability Hypervigilance | Diazepam<br>SECOND LINE | 2– 5 mg/day<br>By mouth | 2– 40 mg/day<br>Divided doses |
| | •Use medications to target symptoms described by patient<br>•If symptoms improve continue medication for at least 6-12 months except for diazepam given dependence/addiction potential<br>•If symptoms recur, restart therapy and continue indefinitely | | |

# Asthma: diagnosis and management

## A guide suitable for developing countries

**Richard A Lewis[a] BSc DM FRCP**

### Introduction

The prevalence of asthma is highest in 'developed' countries and lowest in developing and emerging countries. The prevalence increases as development progresses (1) and is higher in urban compared to rural areas in developing countries. This increase may be a result of several factors including:

- The population facing new allergens in an urban environment (2).
- A reduced exposure to infectious agents, symbiotic micro-organisms and parasites which leads to a reduction of T helper 1 mediated immune responses and thus an increase in T helper 2 mediated responses which stimulate antibody mediated immunity leading to allergic disease. This has been called the 'hygiene hypothesis' (3).
- Increased awareness of asthma in areas with more health provision.

Even a small rise in asthma prevalence in developing countries has important public health implications (4).

This guide should be read together with local guidelines including the 'Prevention and Treatment Guidelines for Primary Health Care Centres and Hospitals' (5). It is not meant to replace any of the recommendations of local guidelines. It is designed to help those managing asthma to think about why asthma may be a problem and how to overcome that problem.

### Management of asthma - The 5 'D's

I use a simple checklist of 5 'D's (Diagnosis, Drugs, Dose, Delivery, Dirty air) when faced with a case of difficult asthma. This checklist explains why the asthma is difficult to control.

**Diagnosis**

The diagnosis of asthma is more difficult in developing countries with a high prevalence of tuberculosis and other poverty related lung conditions, and HIV associated lung diseases. It is likely that many patients with asthma are not recognised. Diagnosis in the under 5-year-olds is even more difficult due to a high incidence of viral respiratory infections associated with wheeze. I have noted an increase in bronchial hyper-reactivity in patients with tropical pulmonary eosinophilia in a deprived community in India. In the UK I find the following conditions could mimic or exacerbate asthma so, rather than add another layer of anti-asthma medication, I always check for:

1. **A for Aspergillus** related disease. Both allergic bronchopulmonary aspergillosis (ABPA) and Severe Asthma with Fungal Sensitisation (SAFS) (6) results in asthma which is difficult to control. The chest X-ray may show segmental or subsegmental collapse, sputum may contain Aspergillus fumigatus and blood tests may show a raised IgE and raised aspergillus RAST or aspergillus precipitins. Anti-fungal treatment with intraconazole for one month or more helps both conditions. This may be combined with oral steroids.
2. **B for Bronchitis,** especially in children where viral illness may mimic asthma. There may also be a prolonged period of bronchial hyper-reactivity after a respiratory viral illness.
3. **C for COPD.** Chronic obstructive pulmonary disease may be difficult to distinguish from asthma. The diagnosis is helped by a history of exposure to tobacco smoke or biomass smoke ('biomass' is biological material from living or recently living organisms such as dead branches, wood chippings, crop remains) (7). A symptom-based questionnaire is available to distinguish COPD from asthma (8)
4. **D for Diffuse lung disease.** This can be difficult to diagnose without X-ray. Fine crackles, especially at the lateral lung bases should alert you to the possibility of an interstitial lung disease such as idiopathic pulmonary fibrosis. Spirometry is restrictive rather than obstructive. Peak flow may be normal.
5. **E for Embolus.** Pulmonary embolus can cause rapid onset of breathlessness and should always be considered in patients in whom the degree of breathlessness is disproportionate to the severity of their other underlying lung disease or lung function.
6. **F for Failure.** Heart failure may mimic asthma with wheeze and indeed used to be called 'cardiac asthma'. There may be significant reversibility to

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inhaled beta agonists. A history of heart disease and the presence of basal crepitations help to make the diagnosis.

7. **G for Gastro-oesophageal reflux (GORD)** which is frequent in asthma patients and may be exacerbated by the asthma or be a reason for poor asthma control. Always ask whether patients have "heart burn" or acid reflux, and treat aggressively. Note that use of anti-acid therapy such as a proton pump inhibitor may remove the symptoms of acid reflux without stopping the refluxate which may still inflame the larynx or airways due to the presence of pepsin (9).
8. **H for Hyperventilation. Hyperventilation** is frequently associated with asthma and may be the cause of failure of asthma control. Use of a simple tool such as the Nijmegen Questionnaire may help pick up these cases (10).
9. **I for Inhaled foreign body** which may cause wheeze both in the acute and chronic phase. If asthma has been of rapid onset always ask about this possibility. Unilateral wheeze is an important sign and indicates the need to try and obtain an X-ray. Many foreign bodies however may not show on X-ray or CT scan and bronchoscopy is required
10. **J for Just never forget local common diseases** such as tuberculosis which can mimic asthma with breathlessness, noisy breathing and cough.

A major problem in diagnosing and treating asthma in countries like South Sudan is the lack of medical equipment. Clear history taking is therefore very important. Table 1 lists important questions to ask to diagnose asthma.

International guidelines for the management of asthma usually mention the fundamental need for spirometry and blood gases to assess patients and oxygen and nebulisers for management. In a questionnaire study we undertook of 41 centres in 24 developing countries in Africa and Asia (12) we found that continuous electricity was available in 25 centres, oxygen in 23 areas, peak flow measurement in 26, and spirometry in 3 centres. Nebulisers were available in 19 centres and oxygen in 23. Peak flow measurement can be a useful and inexpensive tool in the diagnosis of asthma when a 15% improvement following administration of 400mcg salbutamol supports the diagnosis. Spirometry, particularly using a machine which can provide a flow volume loop, is more helpful to diagnose COPD and to exclude restrictive lung diseases as a cause of breathlessness. Peak flow meters, if available, can also be used to confirm variation over time or show the characteristic morning dip of asthma. We have successfully used colours and symbols on peak flow meters to enable home use in an illiterate population (see Figures 1a and b.) (13)

**Table 1. Important questions to ask to diagnose asthma**

From Global Strategy for Asthma Management and Prevention, 2010 Global Initiative for Asthma (11)

1. Has the patients had an attack or recurrent attacks of wheezing?
2. Does the patient have a troublesome cough at night?
3. Does the patient wheeze or cough after exercise?
4. Does the patient experience wheezing, chest tightness or cough after exposure to airborne allergens or pollutants?
5. Do the patient's colds 'go onto the chest' or take more than 10 days to clear up?
6. Are symptoms improved by appropriate asthma treatment?

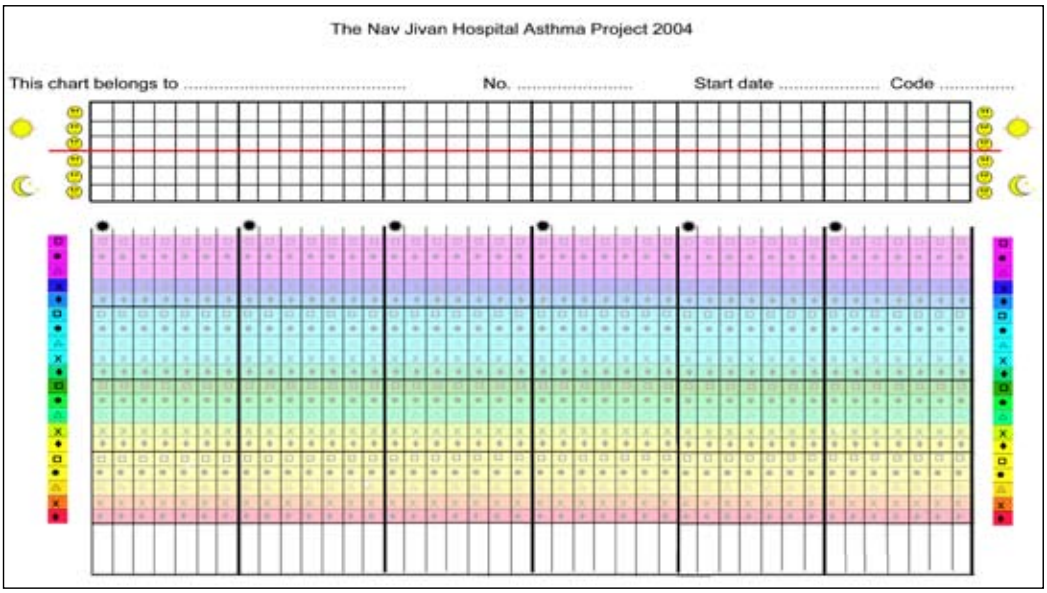
## Drugs

Always check whether the patient is taking drugs which may exacerbate asthma such as beta blockers which may be taken orally or as eye drops.

