

## GUINEA WORM DISEASE

### Towards eradication in South Sudan

- **Chronic suppurative otitis media**
- **Missed opportunities for immunization**
- **Ultrasound and congenital malformations**
- **Foetal macrosomia**

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**Front cover photo:** A health worker extracts a Guinea worm from a person's foot at a clinic in Eastern Equatoria State, South Sudan (Credit: The Carter Center)

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# Guinea worm disease: the final push to eradication

On Tuesday March 21, 2018, the Minister of Health of South Sudan, Dr Riek Gai Kok, announced at the Carter Center in Atlanta, Georgia, USA that South Sudan has interrupted the transmission of Guinea worm disease in the world's youngest nation – it has gone for 15 consecutive months with zero reporting. Despite the ongoing conflict, this is great news for the global efforts towards the eradication of this debilitating disease <sup>[1]</sup>.

According to the WHO, as of 31 December 2015, “196 countries, territories, and areas have been certified free of Guinea worm transmission. Nine countries remain to be certified, of which two countries (Angola and the Democratic Republic of the Congo) have no recent history of the disease. The six other countries are either endemic (Chad, Ethiopia, Mali and South Sudan) or in the precertification phase (Kenya and Sudan)” <sup>[2]</sup>.

Guinea worm disease is caused by the parasitic worm *Dracunculus medinensis* or “Guinea worm”. This worm is the largest of the tissue parasites affecting humans <sup>[2]</sup>.

In 2006, South Sudan instituted the Guinea worm surveillance system to <sup>[3]</sup>:

- Estimate the magnitude of Guinea worm disease in the population at risk, and
- Detect, monitor and contain the cases.

The establishment of this community-based surveillance system became the core of the control efforts for Guinea worm eradication in South Sudan, in partnership with the WHO and the Carter Center <sup>[3]</sup>.

As of December 2017, a total of 30 human cases were reported globally. The 30 cases were reported from 20 villages: 15 cases from 14 villages in Chad and 15 cases from 6 villages in Ethiopia. 817 dogs infected with *Dracunculus medinensis* from Chad as well as 4 infections in baboons and 11 infections in dogs from Ethiopia were reported for the same period <sup>[2]</sup>.

The world is getting closer to eradicating Guinea worm disease, which will join the only other disease to be eradicated in the world – smallpox.

Although South Sudan cannot sleep on its laurels for now as it enters the pre-certification phase, the news that it has interrupted the transmission is one that must be applauded. Thanks to the relentless work of the hundreds of health workers on the ground, and the support of the global community.

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THE WORLD IS GETTING  
CLOSER TO ERADICATING  
GUINEA WORM DISEASE



Filters for drinking water in Guinea worm areas (Source: Southern Sudan Guinea Worm Mid-year 2006 report. Mounir et al, 2006)

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# Chronic suppurative otitis media: bacteriology, susceptibility and clinical presentation among ENT patients at Mulago Hospital, Uganda

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**Background:** Chronic Suppurative Otitis Media (CSOM) is a major health concern in developing countries due to its association with hearing impairment, particularly among children as it may affect their communication skills. Serious complications like meningitis and brain abscess have been reported as a cause of death.

**Objective:** The study aimed to determine the bacteriology, susceptibility and clinical presentation of chronic suppurative otitis media among ENT patients at Mulago, Uganda.

**Methodology:** We performed a cross sectional study and enrolled 89 patients. Pus was collected from the middle ear for microbial laboratory examination. Our primary outcome was microbial isolates, sensitivity patterns and common clinical features.

**Results:** The commonest isolates identified were *Pseudomonas aeruginosa* (17.32%), *Klebsiella pneumoniae* (17.32%), *Proteus mirabilis* (13.39%), *Escherichia coli* (9.5%) and *Staphylococcus aureus* (9.5%). *Pseudomonas aeruginosa* was found to be 64.7% sensitive to ciprofloxacin, 57.1% to chloramphenicol, and 41.2% to gentamicin. More than 60% of patients had a hearing impairment; 78% had a central perforation.

**Conclusion:** Susceptibility patterns to antimicrobial agent greatly varied but most demonstrated sensitivity to ciprofloxacin followed by chloramphenicol and gentamicin.

**Key words:** chronic suppurative otitis media, bacterial isolates, susceptibility profiles

## INTRODUCTION

Chronic Suppurative Otitis Media (CSOM) is an inflammation of the middle ear that causes a perforated tympanic membrane (TM) with persistent discharge lasting more than three months [1]. The World Health Organization (WHO) in 2008 estimated 65-330 million individuals affected worldwide, with 60% experiencing significant hearing impairment [2]. In the developed world and emerging economies disease prevalence was estimated at as low as 1% for UK and Denmark, and 1-2% for Brazil. However, prevalence is high in developing countries such as Tanzania (6%) [1]. In Uganda, unpublished prevalence data of under-five year old patients with CSOM gave a figure of 13.2%, which is double the known global prevalence [3]. CSOM is commonly found among children of poor socio-economic status and patients with inadequate health care access [4].

Global patterns of CSOM show the commonly

encountered microbial isolates are *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Escherichia coli* and *Klebsiella pneumoniae* [5]. According to WHO microbial predominance and their antibiotic sensitivity patterns change over time which warrants periodic reviews [1]. It has been noted that different geographical regions yield different types of organisms [6].

Unpublished 2008 Ugandan data of HIV-positive children with CSOM, showed *Proteus mirabilis* and *Pseudomonas aeruginosa* to be the commonest isolates sensitive to ciprofloxacin at 78% [7]. It is not known whether the same is reflected among the general population across all age groups.

This study aimed to determine the bacteriology, susceptibility and clinical presentation of chronic suppurative otitis media among ENT patients at Mulago, Uganda.

**Table 1. Number and percent of common organisms isolated from the ear swabs by age groups**

Bacterial isolate	Age groups (years)				Total n (%)
	<5 n (%)	6-12 n (%)	13-18 n (%)	>18 n (%)	
<i>Klebsiella pneumonia</i>	6(27.3)	5(22.7)	2(9.1)	9(40.9)	22(17.3)
<i>Pseudomonas aeruginosa</i>	3(13.6)	2(9.1)	4(18.2)	13(59.1)	22(17.3)
<i>Proteus mirabilis</i>	3(17.6)	5(29.4)	4(23.5)	5(29.4)	17(13.4)
Actinobacter spp	3(21.4)	4(28.6)	1(7.1)	6(42.8)	14(11)
<i>Escherichia Coli</i>	3(25)	2(16.7)	1(8.3)	6(50)	12(9.4)
<i>Staphylococcus aureus</i>	3(25)	0(00)	3(25)	6(50)	12(9.4)
Citrobacter spp	3(30)	2(20)	0(00)	5(50)	10(7.8)
Morganella Spp	1(25)	2(50)	0(00)	1(25)	4(3.2)
Viridian Streptococcus spp	1(25)	1(25)	0(00)	2(50)	4(3.2)
Enterobacter spp	0(00)	0(00)	0(00)	3(100)	3(2.4)
Enterococcus spp	1(50)	1(50)	0(00)	0(00)	2(1.6)
Serratia spp	2(100)	0(00)	0(00)	0(00)	2(1.6)
<i>Haemophilus influenza</i>	1(100)	0(00)	0(00)	0(00)	1(0.8)
Providencia Spp	0(00)	0(00)	0(00)	1(100)	1(0.8)
<i>Moraxella catarrhalis</i>	0(00)	0(00)	1(100)	0(00)	1(0.8)
Total	30(23.6)	24(18.9)	16(12.6)	57(44.9)	127(100)

**Table 2. Gram stain and bacterial culture**

	Positive n (%)	Negative n (%)
<b>Gram stain</b>	89(94.6%)	5(5.4%)
<b>Culture</b>	88(93.6%)	6(6.4%)

## METHODOLOGY

A descriptive cross sectional study of 89 patients diagnosed with CSOM attending the outpatient clinic were consecutively enrolled. These patients had persistent/recurrent ear discharge of more than three months and a perforated tympanic membrane. Patients who declined consent and/or had a narrowed ear canal were excluded. Aural toilet using sterile cotton or suction was done and the tympanic membrane visualized using an otoscope and/or otomicroscope (12.5X). Samples from the discharging middle ear were collected with a sterile ear swab guarded by appropriate speculum size, put in armies media and transported for laboratory examination.