The problem in developing countries is that the most basic drugs required for the management of asthma (such as inhaled bronchodilators and inhaled steroids) are unaffordable. In the questionnaire study we undertook (12) inhaled steroids were prescribed in only 2 out of 41 centres. Where they were available, the median (range) cost of a beclomethasone 50 micrograms inhaler was 20% (6.8-100%) of average local monthly income and a salbutamol inhaler 13% (3.3-250%). Following the publication of this paper the Asthma Drug Facility (ADF) (14) was established by the International Union Against Tuberculosis and Lung Disease. Through the ADF, low and middle income countries can purchase the quality-assured asthma medicines they need at affordable cost. The ADF has a quality assurance system based on World Health Organization norms and standards. It keeps prices down by having a competitive process among selected manufacturers. However it is probable that oral medication such as oral beta agonists, theophyllines and steroids may be the only affordable drugs. For recommendations for the management of acute asthma and maintenance therapy in South Sudan see MOH/GOSS 2006 (5).

## Dose

The most important aspect of 'dose' is not the dose prescribed but the dose that the patient is actually




*Figures 1a and b. Example of a colour coded peak flow meter and chart for home use by illiterate patients.*

taking. Lack of funds, fear of side effects or lack of understanding of the need to take regular medication may result in the patient taking a much lower dose of drug than that prescribed, or stopping the medication when the symptoms resolve. It is important to:

- Establish the actual dose being taken.
- Explain the difference in action of the various inhalers, and the fact that the 'preventer' steroid inhaler should be taken on a regular basis while the 'reliever' bronchodilator is taken as required. 'Stepping up' the dose of inhaled steroids when asthma control is not established is frequently considered, but 'stepping down' once control is established is not so frequently considered. This is important as it reduces costs and long term side effects.

**Delivery**

The metered dose inhaler (MDI) is the cheapest form of delivery of asthma medication in most countries and therefore the most commonly used and misused (15). In my experience the lack of ability to use the MDI is the most common cause of failure of asthma control. A simple rule is to assume that patients fail to use an MDI correctly until proved otherwise . Unfortunately demand delivery devices such as dry powder inhalers, or auto delivery inhalers are more expensive. The use of a spacing device with an MDI overcomes the problems of co-ordination, markedly improves response (16) and reduces oropharyngeal side effects of inhaled steroids. A spacer is an additional expense, but a cheap spacer may be made from a plastic bottle. It is important to stress the need for compliance with the spacer since many patients do not feel they are benefitting from their MDI unless they feel the spray hitting the back of the mouth!

The use of inhalers should not be a problem for Muslims fasting during Ramadan because using a spacer device means that most of the inhaled medication goes directly to the lungs and the small amount delivered to the oro-pharynx can be rinsed out.

**Dirty Air**

The three types of 'dirty air' to consider are inhaled smoke, occupational lung disease and allergens.

- **Inhaled tobacco smoke** may be passive in children and those living with smokers or due to active smoking. In the UK many smokers deny smoking, but brown discolouration of the nails, smell of smoke on the breath or, if necessary, measurement of end-tidal carbon monoxide helps confirm the truth. In developing countries smoke inhalation due to the use of biomass fuels in unventilated huts is an important cause of respiratory disease (17). Education and cultural changes may be necessary, but these have to adapt to users' needs (18). The education level has shown a strong correlation with the risk of respiratory diseases from biomass exposure in women; illiterate women are at three to six times higher risk for all respiratory diseases compared with literate women (19).
- **Occupational lung disease.** Ask patients with asthma about their occupation and whether asthma symptoms are better on days they are not working. There are many occupational exposures which cause or exacerbate asthma and appropriate health and safety precautions may not be in place or followed.

*Figure 2. Inhalation of smoke from biomass fuel may cause respiratory disease in adults and children.*

- **Allergens** may be an important cause of asthma. In 2003 locusts were associated with 11 deaths and 1600 hospital visits in central Sudan. Asthma and rhinitis in Sudan has also been associated with exposure to airborne allergen from the "green nimitti" midge Cladotanytarsus lewisi. Urbanisation is associated with an increase in exposure to indoor allergens such as the house dust mite or pet dander (2), and increased air pollution increases sensitisation to allergens.

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# Dengue fever

**Milada Tavodova[a] MD PgDip**

## Introduction

Dengue fever is caused by dengue viruses (DENV). Transmission of DENV has increased dramatically in the past two decades making DENV the most important human pathogens among arthropod-borne viruses (1). About 50-100 million dengue fever infections occur every year in tropical and subtropical countries (2) – see Figure 1.

The emergence of dengue haemorrhagic fever (DHF) in most tropical countries is a public health priority. Little is understood about dengue virus pathogenesis. No other animals develop symptoms and research has been limited to studies involving humans (1).

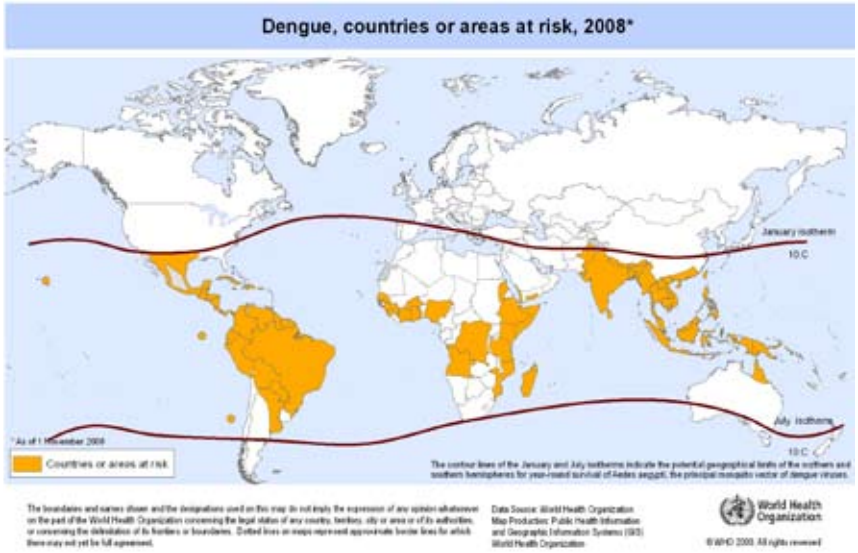


*Figure 1. Dengue fever risk map 2008. (Source: WHO)*

DENV comprise four serotypes (DENV 1 to 4) but are epidemiologically similar (3). Dengue viruses are RNA viruses with a positive RNA strand, which belongs to the family *Flaviviridae*. There is a high mutation rate increasing biodiversity (4) and possibly increasing disease severity and problems with vaccination (4).

## History of dengue fever

The earliest record appears in a Chinese medical encyclopaedia (5). It may have spread via sailing ships, where mosquitoes used the stored water as a breeding site and could maintain the transmission cycle.

The global epidemiology and transmission of dengue viruses changed in Southeast Asia during World War II. Troop movement accelerated the spread of viruses between populations and a few years later the first documented outbreaks of DHF occurred in Manila, Philippines in 1953/54 (6).

The successful eradication of *Aedes aegypti* in the Americas in 1970s reduced the spread of dengue fever. After this programme was abandoned, *A. aegypti* re-invaded most of the countries causing a significant health problem (7). The true prevalence of dengue fever in Africa is unclear because of inadequate surveillance (2, 7).

Dengue viruses originated from an animal reservoir. Two distinct DENV transmission cycles are recognised (Figure 2):

- endemic/ epidemic cycle and
- sylvatic /zoonotic cycle.

Endemic and epidemic cycles involve the human host and viruses are transmitted by *A. aegypti, A. albopictus* and other mosquitoes as secondary vectors (3). The sylvatic transmission cycle involves monkeys and several different Aedes mosquitoes identified in Asia and West Africa (7).

## Transmission to humans

Transmission to humans is through the bite of an infected mosquito, *A. aegypti* (Figure 3). This mosquito lays its eggs in containers found around the home (e.g. old car tyres, water storage containers). The adult mosquitoes feed on humans during daylight hours. There are two peaks of biting activity, early morning for 2 to 3 hours after daybreak and in the afternoon for several hours before dark. A. aegyptii females often feed on several persons during a single blood meal hence increasing the transmission rate (5).

The incubation period is 3 - 14 days (average 4 to 7 days). There follows an acute febrile period of 2 – 10 days accompanied by nonspecific symptoms. During this period dengue viruses circulate in the peripheral blood. During this viraemic stage other biting mosquitoes become infected.

## Clinical picture

Dengue fever is mostly occurs in children and young adults (8). Clinical features vary with the age of the patient

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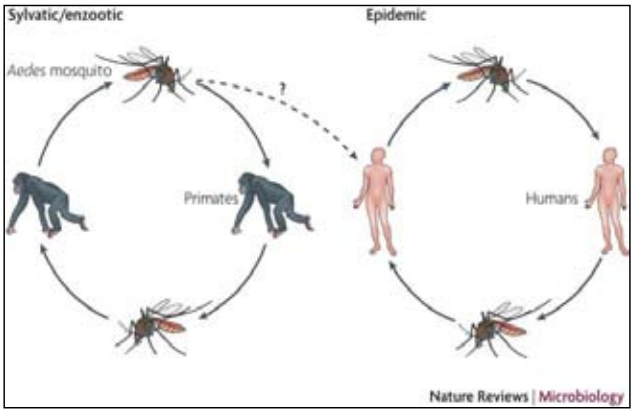


*Figure 2. The two DENV transmission cycles. (Source: Nature reviews Microbiology 2007; 5: 518 – 528)*

although clinically occult infection occurs in about 80% (9). There are four presentations (Figure 3):

- Non-specific febrile illness
- Classical dengue fever
- Dengue haemorrhagic fever
- Dengue haemorrhagic fever with dengue shock syndrome, encephalopathy and liver failure

**Non-specific febrile illness:** A maculo-papular rash occurs mostly in young children. Upper respiratory features, especially pharyngitis, are common (10).

**Classical dengue fever (DF)** is primarily a disease of older children and adults. It begins abruptly followed by three phases – febrile, critical and recovery (Figure 4). The fever may be biphasic lasting 3 to 7 days and accompanied by a variety of symptoms including severe headache, retro-orbital pain, fatigue, nausea, vomiting, generalised aches, arthralgia and myalgia, hence the term "break bone disease"(9). A flushed skin (face and neck) and maculo-papular rash are common (11). Haemorrhagic manifestations range from mild to severe; cutaneous petechiae and purpura, gum bleeding, epistaxis, gastrointestinal haemorrhage all can occur (5).

Recovery may be prolonged with weakness and depression (10). Laboratory findings include neutropaenia, lymphocytosis, thrombocytopaenia and elevated liver enzymes.

**Dengue haemorrhagic fever (DHF)** is primarily a disease of children under 15 years in hyperendemic areas. It usually follows a secondary dengue infection and is characterized by high fever, haemorrhages, circulatory failure and hepatomegaly (11). Patients either recover or progress to the plasma leakage stage remaining ill despite normalisation of temperature. Plasma leakage is characterized by tachycardia and hypotension with sweating, restlessness and cold extremities. Most patients recover, but in severe cases patients may develop circulatory shock (11). Mortality may reach 10 – 20% without early appropriate treatment but can be reduced to less than 1% with aggressive fluid replacement therapy.

Leucopaenia and thrombocytopaenia (less than100,000/mm3) are usually found between days 3 and 8. Elevated liver enzymes are common.

**Dengue shock syndrome (DSS)** is associated with almost 50% mortality. Warning signs include sustained abdominal pain, vomiting, irritability or somnolence, a fall in body temperature and decrease in platelet count (10). Patients die from multi-organ failure and disseminated intravascular coagulation. DSS may be accompanied by encephalopathy caused by metabolic and electrolyte disturbances (11).

Haemostatic disturbances result from vascular changes, thrombocytopaenia and coagulation disorders arising from, for example,. a decreased fibrinogen level, and increased level of fibrinogen degradation products (5). Other reported complications include liver failure, disseminated intravascular coagulation, myocarditis and acute renal failure.

## Pathogenesis

This is poorly understood. It is likely that viral, immunopathogenic and other host factors have a role. The main risk factors for severe disease include the virulence of the strain of the virus, previous infection with heterotypic DENV, age and genetic background of the person (12).

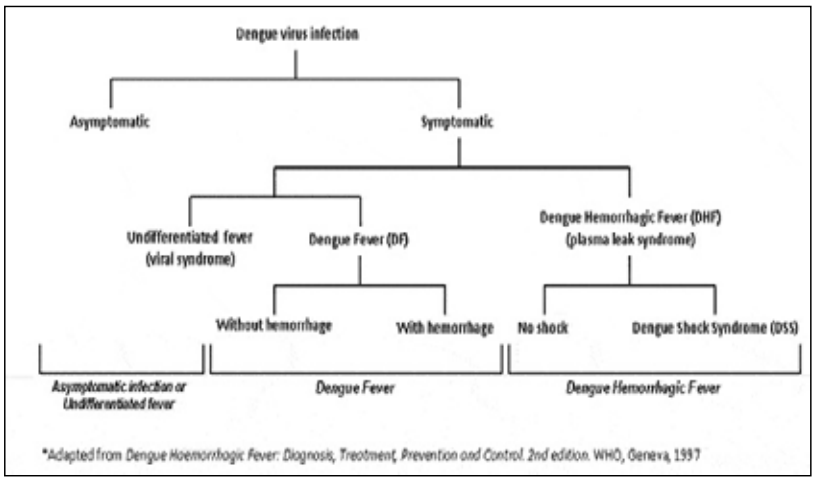


*Figure 3. Dengue fever flow chart. (Source: WHO 1997 Dengue haemorrhagic fever: Diagnosis, Treatment, Prevention and Control, 2nd edition)*

The two main theories of pathogenesis (5) are:

1. The secondary-infection or immune enhancement hypothesis. This implies that patients having a second infection with heterologous virus serotype have a significantly higher chance of developing DHF and DSS (13). Pre-existing antibodies cross-react with the virus and form antigen-antibody complexes, which then bind to the cell membrane of leucocytes. Because the antibody is heterologous, the virus is not neutralised. This facilitates virus entry to cells resulting in higher viral titres (5, 13). Higher viral titres may result in an amplified cascade of cytokines and complement activation causing endothelial dysfunction, platelets destruction and consumption of coagulation factors leading to plasma leakage and haemorrhage (10).

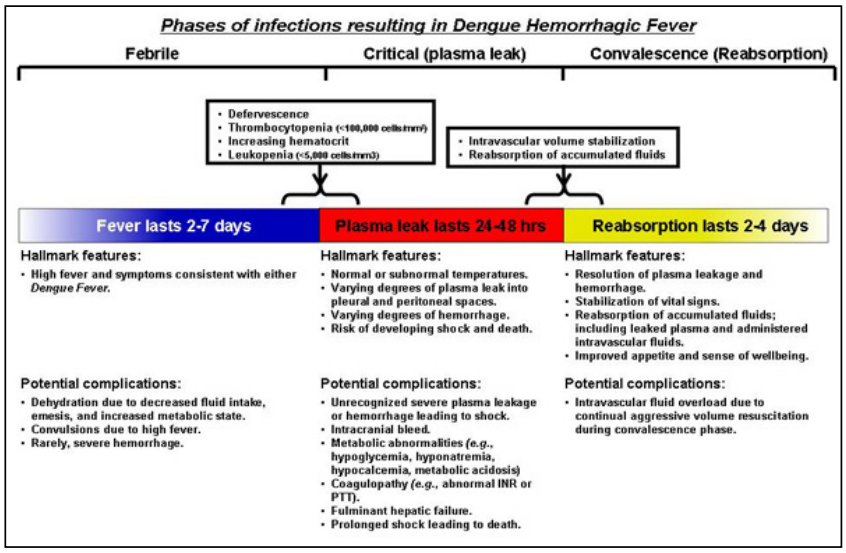


*Figure 4. Phases of infection resulting in dengue haemmorhagic fever. (Source: Centers for Disease Control and Prevention, Atlanta, USA)*

2. The other hypothesis assumes that dengue viruses vary and some are associated with higher virulence, severe disease and have greater epidemic potential (14).

## Laboratory diagnosis

Laboratory diagnosis depends on virus isolation and identification of virus-specific antibodies. Each method has its advantages and limitations and requires laboratories with the necessary infrastructure and technical expertise (15). Dengue viruses can be isolated from serum, plasma or leucocytes during the febrile phase of the disease (within 6 days) and from post-mortem specimens of liver, lung, spleen, lymph nodes, cerebrospinal fluid or pleural/ascitic fluid.

Serological diagnosis is more readily available. It is complicated by the existence of cross-reactive antigenic determinants shared by all four dengue virus serotypes and members of the flavivirus family (2).

IgM antibodies are the first to appear and are detectable in 50% of patients by days 3 – 5 after onset of illness, increasing to 80% by day 5. IgG antibody is detectable at low titres at the end of first week, increasing thereafter and still detectable after several months. During secondary dengue infection antibody titres rise rapidly and react broadly against many flaviviruses (15).

Molecular methods (nucleic acid detection assays) may identify virus within 24 – 48 hours, but these methods are expensive and require experienced personnel.

## Management of dengue infections

There is no specific therapy. Uncomplicated dengue infection usually resolves spontaneously. Patients with life threatening complications should be managed in hospital with supportive treatment. Fluid replacement and close monitoring of fluid and electrolytes balance are vital. Isotonic solutions (e.g. 0.9% saline, Ringer's lactate or Hartmann's solution) should be used (15). Signs of successful therapy are:

- Improving central and peripheral circulation (decreasing tachycardia, increasing blood pressure, capillary refill time < 2 seconds) and
- Improving end-organ perfusion e.g. stable conscious level, urine output >=0.5 ml/kg/hour, degreasing metabolic acidosis (15).