Data were entered into EPI-info version 3.2.2, coded and exported to SPSS version 16 for statistical analysis using a univariate, bivariate and multivariate methods.

Chi square was used to assess the effect of previous exposure to an antibiotic for CSOM and the type of organisms isolated.

## RESULTS

There were 47 patients aged under 18 years and 42 aged over 18 years; 52 were males and 37 were females. Five patients had bilateral CSOM; swabs were taken from each ear. The number and percent of common organisms isolated from the ear swabs by age groups are shown in Table 1. The number of bacterial isolates per swab were one (33%), two (47%) and three (20%).

Table 2 shows the distribution of bacteria by culture and gram stain. The findings of sensitivity tests of bacterial isolates to the common antimicrobials was done and shown in Table 3. Among the 89 patients with CSOM, 86 (91.5%) presented with offensive discharge and 59 (62.8%) with reduced/affected hearing. Other clinical presentations are shown in Table 4. The site of tympanic perforation in the patients with CSOM are 78% central, 16% sub-total and 6% total.

## DISCUSSION

In our study there were slightly more children than adults. This is similar to results of studies in Pakistan and Ethiopia<sup>[8, 9]</sup>. This could be attributed to frequent URTI and the short and more horizontal eustachian tube found in a child which means infections are more easily spread.

Medical seeking behaviour is usually commoner in females than males but in this study 58% were males and

Table 3. Sensitivity of bacterial isolates to antimicrobials

	Drugs tested showing percentage (%) of sensitivity									
	Chloramphenicol	Gentamicin	Co-trimoxazole	Ciprofloxacin	Amikacin	Ceftriaxone	Cefuroxime	Amoxicillin-clavulanic acid	Ampicillin	Piperacillin tozobactam
<i>Klebsiella pneumoniae</i>	50	60	21.4	57.1	69.2	74	77	5	10	80
<i>Pseudomonas aeruginosa</i>	57.1	41.2	0	64.7	81.3	-	-	-	-	63.2
<i>Proteus mirabilis</i>	46.7	92.9	33.3	88.2	90	77.8	71.4	50	33	100
Acintobacter spp	33.3	60	0	85.7	90.8		0	100	100	80
<i>Escherichia coli</i>	54.5	70	0	87.5	71.4	82	57	9	0	100
<i>Staphylococcus aureus</i>	83.3	83.3	0	75	-	-	-	-	-	-
Citrobacter spp	66.7	60	40	55.6	85.7	60	25	20	14.3	100
Morganella spp	33.3	50	0	66.7	50	75	100	0		100
Streptococcus viridians	50	-	-	0	-	50	-	-	100	-
Enterobacter spp	66.6	66.7	0	100	100	66.7	0	33.3	-	100
Serratia spp	50	100	50		100	0	50	0	0	-
Haemphilus influenza	0	-	-	50	-	-	0	0	0	-
<i>Providencia spp</i>	100	-	0	100	-	100	100	-	-	-
Moraxella spp	-	100	-	-	100	-	-	-	-	-

42% were females. However other studies showed a higher ratio of females to males<sup>[10,11]</sup>. This gender variation could be just an incidental finding.

The commonest isolates identified were *Pseudomonas aeruginosa* 22(17.32%), *Klebsiella pneumoniae* 22 (17.32%), *Proteus mirabilis* 17 (13.39%), *E.coli* 12 (9.5%), and *Staphylococcus aureus* 12(9.5%). These are similar to findings in Ethiopia<sup>[9]</sup> India<sup>[12]</sup>, Nigeria<sup>[13]</sup> and Singapore<sup>[14]</sup>. A 2008 study in Uganda on the bacteriological profiles of patients aged under 12 years diagnosed with CSOM showed no difference in microbial colonization among those with or without HIV infection<sup>[7]</sup>.

In this study 67% of the samples showed polymicrobial isolates compared to 33% mono-microbial. This is contrary to studies in India and Indonesia where 30.6% had more than one organism, 64% had a single isolate and 5% had no growth<sup>[12,15]</sup>. However, another Indian study concurred with our results<sup>[16]</sup>.

Finding poly-microbial isolates can pose a challenge

when selecting a relevant antimicrobial agent due to different sensitivities and resistance within the same sample. In this study the isolates were tested for susceptibility with the most common antimicrobial agents. We found that *Pseudomonas aeruginosa* has a sensitivity of 64.7% to ciprofloxacin, 81.3% to amikacin, 57.1% to chloramphenicol, and 41.2% to gentamicin. These findings are similar to a Nigerian study [13]. *Klebsiella pneumoniae* was 80% sensitive to piperacillin, 74.1 % to ceftriaxone, 69.2% to amikacin, 60% to gentamicin, 57.1% to ciprofloxacin, 50% to chloramphenicol and 5 % to amoxicillin-clavulanic acid. The susceptibility of *Proteus mirabilis* to ciprofloxacin was 88.2%, 90% to amikacin, 92.9% to gentamicin, 77.8% to cephalosporin and 46.7% to chloramphenicol. *Staphylococcus aureus* is susceptible to ciprofloxacin in 75% of the isolates, 83.3% sensitive to chloramphenicol. Among the three common topical antibiotics tested the order of susceptibility decreases from ciprofloxacin, gentamicin to chloramphenicol. This finding matches those of Abera et al and Singh et al<sup>[12,9]</sup>.

**Table 4. Clinical features of CSOM in 89 patients**

Feature	n	%
Discharge offensive	86	91.5
Reduced/affected hearing	59	62.8
Pain in the ear	25	26.6
Dizziness, fever or headache	12	12.9
Perforation of the ear drum	94	100
Meningitis	1	1.1
Facial palsy	2	2.1
Mastoiditis	2	2.1
Treatment was given before?	89	100.0

*Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and *Staphylococcus aureus* show some degree of resistance across all the antibiotics tested. *Meropenem* spp were however tested for amikacin and gentamicin and found to show no resistance. The rest of the organisms show selective resistances. There was complete resistance reported by *Haemophilus influenzae* to chloramphenicol, ceftriaxone, amoxicillin-clavulanic acid, and ampicillin but 100% sensitive to gentamicin only.

This study demonstrated that most patients with CSOM presented with an offensive mucoid ear discharge and reduced hearing. This tallies with a 2004 global WHO study in which 60% of CSOM patients suffered hearing impairment<sup>[1]</sup>. Among the patients who complained of pain, headache, dizziness and fever, 3.2% developed a complication – which is similar to the 4.1% of patients with complications found by Mamon et al [10]. The commonest complications were mastoiditis, facial palsy and meningitis.

Bilateral disease was seen in 5.6% of our patients; Mohit et al in India found 7% bilateral disease<sup>[17]</sup>. Most of the microbes we found were different in both ears and this concurred with a study in South Africa<sup>[18]</sup>.

All the participants had perforation of the ear drum; 78% had central perforation, 16% subtotal and 6% total perforation. This is similar to studies conducted by Memon et al in which the frequency of central perforation was 89% compared to 11% subtotal<sup>[10]</sup>. Other studies had the same finding where 22.1% were subtotal perforations and 77.9% central perforations<sup>[18]</sup>.

## CONCLUSION

- The commonest isolates implicated in causation of CSOM in this study was *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*, followed by *Proteus*

*mirabilis*, *E.coli* and *Staphylococcus aureus*. Polymicrobial isolates were seen in 67% of the patients.

- Susceptibility patterns to antimicrobial agents greatly varied but most demonstrated sensitivity to ciprofloxacin, followed by chloramphenicol, and gentamicin.
- The major clinical features of patients were mucoid offensive ear discharge associated with reduce hearing in more than 60% and mainly having central perforation.

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### Yei River State hospital in need of an ambulance



An official in the ministry of health and environment in South Sudan's Yei River state says they are in dire need of an ambulance to handle emergency cases from around the state. The ministry's Director General James Wani told Radio Tamazuj on Wednesday that its only ambulance was involved in a serious accident and is beyond repair.

Wani said that patients who are not able to afford transportation from remote parts of Yei town, Morobo and Lainya counties are forced to transport patients on bicycles while others use foot to access emergency health care services at the main state referral hospital. "The issue of ambulance remains a big challenge at the state hospital. Our only single ambulance had an accident along the Yei-air strip some months ago. At the moment we are left stranded. I am calling on partners and other well wishes to help us on the ground," he appealed.

Yei Civil Hospital is the state's main referral hospital serving patients from greater Morobo, Lainya, Kajo-Keji and Yei River.

Sourced from [RadioTamazuj](#) by Dr Eluzai Hakim ([eluzaihakim@gmail.com](mailto:eluzaihakim@gmail.com)) who is happy to coordinate any assistance to Yei Hospital.



# Missed opportunities for immunization among children attending a Paediatric Outpatient Clinic at Juba Teaching Hospital

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**Background:** Immunization prevents child morbidity and mortality through the universal access to routinely recommended childhood vaccines.

**Objectives:** To determine the prevalence and factors associated with missed opportunities for immunization (MOI).

**Method:** An out-patient paediatric clinic-based study conducted in May - June 2012 using the standard World Health Organization (WHO), Expanded Programme on Immunization (EPI) protocol for assessing MOI. The study involved client exit interviews with caregivers of children aged less than 2 years, reviews of immunization cards and parental recall of immunization history, and interviews with health workers.

**Results:** Data were collected on 448 children aged 0-23 months and from 18 health workers. The prevalence of MOI was most common among children older than 12 months. As the age of administration of the vaccine increased so did the number of MOI. MOI were more common for DTP3 (22.1%) OPV3 (24.4%), and measles (31.2%) compared to other vaccines. Factors associated with MOI included home births, inadequate antenatal care, lack of information, and, among health workers, poor knowledge of immunization schedules and contraindications.

**Conclusion:** The high prevalence of MOI could be reduced by defaulter tracing, encouraging antenatal visits and hospital deliveries, and education of caregivers and health workers.

**Keywords:** Immunization, missed opportunities, young children, South Sudan.

## INTRODUCTION

The Expanded Programme on Immunization (EPI) was established by the World Health Organization (WHO) in 1974 to ensure universal access to routinely recommended childhood vaccines. Six diseases were targeted: tuberculosis, poliomyelitis, diphtheria, tetanus, pertussis, and measles <sup>[1]</sup>. In 1974, fewer than 5% of the world's infants were fully immunized <sup>[1]</sup>. By 2005 global coverage with the third dose of diphtheria-tetanus-pertussis vaccine (DTP3) was 79%, but many children, especially those living in poorer countries, still were not being reached. In 1974, WHO and the United Nations Children's Fund (UNICEF) developed the Global Immunization Vision and Strategy which aimed to decrease vaccine preventable diseases related morbidity and mortality <sup>[2]</sup>.

EPI was launched in Sudan in 1976 but coverage in South Sudan remained very low. The 2006 Sudan Household Health Survey (Southern Sudan Report 2006 <sup>[3]</sup>) showed percent coverages, by the age of 12 months, were:

- BCG 43%.
- DTP1 37%, DTP2 26% and DTP3 20%.

- OPV1 46% and OPV3 24%.
- Measles 28%.
- All recommended vaccinations 32%

Of children aged 12-23 months 43% had not received any of the recommended vaccinations <sup>[3]</sup>. By the end of 2004, DTP3 coverage of children less than one year of age in South Sudan was 10% <sup>[4]</sup>. After the comprehensive peace agreement in 2005, the Ministry of Health-Republic of South Sudan (MOH/RSS) together with its partners worked to re-establish the immunization programme in all parts of the country and this was launched in 2009. The immunization coverage for DTP3 had risen to 43% by 2009 <sup>[4]</sup>.

The immunization schedule includes BCG, three doses of DTP, four doses of OPV and measles vaccine.

According to Sudan Household Health Survey II, 2010 Southern Sector, only 4.3% children aged 12-23 months had immunization cards but, if caregivers' recall was included, the coverage was: BCG 34.4%, DTP3 15%, OPV3 14.8% and measles 26.3%. Only 6.3% of children aged 12 and 23 months were fully immunized <sup>[5]</sup>.

WHO recommends that each health facility has a health information system for monitoring and evaluating immunization programmes. Assessing the immunization status of children exiting health facilities is recommended to identify the gaps in the programmes and factors associated with MOI. The immunization status of each child should be updated at every contact with the health care system. Immunisation services are free of charge in South Sudan but the coverage remains low. Information on the prevalence of MOI is lacking. This study, therefore, aimed to determine the prevalence and factors associated with missed opportunities for immunization in South Sudan.

## METHOD

A hospital-based cross-sectional study was conducted between May and June 2012 at Juba Teaching Hospital Paediatric Outpatient clinic. A sample of 448 children was obtained using the Fisher's formula and consecutive sampling.

All children aged up to 24 months were accepted with caregiver's consent except where the caregiver could not provide a history of vaccination, or the child had contraindications or was admitted.

The estimated number of patient attendances was 560 per week hence during a four weeks' study 2,240 patients were anticipated. A consecutive sampling technique was employed for collecting data up to 424 patients.

The standard World Health Organization, Expanded Programme on Immunization (WHO EPI) protocol for assessing MOI was adapted and used to conduct this study<sup>[6]</sup>. Exit interviews were carried out with a review of immunization cards and caregivers recall of immunization history. Eighteen health workers, out of a total of 30 (12 of whom were not willing to participate), from different paediatric wards and the EPI department were interviewed using a questionnaire administered by the principle investigator.

After checking for accuracy and completeness, data were transferred into a Microsoft Access data base, checked for input errors and analyzed using IBM-SPSS software version. The chi-square test and Mann Whitney U test were applied to determine factors that related to children and caregivers. Odd's ratio and test of significance were used to determine factors associated with MOI. Logistic regression analysis was done to determine factors independently associated with MOI.

Responses to the open ended questions to health workers were summarized and emerging themes were identified.

## RESULTS

The median age (IQR) of the 448 children was 8

**Table 1. Children's characteristics**

Variable	n (%)
<b>Age Group</b>	
<=12months	328(73.3)
>12months	120(26.7)
<b>Sex</b>	
Male	59 (57.8)
Female	189 (42.2)
<b>Mother's antenatal care</b>	
Yes	427 (95.3)
No	21 (4.7)
<b>Place of birth</b>	
Health facility	294 (65.7)
Home	154 (34.3)

**Table 2. Socio- demographic characteristic of the caregivers**

Variable	n (%)
<b>Sex of the caregiver</b>	
Male	9 (2.0)
Female	439 (98.0)
<b>Relationship with child</b>	
Mother	435 (97.1)
Other relative	13 (2.9)
<b>Marital status</b>	
Married	431 (96.2)
Single/Widowed/Separated/divorced	17 (3.8)
<b>Occupation</b>	
Employed	74 (16.5)
Unemployed	374 (83.5)
<b>Education</b>	
No education	134 (29.9)
Primary education	190 (42.4)
Secondary	92 (20.5)
College / University	32 (7.1)
<b>Religion</b>	
Christianity	435 (97.1)
Muslim	13 (2.9)

**Table 3. Missed opportunity for immunization per vaccine**

Vaccine	Missed opportunity	95% CI of %
BCG (n=448)	34 (7.6)	5.4 - 10.0
DTP1 (n=399)	14 (4.5)	1.8 - 5.4
OPV1 (n=399)	20 (5.0)	3.0 - 7.1
DTP2 (n=375)	38 (10.1)	7.0 - 13.3
OPV2 (n=375)	39 (10.4)	7.2 - 13.5
DTP3 (n=357)	79 (22.1)	17.5 - 26.4
OPV3 (n=357)	87 (24.4)	20.0 - 29.0
Measles (n=218)	68 (31.2)	25.2 - 37.6

months (5-13 months); 57.8% were males and 42.2% were females. Most (95.3%) mothers attended antenatal clinics and 65.7% delivered in a health facility (Table 1). Of the 448 caregivers 435 (97.1%) were mothers of whom 431 (99%) were married, 374 (83.5%) were unemployed, 134 (29.9%) had no formal education and 435 (97.1%) were Christians (Table 2).