Give paracetamol for fever and analgesia. Avoid aspirin, ibuprofen and other non-steroidal anti-inflammatory agents as they may aggravate gastritis or bleeding (15). Acetylsalicylic acid (aspirin) may be associated with Reye's syndrome.

Monitor patients at least 6 hourly in 24 hours and particularly around the time of defervescence of symptoms as shock may develop. The indications for hospitalisation are:

- Poor oral intake
- Bleeding
- Change in level of consciousness
- Laboratory evidence of DHF
- Pregnancy, infancy, old age, obesity and diabetes

mellitus (15).

## Impact of global changes to the spread of dengue viruses.

Several factors contribute to the increase of dengue viruses (Figure 5):

- **Increasing human population** and urbanisation were critical factors in the past enabling the spread of viruses. The dengue virus broke free of its sylvatic cycle and established itself as the endemic human disease we see today (7).
- **Increased urbanisation.** The industrialisation and urbanisation are creating large populations of susceptible hosts and fertile habitats for mosquito vectors.
- **Poverty** associated with rapid population growth leads to concentration of people without the necessary infrastructure for the safe storage and distribution of water and drainage. Used containers and tyres provide breeding sites for mosquito vectors.
- **Decreased vector control** in areas where dengue is epidemic.
- **Human travel** and particularly air travel.

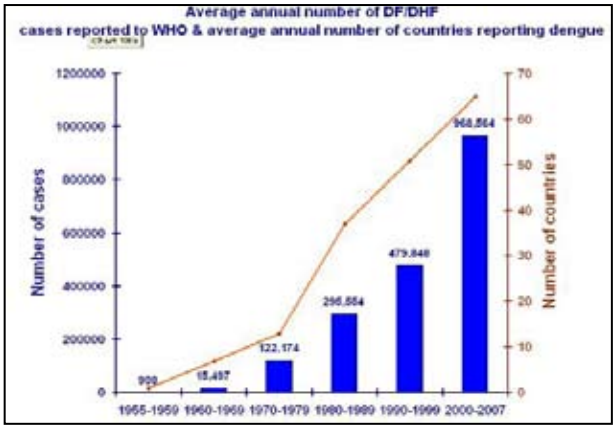


*Figure 5. Average annual number of DF/DHF cases. (Source: WHO -http://www.who.int/csr/disease/dengue/impact/en/)*

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# How to get published

**Heather Mackenzie[a,b], Carole Fogg[a], Amy Drahota[a], Sue Halson-Brown[a], Rebecca Stores[a] and Ann Dewey[a]**

The purpose of this article is to guide you through the publication process from start to finish. It will help you to think about where to publish, and provide guidance on writing and submitting your article, and the peer review process.

## Why do you want to publish?

Firstly, think about why you want to publish. For healthcare professionals the primary reason is sharing research findings which contribute to knowledge, and influence practice and/or policy. Other reasons include career progression or personal satisfaction (1). Secondly, think about your target audience. Do you want to share your findings with healthcare professionals working in your area, academics or policy makers? How many people do you want to reach? Thirdly, think about time. How much time do you have available? How quickly do you want your findings to be available for others to read?

## Publishing in academic journals

Academic journals are good places to publish if you wish to contribute to knowledge in the field and/or to influence practice or policy. There are a lot of academic journals – for example, as of July 2011, 5560 journals were indexed in Medline alone (2).

To identify a list of potentially relevant journals search for keywords in the journal field of PubMed (www.ncbi.nlm.nih.gov/pubmed) and also see where key papers in your field have been published. When you have a rough list, try to find out whether your work is likely to be of interest to the journal. Most journals have information about their scope on their website. It is very informative to look at what types of research the journal has previously published; for example, if you have conducted a qualitative study, has the journal ever published qualitative research? For your target journals consider the issues raised in Table 1 below.

## Style and Content

When you have selected your target journal, it is important to follow the journal guidelines (and template, if provided) regarding the formatting, style, word count, and type of information provided (this guidance should be on the journal's website). Submitting an article which does not conform to a journal's guidelines may get it rejected immediately even if the content is very interesting. It is also good practice to follow international standard reporting guidelines for the type of research you are reporting, even if the journal does not explicitly request this.

Remember that when your article has been published, it will take on a life of its own. Other people will read, appraise, and learn from it; they apply the findings in their practice, to inform guidelines, or to include in a systematic review. It is important therefore that your standard of reporting is appropriate for these purposes, so your article can have the best opportunity to make a difference to healthcare. The EQUATOR Network is an international initiative, which promotes better reporting standards for health research. The EQUATOR Network website (http://www.equator-network.org/) has a library hosting guidelines and checklists for a range of research methods (including systematic reviews, experimental designs, observational studies, quality improvement studies, qualitative, and mixed methods studies).

When trying to get published, do not lose your integrity as a researcher! For example, it may be tempting to elaborate on a statistically significant finding discovered in a post-hoc exploration of your data, whilst forgetting that your original primary outcome was non-significant (3). Good research begins with a protocol (you should aim to publish this too) that sets out, before research begins, how the study will proceed. This should primarily describe the rationale, aim(s) and methods of the study, including information about study design, how participants will be recruited, data collection procedures, the outcomes you intend to measure and the approach to data analysis. The World Health Organization offer guidance on writing research protocols at http://www.who.int/rpc/research_ethics/format_rp/en/index.html. When reporting your research keep to your protocol as much as possible.

Remember, it is just as important to know that something may not work, than to know what might work. Users of that information may make decisions to disinvest in something, which may save money and avoid unnecessary treatment of patients. So called 'outcome reporting bias' (where non-significant findings tend to go under-reported) can cause big problems for decision-makers and the consumers of healthcare. As a conscientious researcher, you will not want to contribute to this issue, so you should report the primary and secondary outcomes as originally intended.

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**Table 1. Considerations when choosing a journal to which to submit your research article**

| Question | Important if… | Advantages | Disadvantages |
|---|---|---|---|
| Is the journal peer-reviewed?<br>Academic journals are usually peer-reviewed by "experts in the field". Their role is to advise editors on the merits of the article and whether to accept it for publication or not. | • You want to contribute to knowledge in the field and academics are your target audience. | • Peer review comments can provide "constructive" feedback, to inform and improve your article. | • In some cases (but not all), peer review can take some time.<br>• It is worth checking the journal's website to find out how long the peer review process is likely to take. |
| Does the journal have an impact factor?<br>The impact factor of a journal (or IF) is the average number of citations received per paper published in that journal during the two preceding years.<br>Check out the impact factor of your target journal by going to the ISI Web of Knowledge which indexes more than 11,000 Science and social science journals. Impact factors vary widely with journals such as New England Journal of Medicine and Lancet holding the highest. | • You want to establish an academic or research career. | • Publishing in a journal with a high impact factor conveys a message about what calibre researcher you are<br>• The IF will help you to evaluate a journal's relative importance, especially when you compare it to others in the same field in a given year. | • Criticisms have been made of the use of the impact factor, mainly relating to its validity<br>• It's a highly competitive process.<br>• More likely to accept novel, well-conducted studies that have obvious implications for theory and/or practice.<br>• Can be a time consuming route with no guarantee – even high quality research is not always accepted by such journals. |
| Is the journal subscription only, open-access or a mixture of both?<br>Some journals can only be accessed by fee paying subscribers. Others are available by "open access" because the author typically pays a fee to publish. Other journals may have alternative funding which allows readers to access articles for free without authors paying a fee to publish. | • If you want to reach academic readers, many will have access (via their institution) to subscription-only journals.<br>• If you want to reach a large number of health professionals go for open-access journals. | • Subscription-only journals allow you to publish your work at no cost.<br>• Open access journals allow any reader to read your work. | • If you want to reach a professional audience, they may not have access to subscription only journals.<br>• Cost may prohibit publishing in some (but not all) open access journals. It is sensible to find out how much a journal charges before choosing to submit a paper to them. |

## Contribution of authors

Many journals have clear guidelines on who can be an author for a research article, typically specifying that to be considered an author an individual must have:

- made a significant contribution to either the conception/design of the research, data collection and/or analysis
- been involved in writing or making critical comment on drafts of the article and
- given final approval of the submitted manuscript.

Only (and all) those individuals who meet these criteria should be listed as authors. Individuals who have made minor contributions (e.g. someone who has assisted with data collection) would not typically be considered an author and should be identified in the acknowledgements section. Some journals ask for the specific contribution of each author to be made explicit upon submission of the manuscript. You should check a journal's 'Instructions for authors' for their guidelines. If a journal does not have its own guidelines, the International Committee of Medical Journal Editors (ICMJE) offer clear guidance on authorship and contributorship (http://www.icmje.org/ethical_1author.html).