The prevalence of MOI was 56.5% (95% CI 51.8-60.9%). There was an increased prevalence of MOI as the age for administration of the vaccine increased. Table 3 shows that MOI was highest for DPT3 (22.1%), OPV3 (24.4%) and measles vaccines (31.2%).

MOI was associated with children’s and caretakers’ socio-demographic characteristics. Children who had missed most immunizations were older than 12 months (OR 1.5, 95%CI 1.0-2.4). Children whose mothers attended antenatal care were statistically less likely to

have missed immunization (OR 0.1; 95% CI 0.0-0.5). Children born at home were more likely to have missed immunization (OR 2.2, 95% CI 1.4-3.3) compared to those who were born in hospital. Lack of formal education was associated with an increased MOI (OR 1.8, 95%CI 1.4-3.3) (Table 4).

To adjust for confounding variables, the data were analysed using logistic-regression modelling. The following were independently associated with missed opportunity for immunization; antenatal care (p=0.018) and place of birth (p=0.007). However caretakers’ education and children’s age (p=0.074) were not associated with MOI (p=0.115) (Table 5).

Responses from the 18 health workers showed that:

1. There was poor knowledge of the vaccination schedule especially for the BCG vaccine. None knew the appropriate time to give BCG. The measles vaccination schedule was more commonly known than the DTP3 and polio vaccination schedules.
2. The majority were not aware of the contraindications for BCG and polio vaccines. None was aware of any contra-indication for DTP and measles vaccines.

**DISCUSSION**

The high prevalence of MOI in this study is similar to one from Kenya where it was attributed to inadequate knowledge of health workers [7]. A study in a health centre in Sudan found that prevalence of children missing at least one vaccination was 58% and missing all vaccinations was 29% [8]. Similarly in Uganda the prevalence of MOI was 59.6% [9].

**Table 4. Factors associated with missed opportunity for immunization**

Variable	Missed opportunity		OR (95 % CI)	P value
	Yes	No		
<b>Child’s age group</b>				
<=12 months	176(69.6)	152(77.9)	1.0	
>12 months	77(30.4)	43(22.1)	1.5(1.0-2.4)	0.047
<b>Mother’s antenatal care</b>				
Yes	233 (92.1)	194 (99.5)	0.1 (0.0-0.5)	
No	20 (7.9)	1 (0.5)	1.0	<0.001
<b>Place of birth</b>				
Health facility	147 (58.1)	147 (75.4)	1.0	
Home	108 (41.9)	48 (24.6)	2.2 (1.4-3.3)	<0.001
<b>Caretaker’s education</b>				
No formal education	89 (35.2)	45 (23.1)	1.8 (1.2-2.8)	
Formal education	164 (64.8)	150 (76.9)	1.0	0.006

Our study shows the highest prevalence of MOI was for OPV3, DPT3 and measles; the results among the three vaccines was not statistically different. A higher prevalence of MOI for measles compared to DPT3 is attributed to the long interval between DPT3 and measles vaccine - a finding similar to that in Nigeria <sup>[10]</sup>.

The high prevalence of MOI in our study can also be attributed to civil war, bad road networks, inadequate technical staff, low accessibility to health facilities, frequent vaccine stock outs and breakdowns of the cold chain. That 5.6% of children had never been immunized was attributed to the lack of information and ineffective out-reach programmes especially in remote areas.

There have been frequent immunisation campaigns against poliomyelitis and measles and this was reflected in the knowledge of caregivers.

Children of mothers who did not attend antenatal clinics and/or who delivered at home have an increased chance of not being immunized. It is likely that interaction with health workers in antenatal clinics and during hospital delivery enhances the uptake of immunisation.

Lack of information was cited as one of the commonest causes of incomplete immunization as either caretakers did not know the child needed to be immunized or were unaware of the need for return visits. Inadequate knowledge of health workers on dosing, schedule and contra-indication on immunization is a similar finding in a study which had been done in Kenyatta National Hospital in 1996 <sup>[7]</sup>.

MOI can be reduced by creating awareness among health workers and caregivers, and by attaching immunization data detail to out-patient forms.

## CONCLUSION

Home delivery and failure to attend antenatal clinic were independently associated with MOI. Lack of information was the most common reason given by the caretakers for incomplete immunization.

## RECOMMENDATIONS

The South Sudan EPI should have a clear policy that every child coming in contact with a health facility should have her/his immunization status updated. Strategies should be put in place to ensure that all unvaccinated children in the community or in contact with health facilities are identified. Health workers should be given continuing training on immunization practices. The media can be used to promote caretakers' awareness on the importance of immunization and immunization schedules.

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**Table 5. Multivariate logistic regression analysis**

Variable	OR (%95 CI)	P value
<b>Child's age group</b>		
<=12 months	1.0	
>12 months	1.5(1.0-2.3)	0.074
<b>Mother's antenatal care</b>		
Yes	0.1 (0.0-0.8)	
No	1.0	0.018
<b>Place of birth</b>		
Health facility	0.6 (0.4-0.9)	
Home	1.0	0.007
<b>Caretaker's education</b>		
No formal education	1.4 (0.9-2.2)	
Formal education	1.0	0.115

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# Foetal macrosomia: risk factors, maternal and foetal outcomes in N'Djamena Mother and Child Hospital, Chad

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**Background:** Macrosomia is a birth weight above the 90th percentile corrected for gestational age and sex, or a birth weight of 4000-4500 g.

**Objective:** To determine the incidence of foetal macrosomia and macrosomia-associated maternal and perinatal morbidity and mortality.

**Method:** This was a cross-sectional study covering a period of six months, from January to June 2016 in N'Djamena Mother and Child Hospital, Chad. The sample consisted of two groups: mothers who gave birth to macrosomic babies (the study group) and an equal number of mothers who gave birth to normosomic babies (the control group).

**Results:** Out of a total of 5,284 deliveries, 403 babies weighed 4.0 kg or more giving an incidence of macrosomia of 7.6%. The mean maternal age and mean birth parity of the study group were significantly greater than in the control group. There were significantly more mothers with a previous history of macrosomia in the study group than in the control group. Ninety three babies (23.1%) in the study group were delivered by Caesarean Section, and 76.9% by vaginal delivery. The commonest maternal complications were: postpartum haemorrhage (15.9%), prolonged labour (13.9%) and perineal laceration (4.4%). There were significantly more babies with a poor Apgar score in the first and the fifth minute in the study group than in the control group ( $P= 0.0009$ ). Other complications among the macrosomic babies were: shoulder dystocia (1.3%), stillbirths (0.7%) and hypoglycaemia (8.4%).

**Conclusion:** Macrosomic neonates are more often delivered by Caesarean Section than normosomic babies. There is a clear need during prenatal care and delivery to minimise maternal and perinatal complications.

**Keys words:** Caesarean Section, foetal macrosomia, complications, N'Djamena Mother and Child Hospital

## INTRODUCTION

A macrosomic baby has been defined in different ways with considerable variations of the minimum weight that defines macrosomia<sup>[1-3]</sup>. The most satisfactory definitions are a birth weight above the 90th percentile corrected for gestational age and sex or a birth weight over 4000g. Due to the variation of the minimum weight that defines macrosomia, reports of its incidence vary from 3% to 15%<sup>[4]</sup>. The incidence also varies with ethnicity. Studies have shown that Chinese and South Asian infants are smaller for their gestational age<sup>[5]</sup>. Differences in birth weight distribution are probably due to the genetic and anthropometric factors<sup>[6]</sup>. Macrosomia is recognized as a cause of perinatal and maternal morbidity and mortality<sup>[4]</sup>.