## Declarations of funding and conflicts of interest

Personal or financial interests of authors may inappropriately influence the actions of authors, even though they may not be aware that it has. Such influence may be small or large. Any and all conflicts of interest should be declared to the journal to which you are submitting, as should all sources of funding for the research. This is commonly presented as a section in the manuscript, and most journals require a signed conflict of interest declaration from all authors prior to publication. If authors do have conflicts of interest, this is not necessarily problematic. However, a

clear declaration helps the editor, and the readers of your paper, to make an informed judgment about the potential influence your own interests may have had on the outcome of the research. Further guidance on potential conflicts of interest can be found at the ICMJE's website (http://www.icmje.org/ethical_4conflicts.html) .

## What can I expect from the peer review process?

The peer review process is important for journals to be assured of the quality and relevance of the material they publish. Each submission is sent out to several reviewers who are chosen according to their expertise in the field, and their own record of publications. Some journals ask you to recommend people outside your research team who could provide a review. Each journal provides peer reviewers with a format for the review and some guidelines as to what the reviewers should focus on. Below are examples of common areas that reviewers are asked to look at. You should have considered these before submitting your article, as this makes the peer review process smoother and reduces delays in the path to publication.

- Is the research question clearly defined? The research question and the purpose of the research have to be clear to the reader, and the question should be reflected throughout the article – i.e. the results and conclusions should relate directly to the question outlined in the introduction.

- Are the chosen methods appropriate and well described? The study design used to answer the research question should be appropriate and also clearly stated in the text. The described methods should be an accurate representation of the study design. Ideally, another researcher should be able to replicate the research from reading the methodology of the paper.

- Are the data presented in the results clear and appropriate? Relevant data and analyses should be clearly displayed in tables and figures. An explanation for the presence of any potential biases and/or missing data (including how they were addressed) should be given. Some study designs have recommended reporting guidelines, e.g. the CONSORT statement for clinical trials. Where they do, reviewers will check if the guidelines have been followed. To ensure that the analyses you conduct are sound and appropriate consult a statistician at an early stage, preferably when you are writing your protocol. Mention this in your paper as it will reassure the peer reviewer of the robustness of your analyses.

- Are the discussion and conclusions well balanced and adequately supported by the data? The reviewers will ascertain whether the discussion of the data and the resulting conclusions are justified, and whether limitations of the work have been clearly stated, and the implications of limitations been taken into account.

- Is the work clearly placed within the current knowledge base and ongoing research initiatives? As peer reviewers are experts in the field, they will identify whether the authors are aware of currently available literature and will expect to see acknowledgement of the key topics within the subject area and the necessary links made to put the submission into the wider context.

- Does the work make an original contribution to knowledge? Peer reviewers will want to be assured that your research makes an original contribution to knowledge in the field, so you need to be explicit about the contribution your work makes. Peer reviewers will not expect you to have made giant leaps in knowledge, such as a cure for cancer, in one small research study. So be realistic; knowledge is gained incrementally; a small, but important, contribution is sufficient. Be aware that leading journals in the field may publish only the most novel research studies.

- Do the title and abstract accurately convey the main points of the article? Reviewers will check whether the title and abstract truly reflect the purpose, method, main results and conclusions of the article, and whether any significant information is missing.

- Is the writing acceptable? Reviewers are not expected to 'proof read' your article, but they may recommend major editing before publication if there are many grammatical and spelling errors, and if areas of text are unclear.

Reviewers will make suggestions for revisions which are either discretionary (i.e. the author can choose to ignore them), minor essential revisions (e.g. missing labels on figures or the wrong use of a term) or major compulsory revisions, to which the author must respond before a decision on publication can be reached. Peer reviewers will also examine the plausibility of the results primarily to identify any likely issues with the data analysis but also to be assured of the veracity of the data (although a rare occurrence, some researchers have been found to have deliberately falsified their data).

Finally, the reviewers will recommend to the journal whether the article should be accepted or rejected, with the decision based upon the level and type of revisions to be made and the scientific soundness of the article. They may also be asked to comment on the relevance and importance of the article to the journal and within the field. The journal editor will then make a decision based on the recommendations of the reviewers, and provide you with the peer reviews to assist you in producing a further version of the article if necessary.

## Other ways of getting published

The traditional methods of publishing research in academic journals can take a long time. If you want to disseminate your work immediately or solicit peer review/ comment before submission for publication then the World Wide Web may provide an answer.

A blog (or web log) is an interactive website which is maintained by an individual or group with regular entries. Visitors to the site can leave comments about the text, images or links contained within the blog. It may provide a very fast way of receiving peer review or comment on ideas or research. The collective community of all blogs, the blogosphere, can be searched by topic and there are several Search Engines available such as Bloglines (www.bloglines.com), Blogscope (www.blogscope.net ) and Technorati (www.technorati.com). Google Blogs (www.google.com/blogsearch ) is readily available and free of charge. For example a simple search of "South Sudan Medical Journal" in the Google search engine yields several relevant blogs, for example, one relating to maternity service provision. Other suitable search phrases may be "health and social care South Sudan".

An extension of the blog is the "microblogging" service twitter (www.twitter.com ) which enables authors to rapidly send and receive thoughts/ideas using just 140 characters. This could be a useful tool for communicating, say, within a research group. An example of a relevant search on the twitter website using "health care South Sudan" yielded a comment from Keith Martin on maternity services with useful links to further information. Researchers can use both blogs and twitter to formulate and develop ideas and to quickly disseminate information.

A note of caution to potential bloggers – do remember to take responsibility for the comments within the blog and also the comments from visitors to the site. There is a legal liability regarding defamation of character and liability.

## Final pearls of wisdom

- If you are early in the process of planning your own research study, do the study with the paper you want to write in mind
- Do ask colleagues to help you write the article – you can halve the pain and hard work involved. This short article involved some six members of academic staff, snatching time to work together, discussing and reviewing each section. It was great fun and reduced individual effort!
- Finally, practice, practice, and practice the craft of writing.

So remember with careful preparation, lots of hard work and determination, anybody can publish! Good luck.

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More resources to improve our writing skills? AuthorAID at www.authoraid.info is global online network that provides support, mentoring and training for researchers in developing countries. It has an excellent library of resources (e.g. writing CVs, scientific papers, etc).

# Implementing a routine health management information system in South Sudan

**Richard Laku[a], Carmen Maroto Camino[b], Norah Stoops[c] and Mohammed Ali[d]**


## Abstract

South Sudan has recently acquired statehood. Planning and management of the health care system, based on evidence, requires a constant flow of information from health services. The Division of Monitoring and Evaluation (M&E) of the Ministry of Health developed the framework for the health sector of the country in 2008. At that time data were collected through surveys and assessments.

Two health system assessments conducted in 2007 (1) and 2009 (2) highlighted the absence of a working routine Health Management Information System (HMIS). An M&E Scoping Mission conducted in March 2010 (3) noted the lack of tools and procedures for data collection, the inconsistent data flow and the limited capacity for analysis and use of data for action at all levels of the system. A plan to develop the system based on the '3-ones' strategy (one database, one monitoring system, one leadership) was put in place under the leadership of the Ministry of Health (MOH). The MOH has since developed, tested and refined the tools and procedures for the routine HMIS, produced a comprehensive roll out plan and started the integration of health programmes into the system.

The design of the routine HMIS tools was followed by their pre-test in Jonglei and Upper Nile States. In these two states, the combination of appropriate tools, training and support resulted in health facilities, counties and states officers able to provide consistent and quality routine reports. While this happened in the two states, at central level tools were refined and explained to MOH programmes staff and partners staff; consensus was built on the need for collecting only the relevant data for action and the database for the South Sudan information system was developed in the District Health Information Software (DHIS). This joint approach provided the needed impulse for the health agencies to adhere to the MOH system. From February 2011, a flurry of activities happened to support M&E in states and counties including provision of equipment, printing and distribution of registers and manuals and training in HMIS and DHIS of MOH officers, partners and programmes staff.

This approach has started to pay off and the routine information system is progressing. This paper presents the path followed, challenges met, advances made, and the way forward in establishing an integrated routine HMIS in South Sudan.


## Background

South Sudan is a country coming out of more than two decades of civil war and has a history of marginalisation and under-development. Since Sudan's independence little happened to develop the health care system or services in the South. During the conflict years health care was provided by Non-Governmental Organisations (NGOs) and Faith Based Organisations with access estimated at 20-25%. The health status of inhabitants was one of the worst in Africa. For the major part of the war, the health information system was non-existent and reduced to surveys conducted by humanitarian organizations and development partners usually for their own purposes.

The signing of the Comprehensive Peace Agreement in 2005, which led to a referendum in 2010 and the creation of a new country in 2011, represented the start of South Sudan developing a health service again and building this from almost nothing. However, the development of a Health Management Information System (HMIS) could not happen overnight. With the MOH in its infancy there was not a coordinated approach to collect and report information from health services. Stakeholders 'did their own thing', created their own tools and procedures to collect, transmit and analyze data from health services to their head offices or donors.

The newly formed MOH set about developing the health care system in line with the health policy of the Government of South Sudan, 2006-2011. Accordingly, the health care system was to be based on evidence and monitored by regular information from health services so as to guide planning and management. In line with these principles, the MOH started the long process of developing an efficient and relevant HMIS, to provide information to each management level – health facilities, counties, states and central MOH. The M&E framework was published in 2008 (4), but still most of the data were generated from surveys starting with the Household Survey (5) and also periodic data from health facilities, NGOs, international agencies and donors or through the

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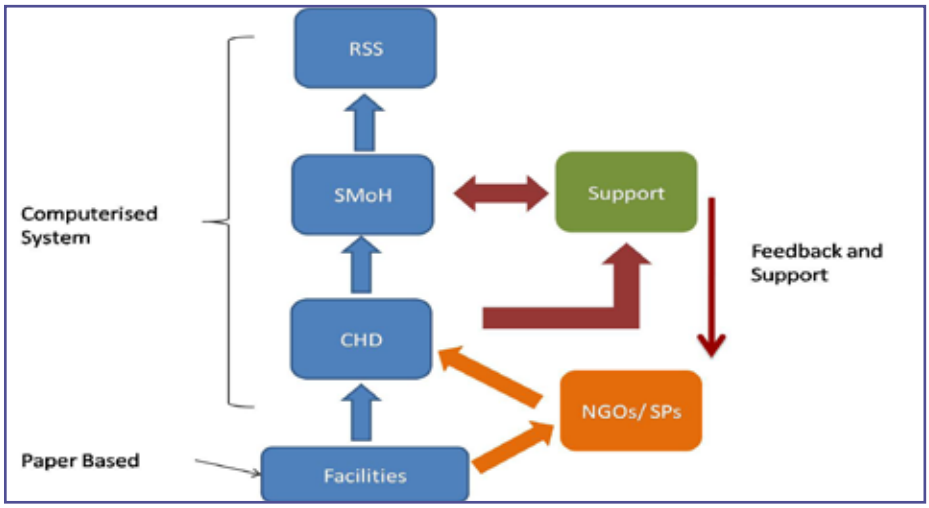


*Figure 1. Data flow of the routine HMIS*

MOH, using the Federal Ministry of Health (Khartoum government) procedures and indicators.

In March 2010 (6) a rapid assessment took place to assess the status of the routine HMIS – the conclusions were sobering: there was not a system in place – data collection was piecemeal and in various formats; the list of indicators for collection was not defined or not relevant; reports (when available) were often incomplete and, when completed, were not understood by the health staff. Perhaps more importantly, there was a lack of understanding by health workers of the basic concepts of data collection, analysis and feedback. To compound matters NGOs and donors collected their indicators more to serve their own individual purposes of reporting to donors than to reinforce the management based on evidence principle. As providers of services, and while the government was strengthening its management capabilities of the health care system, the NGO community established their information systems based on their own information needs.

## Process

As a result of the evidence of the rapid assessment the consensus was that to establish a working routine HMIS two principles were essential: simplicity and relevance. The first, simplicity, required development of uncomplicated tools to be understood and used by health staff and managers at all levels. The second principle, relevance, required understanding and responding to the information needs of health care services staff, counties and states officers, programmes, health partners, donors and the MOH.

The first step was to define what information should be collected by the routine and the non routine systems, particularly the routine system, taking into account limitations for data collection in health services and low capacity for analysis and interpretation at higher levels. Based on the M&E framework of the health sector and the capacity of health facilities staff to calculate and use the data elements, a list of indicators was defined and a simple data flow put forward. The data flow (Figure 1) follows the management lines of the health care system:

- Health facilities collect numerical indicators on paper for the County Health Department
- Counties enter data into the DHIS, calculate coverage indicators and send reports to the SMOH
- SMOH aggregate counties results and send State indicators to the central level.

NGOs operating at county level report to Counties; if operating at State level they send reports to the SMOH M&E Department. Feedback follows an inverse path: from MOH to SMOH, County Health Departments and health facilities.

The implementation milestones were:

- The priority list of indicators, a sample one page monthly report and the quantified supervisory checklist with guidelines were developed, discussed, pretested and refined.
- Registers for all health facilities (Antenatal Care, Delivery, Outpatient Department for Adults and Children, and Expanded Programme of Immunization) were fine-tuned, so that registers contained all the information needed for the routine monthly report. Requirements for each category of health services were calculated based on activity recorded by the health mapping of 2009-2011 (7). MOH and health partners then started printing and distributing the registers.
- Training in HMIS and DHIS started at central, state and county levels, with very fast achievement of computer literacy and knowledge by MOH, state and county officers (Figure 2).
- Programmes' staff and information were progressively integrated into the system: Malaria and Tuberculosis were the first, followed by the Expanded Programme of Immunization,

Integrated Disease Surveillance and Response, and HIV.

Six months after the start of activities, the MOH organized a review meeting (8). State and counties representatives, NGOs, UN Agencies and donors contributed their experience and helped finalise tools and discuss strategies. The main achievement was an agreed reformed list of indicators with programme data elements and the first integrated routine monthly report for all health facilities. The report had two sections. Part 1 included all routine service indicators to measure performance of high impact services; Part 2 incorporated information on communicable diseases relevant for the Integrated Disease Surveillance and Response division, on drugs for the pharmaceuticals directorate and of vaccinations and vaccines for the Expanded Programme of Immunization.

*Figure 2. County Health Officers practice their skills in HMIS and DHID during training conducted in Bor, Jonglei State in 2010, organized by IMA and the State Ministry of Health.*

Major organizational challenges were discussed to look for solutions:

- How to improve data flow and ensure that counties and states were not bypassed.
- How to integrate *all* reports (programmes, NGOs, donors) into the MOH system to reduce duplication and workload to health facilities and counties' staff and still get all information needed for action.
- How to improve the deficit of equipment and tools in rural areas and capacity of and support for the M &E officers in states and counties.

Box 1. *"Some programmes have funds, human resources and tools but they say their mission is to collect their own report ... They do not inform us or help us and we don't have the same means they have. They bypass us but we are responsible for the M&E in each state. Now that we understand the tools they may have to consider us as part of the team"* (comment shared by M&E officers during September 2011 meeting).

## Adopted Solutions

1. Participants agreed that to maintain the flow of information without bypassing the lower management levels of the public health system (Figure 1), state and county officers had to be perceived as leaders and decision makers in HMIS/DHIS. To achieve this proficiency, an intensive training programme was prepared and implemented: MOH, state and county officers were trained by experts in HMIS and DHIS while other health partners trained programmes, health facilities and NGOs staff[a] . HMIS and DHIS manuals were finalized and shared (9). Preliminary training materials have been developed and a basic training curriculum agreed with the SMOH officers. Feedback and performance reports have been defined. The result is best expressed by the comments of one of the SMOH M&E Directors quoted in Box 1.

2. M&E activities have incorporated programmes staff and SMOH M&E Directors reinforce links between them and progress towards the establishment of a national M&E Team (Figure 3); in September 2011 training addressed to M&E officers included participation of staff from programmes and contributed to sharing of knowledge and experiences.

3. The MOH and partners have purchased and distributed equipment to reach all counties. IT equipment has been sent and installed to state capitals and most are

a Liverpool Associates for Tropical Health (LATH)- Health Information Systems Programme (HISP) and Inter-Church Medical Assistance (IMA) World Health trained MOH and SMOH officers, South Sudan AIDs commission and programmes staff; IMA World Health focused on Upper Nile and Jonglei states staff; WHO supported training of the Epidemiological Surveillance Officers; Basic Services Fund (BSF) of NGO staff and counties where they operate; Norwegian People's Aid (NPA) is assisting Central and Eastern Equatoria; Warrap State has trained county staff with support from UNICEF and WHO.

*Figure 3. John Mading, Director of M&E of Lakes States installs DHIS in his laptop with the support of the M&E Directors of Warrap, Western Bahr El Ghazal, Unity and Upper Nile states, September 2011.*

operative, although the budget for recurrent expenses in M&E still needs to be addressed, to ensure autonomy of the M&E Department in each state.

## Conclusion

The implementing of a routine HMIS from scratch is challenging but possible. The system requires tools and procedures but also an enthusiastic, motivated and proficient team who understands the value of data for planners and managers. South Sudan has professionals in the public health care system who are working to make the routine HMIS a reality and to implement the mandate of the Government of a system based on evidence. While there are still challenges ahead there is also measurable progress. This is a joint effort between stakeholders in which negotiation and pragmatism are key concepts.

## What's next?

1. Complete the printing and distribution of registers so that all health facilities have data collection tools.
2. Provide a small allocation of funds to M&E departments in states and counties for printing essentials (toner and paper), fuel for the generator and/or visits to the counties to collect reports.
3. Continue delivering training to SMOH officers so they can in turn start training their fellow colleagues in states and counties.
4. Proceed with integration of programmes into the system and with the integration of staff into the South Sudan M&E Team.
5. Support the central HMIS Unit in Juba to undertake a country wide monitoring function.
6. Ensure that the information collected is used to improve service provision and the health of the people of South Sudan.