Risk factors for macrosomia include high maternal body mass index and weight gain, advanced maternal

age, multiparity, diabetes mellitus, and gestational age >41 weeks<sup>[7]</sup>. However, it is well known that clinical risk factors alone have a very low positive predictive value<sup>[7]</sup>.

The aim of this study was to determine the incidence of macrosomia and macrosomia-associated maternal and perinatal morbidity and mortality during a 6-months study at N'Djamena Mother and Child Hospital.

## PATIENTS AND METHOD

This was a cross-sectional study covering the six months from January to June 2016. Our sample consisted of two groups:

- The study group were mothers who delivered macrosomic babies. We included all live newborn singleton macrosomic babies who were delivered at or greater than 37 weeks gestation and who had no clinical evidence of congenital malformations.

**Table 1. Maternal characteristics**

Maternal characteristics	Study group (n = 403)	Control group (n = 403)	P value
Maternal age (years):			
mean	34 ± 32.3	26.7 ± 4.1	0.02
range	43-18	44-16	
Mean parity	4.5 ± 2.8	2.3 ± 1.7	0.04
Previous history of macrosomia	31.2	14.3	0.001
Gestational age at delivery (weeks):			
mean	41.7 ± 2.5	37.9 ± 2.9	0.003
range	37- 43	37- 42	
Diabetes mellitus*	27 (6.7%)	5 (1.2%)	0.0001

- The control group were mothers who delivered a baby with a normal weight (ranging between 10th – 90th percentiles). These births were recorded after every macrosomia birth so there were an equal number of mothers in each group.

Age, parity, and birth weight were recorded. The outcomes of interest were perinatal and maternal complications. Data analysis was done by Epi info 6.0 French. Chi-square (X<sup>2</sup>) test (p<0.05) was used to compare variables.

## RESULTS

Out of 5,284 deliveries during the study period, 403 babies weighed 4.0 kg and above. So the incidence of macrosomia was 7.6%.

### Maternal characteristics

Table 1 shows that the mean maternal age and mean birth parity of the study group were significantly greater than in the control group. There were significantly more mothers with a previous history of macrosomia in the study group than in the control group.

### Delivery mode

Table 2 shows that 23.1% of mothers in the study group had delivered by Caesarean Section versus 8.7% in the control group. In the study group, 73 out of 93 (78.5%) Caesarean Sections were done as emergencies. The main indication was the foeto-pelvic disproportion. Operative vaginal are deliveries done by the vaginal route

**Table 2. Mode of delivery**

Mode of delivery	Spontaneous vaginal n (%)	Caesarean Section n (%)	Operative vaginal n (%)	Total
Macrosomic (study group)	285(70.7)	93(23.1)	25(6.2)	403(100)
Control group	324(80.4)	35(8.7)	44(10.9)	403(100)

using episiotomy.

### Maternal complications

The commonest maternal complication in the macrosomic group was postpartum haemorrhage, followed by prolonged labour and perineal laceration - mainly first- and second-degree laceration – see Table 3.

### Perinatal outcome

Table 4 shows that the male/female ratio of the neonates was significantly higher among the macrosomic group than the control group (p=0.037). There was a significantly higher proportion of macrosomic babies with an Apgar score below seven in the first and in the fifth minute compared to normosomic babies (p=0.0009). There were 5 (1.3%) cases of shoulder dystocia in patients with macrosomic babies and none in the control group. No births injuries occurred.

There were 34 (8.4%) cases of hypoglycaemia in the macrosomic neonates and 11 (2.7%) in the control group. Among babies with hypoglycaemia 8 babies (23.5%) had mothers with a history of diabetes mellitus.

## DISCUSSION

### Incidence and risk factors

The incidence of macrosomia in this study was 7.6% similar to a Nigerian investigation reporting 8.1% [8]. The highest reported incidence is 20% in Nordic countries [9] while 1.5% of neonates in USA have a birth weight of 4.0kg [10]. These figures are influenced by race and local factors [8]. The pathophysiology of macrosomia is related to the associated maternal or foetal conditions of poorly controlled diabetes mellitus, maternal obesity, and excessive maternal weight gain. All of which have intermittent periods of hyperglycaemia.

Our study showed that mothers of macrosomic neonates were significantly older which agrees with other reports [8,11]. Grandmultiparity was found to be strongly associated with macrosomia. These findings are in keeping with those of Mutihir [12] and Ezegwui [8] who showed that there was a higher proportion of multiparity among mothers of macrosomic neonates.

This study demonstrated that a large proportion of women delivering macrosomic babies had previous histories of delivering macrosomic babies. Women who previously delivered macrosomic babies are 5–10 times more likely to deliver a baby considered large-for-gestational age in subsequent pregnancies [13].

**Table 3. Maternal complications**

Maternal outcome	Study group (n=403) n (%)	Control group (n=403) n (%)	P value
Postpartum haemorrhage	64 (15.9%)	35 (8.7%)	0.003
Perineal laceration	18(4.4%)	7 (1.7%)	0.027
Obstructed labour	56 (13.9%)	23 (5.7%)	0.002

We found a greater proportion of diabetic mothers among the study group than in the control group. Foetal macrosomia in diabetic mothers has been attributed to poor glucose control based on using blood sugar test or HbA1c. Hyperglycaemia in the foetus results in the stimulation of the secretion of insulin, insulin like growth factors, growth hormone, and other growth factors, which in turn stimulate foetal growth and deposition of fat and glycogen.

Macrosomia is associated with a higher incidence of Caesarean Section delivery (double that among the control mothers) and with birth canal lacerations associated with vaginal delivery [14-15]. This was confirmed in this study with a Caesarean Section rate of 23.1% versus 8.7% in the control group. The risk of Caesarean Section rises with increasing birth weight, and the proportion of vaginal instrumental delivery decreases with increasing birth weight [16,17]. The increased Caesarean Section rate is a consistent finding in different countries and between ethnic groups, and the odds are particularly high for primiparous mothers [16]. In macrosomic births, the risk of shoulder dystocia is associated with the need for vaginal instrumental delivery [17].

**Maternal complications**

Macrosomia was strongly associated with prolonged pregnancy in this study. This was comparable to the findings of Mutahir [12] and Spellacy [14] who observed that macrosomic infants account for about 1% of term deliveries and 3-10% of post-term deliveries. Advanced gestational age results in a larger birth weight. This is to be expected as infants gain approximately 150-200g weekly near term. The duration of labour is more prolonged for women carrying macrosomic babies, and the risk is increased with increasing birth weight [16]. Both the first and second stages of labour are longer than for normosomic pregnancies, and arrest of descent in the second stage of labour is associated with macrosomia [16]. Our findings confirmed this with a higher rate of obstructed labour in the study group (19.9% versus 5.7% in the control group). Macrosomia had been reported as a risk factor for

**Table 4. Differences in perinatal outcome**

Maternal outcome	Study group (n=403)	Control group (n=403)	P value
Sex: male	245 (60.8%)	201 (49.9%)	0.037
Apgar score 1st minute (<7)	26 (6.9%)	11 (2.7%)	0.01
Apgar score 5th minute (<7)	15(3.7%)	5(1.2)	0.025
Stillbirth	3 (0.7%)	11(2.7%)	0.032
Shoulder dystocia	5 (1.2%)	0 (0%)	0.025
Hypoglycemia	34(8.4%)	11(2.7%)	0.0006

postpartum haemorrhage [17,18] - a fact confirmed in our study.

**Perinatal outcomes**

Male infants are more likely to be macrosomic than female infants. Male infants are generally 150 - 200 g larger than female infants of the same gestational age near term.

Although the literature frequently and consistently demonstrates an increase in perinatal morbidity and mortality with increasing birth weight, the overall incidence of neonatal complications remains low [19].

We noted a higher proportion of newborns with bad Apgar scores in the study group compared with the control group. Ezegwui [8] also reported a higher proportion of newborns with bad Apgar scores in their study group. The greater the birth weight, the higher the risk of low Apgar scores.