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**Nodding syndrome in Uganada** According to recent reports (1,2) Nodding Syndrome (see SSMJ 4/1) has hit Kitgum, Pader and Gulu districts in northern Uganda. More than 1000 cases were diagnosed between August and mid-December. It has now reached Yumbe, which borders South Sudan – where cases have also been reported.


1.Mysterious nodding syndrome spreading through Uganda. New Scientist Health 23 December 2011.

2. Daily Monitor. Kampala. 20 January 2011.

# Stuck objects on fingers: pattern seen in a Nigerian teaching hospital and technique for removal

**Agaba-Idu Musa**[a]

## Introduction

An ordinary ring can get stuck on a finger if it has been worn for a long time. This is most often due to swelling of the finger. Different techniques have been described for removal of such rings but when the finger is grossly swollen and the ring is very thick or a band, these methods are not successful (1, 2).

From January 1994 to January 2011, 33 patients who had stuck objects on their fingers were treated at the Accident and Emergency Department, Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria (Figure 1). Some of the objects were rings. The rest were nuts, washers (width between 0.8 and 1cm; thickness between 0.5 and 0.7cm) and plastic bands. The patients were healthy children and mentally ill adults. In women the preferred finger on which these objects were worn was the left ring finger. In children and men there was no preferred finger. The youngest and oldest patients were 5 and 64 years respectively. Most were women. Mean age of the patients was 34.2 (+.5) years. The male to female ratio was 1:5. There was no gangrene of any of the fingers at presentation.

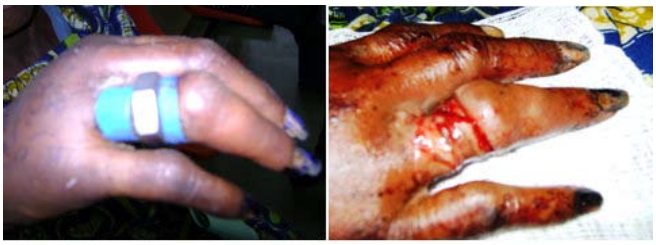

*Figure 1. Object stuck on adult's finger.*

## The technique for removal

Usual ring cutters cannot cut these objects. The preferred instruments are technician's instruments that are easily available – see Figure 2. The screw driver without a handle is inserted between the ring and the finger. This prevents further injury to the finger during cutting of the object with the junior hack saw. The object is cut at two spots along its circumference. After cutting the first spot

*Figure 2. Technician's instruments for removing objects stuck on fingers (from left to right: screw driver without a handle, wire stripers, wire cutters and a junior hack saw).*

on the ring, the wire cutters are used to widen the gap created on the ring. This widens the circumference of the ring. Further cutting of the ring at another spot removes an arc. The space created is usually wide enough for the ring to slip off. Wide bands are easily cut with a pair of wire strippers.

## Result

Only manual instruments are safe for the removal of these objects because powered drills generate a lot of heat and can burn the finger and further compromise the circulation. Ischaemia of the fingers resolved after healing of the pressure sores (Figure 1) on the proximal phalanges. The microorganism isolated from the pressure sores was *Staphylococcus aureus* and most sensitive to ciprofloxacin. There was deficiency in movement in all the joints of the finger after healing of the pressure sores and flexion was initially painful. This resolved with time.

## Conclusion

These types of patients have a poor sense of judgment and those who take care of them should always be attentive to what is worn on their fingers. Cheap expansible rings can be given to them. Children can be trained to avoid wearing tight objects over their fingers. None of the patients ever had an object stuck again on the finger.

*References*

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2. Harvard Medical School Family Health Guide. http://www.health.harvard.edu/fhg/firstaid/ring.shtml (browsed 18/11/2011).

*Photographs are the property of the author.*

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# CASE STUDY – LEFT PARIETAL PARAFALCINE MENINGIOMA

**Clinical History**

Sudden onset of right sided weakness, facial droop, previous medical history of multiple TIAs and hypertension.

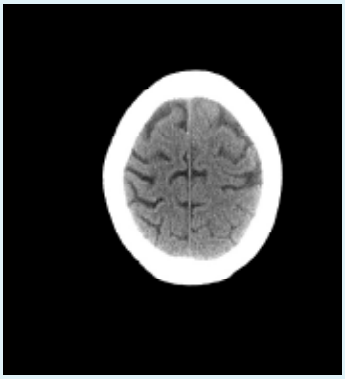


**Figure 1.**

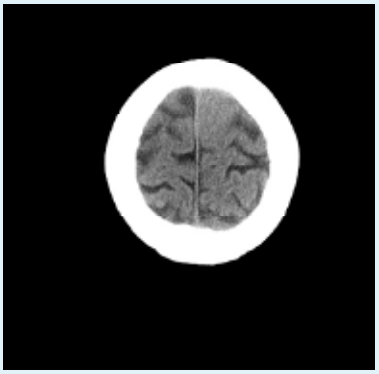


**Figure 2.**

**Pictures 1 and 2:** Non-enhanced CT of the brain. These images have been acquired at patient admission featuring a poorly defined isodense extra-axial left parietal mass lesion barely distinguishable from the adjacent normal cerebral cortex.

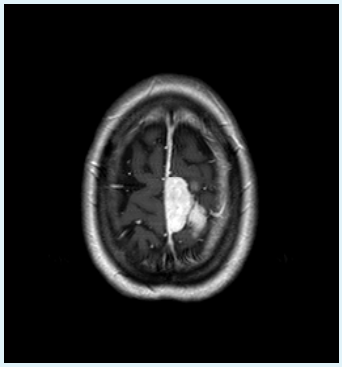


**Figure 3.**

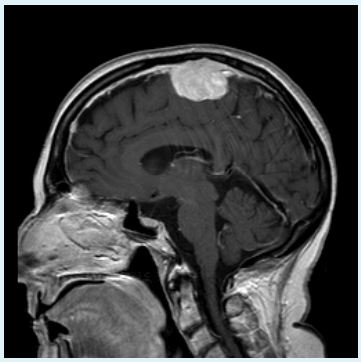


**Figure 4.**

**Pictures 3 and 4:** Axial and sagittal T1W MRI images post iv contrast application. The lesion features a vivid homogenous contrast uptake with broad based dural contact and perifocal thickening of the adjacent dura resembling a "dural tail" sign consistent with a meningioma.

**Radiological Report**

The non enhanced CT of the brain has been acquired at patient admission (Pictures 1 and 2). There is no evidence of an intracranial haemorrhage or haematoma. There is also no evidence of recent demarcated ischaemic changes, midline shift or signs of raised intracranial pressure. However, an isodense extra-axial left parafalcine soft tissue mass is identified causing a subtle perifocal mass effect resulting in perifocal sulcal effacement.

A subsequent pre and post iv contrast MRI of the brain confirms the initial CT findings. The suspicious lesion displays a homogenous hypointense signal appearance in T1W images featuring a thin capsule. The T2W images display a hyperintense signal pattern of the lesion concerned. Post contrast T1W images (Pictures 3 and 4) demonstrate a densely enhanced lesion with broad based dural attachment and an enhanced meningeal tail as well moderate compression of the adjacent slightly displaced parietal parasagittal gyri. No perifocal oedema is identified. No malignant growth pattern or bony destruction is noted.

CT and MRI findings are consistent with a benign parietal parafalcine meningioma.

*Contributed by Dr med. Stephan Voigt, Consultant Radiologist, St. Mary's Hospital, Isle of Wight, UK.* stephan.voigt@iow.nhs.uk

# Resources

These are listed under:

- General information
- Non-communicable diseases

## General information

**Information and Evidence of Effectiveness for Public Health in Low and Middle-Income Countries:**

This site gives an excellent summary and very many useful websites on key health issues and conditions that are common in resource poor settings and which are related to the Millennium Development Goals. They have been compiled by Wessex Deanery and are freely available at:

http://www.wessexdeanery.nhs.uk/public_health/international_public_health/sources_of_help__effectivenes.aspx.

From John Acres, Training Programme Director (Public Health) Hants & IoW, UK. via HIFA2015.

**Infographics on malaria, child health etc.**

The Bill & Melinda Gates Foundation also offers an excellent set of Infographics on their web site

http://www.gatesfoundation.org/infographics/Pages/infographics.aspx. Topics covered include: Malaria; Maternal, Newborn, & Child Health; Simple Tools to Save the Lives of Mothers and Kids; Nutrition; Polio; Vaccines; Family Planning.

Supplied by The Mother and Child Health and Education Trust. www.motherchildtrust.org. From CHILD2015 weekly digest 10/24/11

**Global Health Portal**

The Lancet has launched a Global Health Portal at http://www.thelancet.com/global-health, which offers free access to all global health content in one location including Series, Regional Reports, multimedia content, and their World Report and Perspectives sections. World Reports and Perspectives articles are ideal for anyone who wants a personal view on a subject, and The Lancet Global Health Series, and Regional Reports and Commissions provide in-depth views for anyone seeking disease-specific or regional information. Recent Global Health Series include Obesity, New Decade of Vaccines, and Chronic Diseases and Development.