More newborns with hypoglycaemia were found in the study group. The risk of neonatal hypoglycaemia is higher in heavy babies [20]. Neonates with a birth weight >4,500 g had a seven-fold higher occurrence of hypoglycaemia, compared with those with an appropriate weight for gestation age [21]. Five cases of shoulder dystocia were noted in the study group versus none in the control group. It has been reported consistently in the literature that the risk of shoulder dystocia escalates with increasing birth weight [21]. However, the incidence of shoulder dystocia in different birth weight groups varies widely between studies [21].

**CONCLUSION**

This study shows that the delivery of macrosomic babies is unusual - at about 8% in our hospital. The risk factors are consistent with those reported in the literature. The commonest delivery mode is vaginal despite a high proportion of Caesarean Sections. The main maternal complications are postpartum haemorrhage, prolonged labour and perineal laceration. Perinatal outcomes are a bad Apgar score, hypoglycaemia, shoulder dystocia and stillbirth.

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**Consent:** we obtained consent of patients and agreement of the Director of N'Djamena Mother and Child Hospital.

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# Elimination of Guinea worm disease in South Sudan through multi-disciplinary actions

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South Sudan is now in the pre-certification phase, having gone over sixteen months as of April 2018, with zero reports for cases of Guinea worm disease (GWD). The South Sudan Guinea Worm Eradication Programme (SSGWEP) mobilizes the efforts of thousands of communities, village volunteers, various government institutions and partners, to establish an extensive surveillance system for detection of GWD cases in post-war South Sudan.

Beginning in 2006, with the objective of breaking transmission as soon as possible, this system enabled rapid detection (<24 hours after worm emergence), case containment, and prompt delivery of specific interventions – cloth and pipe filters, vector control, provision of safe water and health education – thereby achieving the ultimate elimination of the disease in ten (10) years from 2006 – 2007.

This unquestionable success story in South Sudan, was possible through the multidisciplinary actions of key partners, such as The Carter Center, World Health Organization (WHO), UNICEF, and other NGOs with the MoH at the helm of the implementation of the key strategies for GWD eradication.

**Key words:** Guinea worm disease, Carter Center, eradication, South Sudan

## INTRODUCTION

Guinea worm disease (GWD), or dracunculiasis is an incapacitating parasitic illness caught by drinking from water containing water fleas (copepods) that harbour infective Guinea worm larvae, *Dracunculus medinensis*. Once inside the body, the stomach digests the water fleas and these larvae find their way to the small intestine where they penetrate the intestinal wall and pass into the body cavity. During the next 10-14 months, the female Guinea worm grows to full size adult (60-100 centimeters long) and migrates to the site where she will emerge usually from the lower limbs. To emerge, the Guinea worm causes a lesion to develop on the skin at the site where she will emerge (Figure 1). The lesion begins with the formation of a blister which causes a very painful burning sensation, and which will eventually self-rupture within 24-72 hours, unless purposefully breached (by the patient or someone else). Once a worm started to emerge, it must be carefully and completely removed over a period of weeks. Often the resultant wound develops a secondary infection, increasing the time it takes for an infected person to resume normal activities. Failure to remove the worm can result in additional bacterial infection, as well as infection of the whole body (septicaemia) and permanent disability.

Despite a prolonged civil war, there was a 95% reduction in reported cases of GWD in South Sudan between 1995



Figure 1. Guinea worm emerging from the foot of a patient in South Sudan (Credit: Makoy S. Yibi)

(118,587) and 2005 (5,585). The comprehensive peace agreement (CPA) signed in January 2005 created the semi-autonomous Government of Southern Sudan. At the time, Southern Sudan accounted for over 45% of the world's GWD cases. The nascent Ministry of Health established the SSGWEP in 2006 with the goal of stopping transmission by December 31<sup>st</sup> 2009, although this initial target was not reached, South Sudan achieved the ultimate objective of interrupting GWD transmission in 2016, and reported 6 cases in 2016 and zero cases in 2017 for the first time since the start of the eradication campaign (Figures 2 and 3). This article details the multi-disciplinary actions in the implementation of the active surveillance system and interventions for GWD eradication in South Sudan.

## MULTI-DISCIPLINARY ACTIONS IN THE FIGHT AGAINST GWD

GWD eradication is an absolute public health goal, and can only be achieved through concerted efforts from multi-disciplinary actors. From the outset, the Ministry of Health established a taskforce called the South Sudan Guinea Worm Eradication Task-Force (SSGWETF). The SSGWETF was under the chairmanship of the Director General for Preventive Health Services with membership from The Carter Center, WHO, UNICEF, Ministry of Water Resources and Irrigation, Ministry of Animal Resource and Fisheries, World Food Programme (WFP) and representatives of water implementing NGOs.

The purpose of the SSGWETF was to help the SSGWEP through high-level technical assistance, advocacy, resource mobilization, and coordination across critical eradication strategies that are all oriented towards empowering communities, to prevent GWD transmission:

1. Provision of safe water to endemic communities, including both “software” (health and hygiene promotion as well as Operations and Maintenance support) and “hardware” – e.g. new facilities such as boreholes, spring-fed schemes, protected wells, dam infiltration, etc.
2. Effective community-based surveillance that is the driving force for complete interruption of Guinea worm transmission.

In achieving this broad purpose, the terms of reference (ToR) for the SSGWETF were as follows:

### a. Safe Water Provision and Health Education/Hygiene Promotion:

The lead partners include: UNICEF, Ministry of Cooperative and Rural Development, Ministry of Animal resource and Fisheries, Ministry of Water Resources

and Irrigation, WFP, and representatives of water implementing NGOs.

1. Mobilize resources from bilateral and multi-lateral donors for sustainable water development and mass health/hygiene promotion activities, targeting the most endemic villages.
2. Identify appropriate roles for communities and partners working in the water and health sectors for implementation of safe water delivery, including both hardware and software components, in targeted endemic communities of South Sudan.
3. Establish technical oversight mechanism for monitoring status of safe water delivery and sustainability in Guinea worm endemic villages.
4. Review and recommend coordination mechanisms with partners at county-, state- and national- levels for safe water development and health/hygiene promotion for both Guinea worm eradication and control of other water-borne/-related diseases.
5. Establish an awareness campaign with traditional, political, and civil society leadership to sensitize them to Guinea worm eradication and the role they can play in its success.

### b. Surveillance and Case Containment:

The lead partners include The Ministry of Health, the Carter Center, and WHO.

1. Roll-out plans for the wider implementation of SSGWEP community-based surveillance activities in South Sudan, including the incorporation of other surveillance structures to detect outbreaks in areas known to be free of GWD transmission.
2. Recommend a monitoring and evaluation plan for the SSGWEP and mechanisms for its implementation.

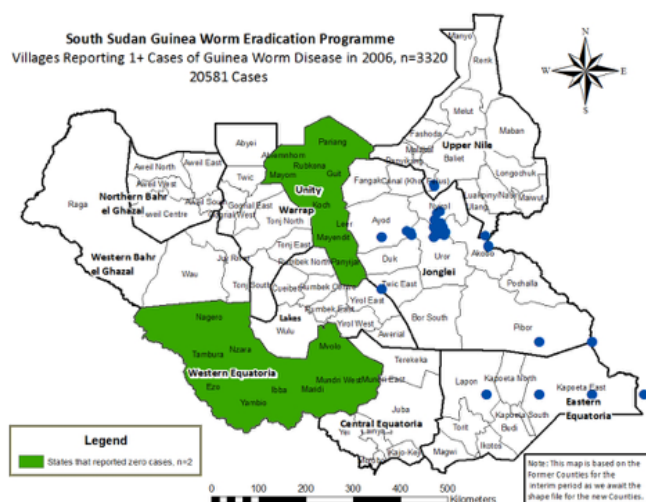


Figure 2. Number of cases of GWD in 2006 in South Sudan

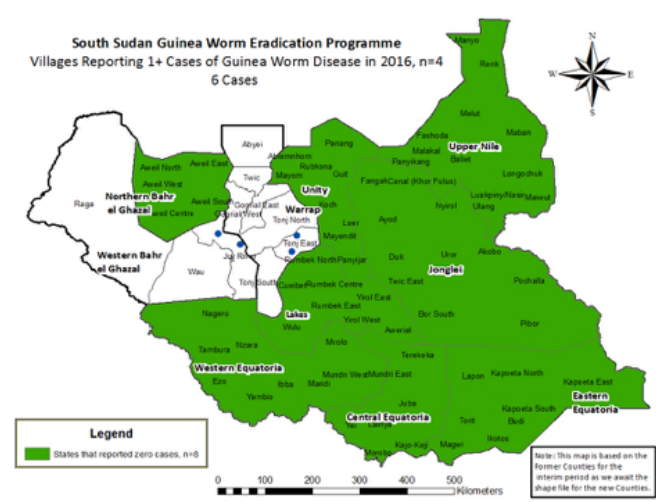


Figure 3. Number of cases of GWD in 2016 in South Sudan

### HOW DID SOUTH SUDAN SUCCEED IN INTERRUPTING THE GWD TRANSMISSION?

The Comprehensive Peace Agreement (CPA) that ended the 21-year war in South Sudan was a crucial turning point not only in forging historic political and constitutional changes for the people of South Sudan, but also in removing the single greatest barrier to completing the global campaign to eradicate dracunculiasis. The SSGWEP began in 2006 with the daunting task of establishing a community-based surveillance system capable of detecting all Guinea worm cases in endemic and at-risk villages of South Sudan and establishing an effective intervention delivery system to break dracunculiasis transmission.

With financial, technical and material support mainly from the Carter Center, the SSGWEP implemented the following strategies:

#### 1. Strengthening Community-based Surveillance and Intervention Structures in endemic counties:

- Maintain active, village based surveillance in all villages.
- Ensure all rumours/suspects investigated within 24 hours of reporting and 100% follow up of previous year's cases and their households on weekly basis.
- Engender at least 80% national awareness of the cash reward – motivate self-reporting.
- Enhance collaboration with other health programmes such as NIDs, IDSR, to integrate active case searches for GWD and Cash Reward awareness.
- Continue engaging partners (UNICEF, MEDIWR) in the water sector to provide access to safe drinking water for communities at higher risk of GWD.

#### 2. Strengthening Surveillance in Guinea worm non-endemic counties:

- Strengthen surveillance capacity at the state, county, payam and village levels to ensure timely detection and reporting systems within the context of the Boma Health Initiative (BHI).
- Ensure collection of quality GWD data and enhance 100% investigation of rumours within 24 hours and follow up of all suspects reported.
- Increase collaboration with partners to create/raise awareness of the communities on GWD and on the cash reward system (>80% of population).

- Enhance collaboration with other health programmes such as NIDs, IDSR, to integrate active case searches for GWD and Cash Reward awareness.
- Continue engaging partners (UNICEF, MWRI) in the water sector to provide access to safe drinking water for communities at higher risk of GWD.

#### 3. Communication Road Map - South Sudan using social and behaviour change communication strategies.

- Objective 1: Increased awareness/knowledge in the general population about GWD and the Cash Reward for reporting of Guinea worm cases and animal infections.
- Objective 2: Increased uptake/maintenance of Guinea Worm Disease prevention practices (filtering water, use of safe water points, prevent people with Guinea worm lesions from entering water sources) among population in Endemic and At-risk counties.

#### 4. Strengthen Cross border collaboration between the three countries, Kenya, Ethiopia and South Sudan.

- Implement cross-border surveillance activities to detect, report, and investigate rumours/suspect with 24 hours of reporting.
- Improve cross-notifications and investigation of cases.

### CONCLUSION

The GWD eradication campaign is an evolving success story in South Sudan, as evidenced by dramatic reductions in numbers of cases and endemic villages, to complete interruption of transmission of GWD. The coordinated actions of key stakeholders have led to disruption of GWD transmission in seven states of South Sudan, and it can be emulated by other public health programs.

South Sudan has emerged victorious in the fight against GWD, despite all odds and has defied the prediction by experts in 2006 that it will be the last country to eliminate the disease. This is a huge psychological boost for the people of South Sudan given that there very rare stories of good things happening in South Sudan, in a very long time. It is a victory for the thousands of the Guinea worm warriors, as they courageously charged forward with only one purpose that is to interrupt transmission of GWD from all their communities.

The health services can institutionalize approaches used by the SSGWEP to implement other field-based initiatives.

# The value of early trimester ultrasound scanning: a case of congenital malformation from Kibaha, Tanzania

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A case report of a mother presenting at 25 weeks pregnancy. An ultrasound scan suggested the size of the foetus to be about 32 weeks with indications of a malformation and hydrops foetalis. A balloon catheter followed by misoprostol given vaginally was used but labour did not progress satisfactorily. A Caesarean Section was carried out and confirmed the congenital abnormalities. The value of early obstetric ultrasonography is discussed.

**Keywords:** Early trimester sonography, foetal congenital anomaly, induction of labour, intracervical balloon catheter, misoprostol, Caesarian Section

## INTRODUCTION

Early detection of congenital malformation using ultrasound among pregnant women living in low and medium limited-resource countries is uncommon <sup>[1]</sup>. Ultrasonography screening during antenatal visits has been observed to be important in the early detection of abnormalities and hence the need to plan appropriate management strategies <sup>[2,3,4]</sup>. This case report highlights the need to have at least one early trimester ultrasonographic examination.

## CASE REPORT

The patient was admitted to Tumbi Regional Referral Hospital, Kibaha, Tanzania on 10 February 2016. She was 33 years old and was a G5P3+1 L3 with a history of one Caesarean Section in her third pregnancy for oblique lie. Her last menstrual period indicated that she was at 25 weeks gestational age and her 'prevention of mother to child transmission' (PMTCT) status was Two (which means she was HIV-negative tested) and her blood group was AB Rhesus positive.

On admission she complained of lower abdominal pain and a vaginal mucoid discharge stained with blood suggesting that she was already miscarrying. No ultrasound scan was done when she had attended the antenatal clinic on two previous occasions. Her general physical condition was good and she was not pale (Hb 12.5g/dl). The fundal height approximated to 32 weeks gestation. Foetal heart

sounds were not heard. The cervix was posteriorly located, shortened and allowed the passage of a tip of a finger.

Because of the absence of foetal heart sounds and the large-for-dates gravid uterus an ultrasound scan was carried out and showed a single foetus in a cephalic presentation with a biparietal diameter of 25 weeks. However, the head of the foetus was surrounded by fluid in the subcutaneous layer making the head appear very big. The foetal abdomen also appeared to be surrounded by fluid. Some cardiac activity was noted, the placenta was located anteriorly. There was normal amniotic fluid. It was concluded that there was hydrops foetalis with multiple congenital anomalies of the live foetus (see Figure 1).

The decision of mode of delivery was difficult with the risk of rupture because she had already one previous scar. Finally, the decision was reached to induce labour with a balloon intra cervical catheter which was infiltrated with approximately 70mls of water for injection. This mechanical method is good because the balloon can be deflated and removed if contractions are too strong, unlike a drug.