[From HIFA2015 28Aug2011 www.hifa2015.org ]

**Special Programme for Research and Training in Tropical Diseases (TDR)**

TDR is a WHO-based global programme of scientific collaboration that helps coordinate, support and influence global efforts to combat a portfolio of major diseases of the poor and disadvantaged. On the website are many downloadable and free publications and images. See http://www.who.int/tdr

## Non-communicable diseases

**Non - communicable diseases (NCD): Training documents**

The following websites provide a set of useful materials for training on NCD. They have been prepared or compiled by Dr Richard Smith for use in low- and middle-income countries.

1. A very good PowerPoint presentation at http://bit.ly/x0eEgc.

2. The WHO Global Status Report on NCDs produced for the UN High-level meeting at http://bit.ly/gMgU1z. This contains a huge amount of information and is easy to use.

3. The Secretary General's report from for the UN High-level Meeting at http://bit.ly/x0eEgc . Also very well presented.

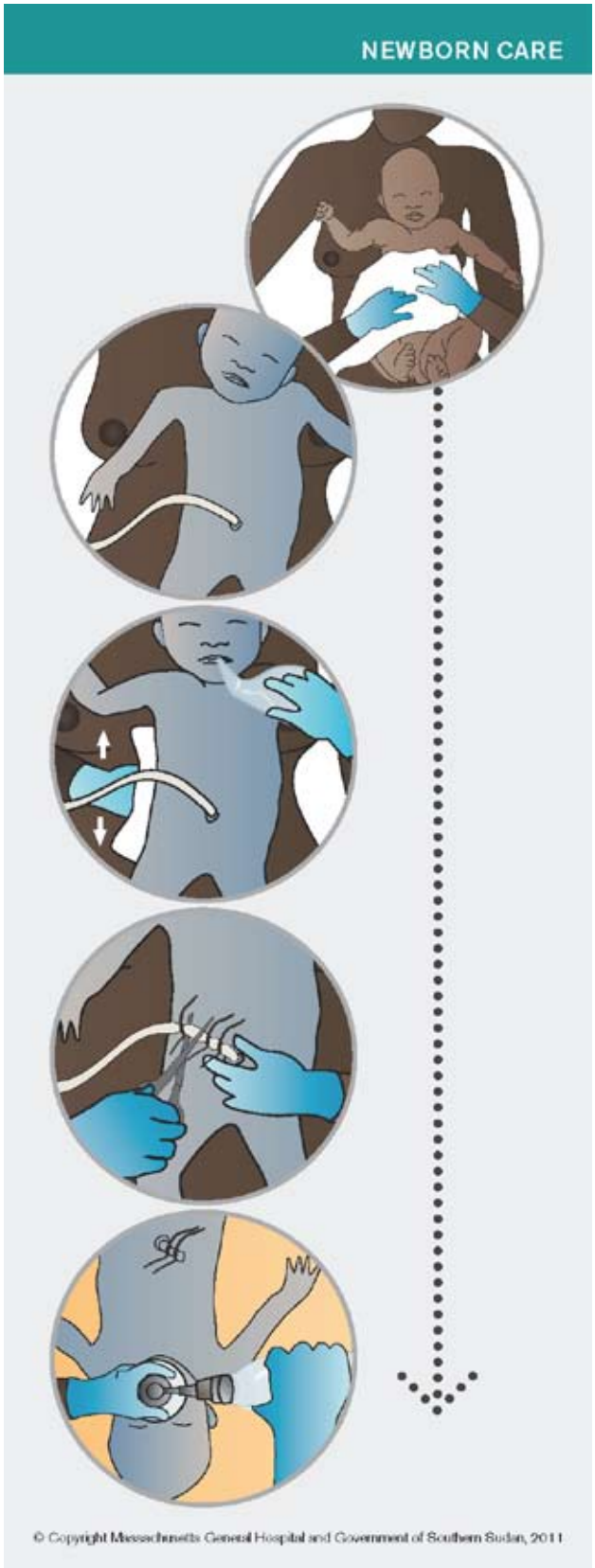
SSMJ thanks Richard Smith and ProCor for permission to publish and David Tibbutt for reviewing the documents. [Seen at ProCor http://www.procor.org which is a global community promoting cardiovascular health and information sharing. Join the group by emailing subscribe-procor@list.procor.org].

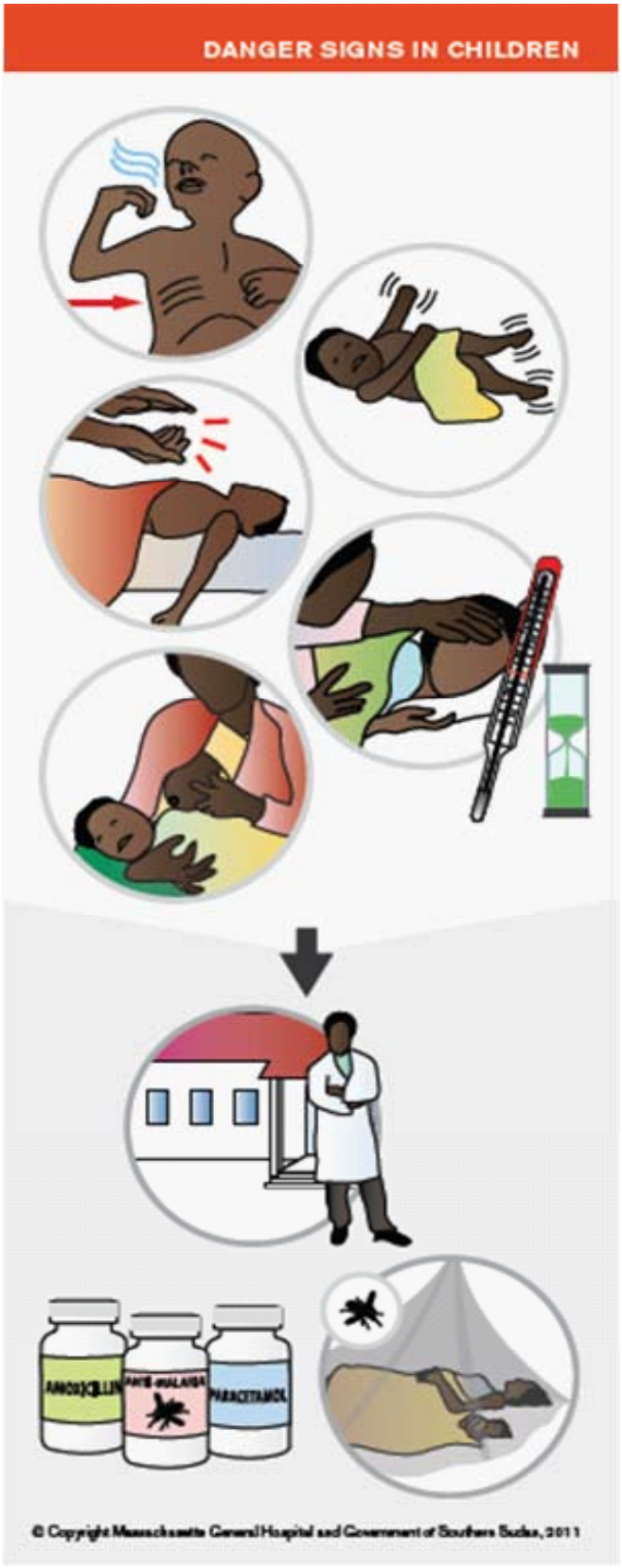
**East Africa: Deaths result from insufficient fruit and vegetable intake**

Around 27% of all deaths in the East Africa region can be attributed to low fruit and vegetable intake, according to a recent WHO and FAO report. Although the report recommends 146 kg per capita consumption of fruits and vegetables, countries in the region fail to meet the standard. Kenya's consumption of fruits and vegetables is 115 kg per capita, Uganda is 65 kg per capita, and Tanzania is 60 kg per capita - just 41% of the recommended minimum. Experts believe the insufficient intake of fruits and vegetables is not only a case of affordability or accessibility, but also of perception and behaviour change. Do you think the situation is the same in South Sudan?

See the report at http://bit.ly/sd9cdg [from procor 2Nov11]

**Examples of checklists for community-based frontline health workers in South Sudan.** Here are two of nine checklists from the Maternal, Newborn, and Child Survival (MNCS) Initiative, which were developed and is being implemented countrywide by Massachusetts General Hospital and the Ministry of Health. These two checklists illustrate the basic steps community-based providers can use to address newborn resuscitation (e.g. warming and drying, assessment of breathing, clearing airway and stimulation, tying and cutting cord, and bag-mask ventilation) and to recognize danger signs in children (tachypnea, seizure, lethargy, fever, and poor appetite). For more information, please contact: Dr Thomas Burke, tfburke@partners.org.




Every effort has been made to ensure that the information and the drug names and doses quoted in this Journal are correct. However readers are advised to check information and doses before making prescriptions. Unless otherwise stated the doses quoted are for adults.