The balloon catheter dropped out so there had been some progress but it did not continue. Misoprostol 25ug was given vaginally every six hours for 24 hours. This was in a hospital with a theatre available in case of uterine rupture, as it would not have been safe otherwise. Although there was further dilatation the head did not descend further than the pelvic brim and the cervix was

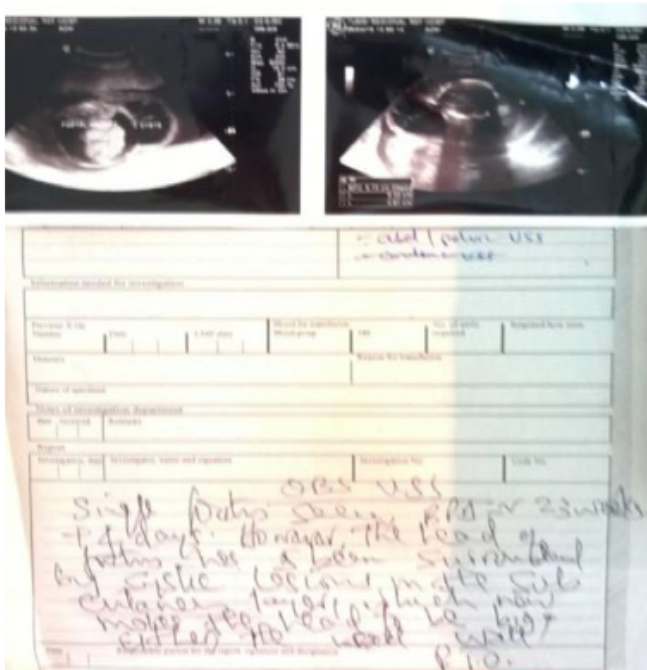


Figure 1. Ultrasound showed single foetus longitudinal in cephalic presentation with a biparietal diameter of 25 weeks and 4 days. (Credit: Naki Mfangavo)



Figure 2. The head of the foetus has been surrounded by fluid and the dilatation of the cervix has moulded the head into a point. (Credit: Naki Mfangavo)

swollen. After 36 hours she had a Caesarian Section done through the old Pfannestiel scar under spinal anaesthesia.

The findings were:

- Severe hydrops foetalis with a very large head and neck fused together. The mouth and nose were not patent. The eyes were small. The gender was not differentiated. The foetus died immediately after taking one breath. Birth weight 2.7 kg.
- Uterus and adnexa were normal with no retroplacental blood clot. Haemostasis was achieved and the uterus and abdominal wall were repaired in layers with the approximate blood loss of 300mls (See Figure 2).

The mother recovered satisfactorily and was discharged on the 4th postoperative day having received appropriate counselling. She failed to attend follow-up clinics.

**DISCUSSION**

Ultrasound scanning is a simple, affordable and non-invasive technique that should be available readily in all prenatal care services in low and middle-resource countries [5]. It should be supported by well trained personnel. This would allow the early detection of congenital anomalies and plans for more investigations and action to be made [6].

Congenital malformations are unpredictable occurring in both developed and developing countries. However

in developing countries there is less availability of investigative techniques and greater ignorance about the need for surveillance during pregnancy [7]. The accuracy of diagnosing congenital abnormalities depends on having a well-skilled ultrasonographer bearing in mind that most structural problems are only seen by ultrasound in the second trimester.

Clinical diagnosis of congenital malformations is difficult without early trimester obstetric ultrasound [8]. However a definitive diagnosis often requires an invasive test as well as a scan e.g. Downs, Edwards and Patau syndromes. In our case, the congenital malformation was not discovered until the initial ultrasound was done in the late second trimester. If the ultrasound had been done earlier another management plan with a termination of pregnancy might have been possible [9]. Each country will have different health service policies and funding regarding routine ultrasound in early pregnancy as well as their own laws on abortion for women who are carrying a foetus with problems that are incompatible with life.

**CONCLUSION**

The accuracy of diagnosis of congenital abnormalities by ultrasound depends on the timing of the examination and on a well-skilled ultrasonographer. It is an affordable and low-risk technique and maybe should be offered to all mothers whatever the estimated gestation.

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**Conflict of interest:** There are no conflicts of interest

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**Consent:** Consent was obtained from the mother and the director of Kibaha Education Center, Tumbi Regional Referral Hospital.

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## Anthrax among South Sudanese refugees in Uganda

According to the [East African](#) (7 April 2018) the local veterinary officer has reported that one South Sudanese refugee has died from anthrax and two others are receiving treatment at a refugee camp in north-western Uganda. It is suspected that this is because many refugees bring infected animals across the border and share their houses with them. Unlike people, animals are not screened at the border. Anthrax is caused by the *Bacillus anthracis* bacterium and mainly affects animals especially herbivores. Humans can become infected through contact with or consumption of an infected animal.

## New Resources

Save the Children IYCF-E Toolkit: Rapid start-up resources for emergency nutrition personnel

<https://sites.google.com/site/stcehn/documents/iycf-e-toolkit>

Antimicrobial Resistance – see MEDBOX guidelines, e-learning courses, apps and policy paper at <https://www.medbox.org/antimicrobial-resistance/listing>

Scratching the itch: is scabies a truly neglected disease? See [http://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(17\)30469-3/fulltext?elsca1=etoc](http://www.thelancet.com/journals/laninf/article/PIIS1473-3099(17)30469-3/fulltext?elsca1=etoc)

# Grant Awards for 2018/2019 to South Sudanese postgraduate students by the Gordon Memorial College Trust Fund(GMCTF), London

At the annual meeting of the Executive Committee of the GMCTF on 19th April 2018, a number of South Sudanese applicants for grants to support postgraduate studies in various universities were awarded. The Grants were varied in nature and included support with living expenses or full support with tuition fees and living expenses. Some applicants had already received grants in previous years and, on the basis of their satisfactory progress, the grants were extended to ensure completion of the respective courses pursued by the applicants.

Evidently there were very few females applicants for the grants which was disappointing. The next round of grants will be awarded in March/April 2019 and applications will open on 1st December 2018 and close on 28th February 2019. I encourage any applicants seeking grants to pursue postgraduate studies to log on to the GMCTF website [www.gmctf.org](http://www.gmctf.org) in December 2018 and apply online. It is important that at the time of application, applicants must ensure that they have the following information to submit with their applications:

- Admission letter to a recognised University.
- Two letters of reference, one of which must be from a person the applicant has worked with or had been supervised by.
- Clear statement of other sources of funding.
- A letter from the Bursar or Chief Finance officer of the University stating clearly in writing the fees for the course and recommended subsistence expenses per year on the headed paper of the University.

## 2018-2019 Grant recipients

### 1. Dr Olang Amon,

Male

St. Paul's Hospital Millennium Medical College,  
Addis Ababa, Ethiopia

Speciality in general surgery

2015 - Sept. 2019

Continuation of living expenses

### 2. Dr Cecelia Joseph Khor Chan

Female

Makerere University, Kampala

Master of Veterinary Medicine

2013 - 2018

Continuation of tuition support

### 3. Dr Denis Monday Tabia Zachariah

Male

Aga Khan University, Nairobi Campus, Kenya

Masters Degree of Medicine in Paediatrics and  
Child Health

2016 - January, 2020

Continuation of tuition support

### 4. Dr Malik Edward Swaka Morbe

Male

The Higher Committee of Medical Specialties,  
Egyptian Fellowship Board of Otolaryngology  
Clinical MD

2015 - February 2020

Continuation of tuition & living expenses

### 5. Dr Anthony Manyang Deng Kuany

Male

Mbarara University of Science and Technology,  
Uganda

Masters of Medicine in Obstetrics and  
Gynaecology

2015 - May 2018

Continuation of tuition fees & support with  
living expenses

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**6. Dr Thomas Donguande Palet**

Male

St. Paul's Millennium Hospital Medical College,  
Addis Ababa, Ethiopia

Obstetrician and Gynaecology

2016 - Sept. 2020

Support with living expenses

**9. Dr Martin Othwon Dak Ajang**

Male

Alexandra University, Faculty of Medicine ,  
Egypt

Masters degree in Internal Medicine

2016 -2021

Support with living expenses

**6. Dr Fardous Charles Waya Abeya**

Female

Mbarara University of Science and Technology

Masters in Public Health

2017 - August 2019

Tuition and support with living expenses

**10. Dr William Marcello Nazario Loyoro**

Male

Makerere University

Master of Medicine in Obstetrics and Gynaecology

2016 - 2019

Tuition and support with living expenses

**7. Dr Martin Adelino Lyya**

Male

Makerere University, Uganda

Masters degree in Paediatrics and Child Health

2015 - January 2019

Tuition and support with living expenses

**11. Dr Marline Malie Anthony Lagu**

Female

Makerere University College of Health Science

Master of Public Health

2017 - August 2019

Tuition and support with living expenses

**8. Dr Amos Jada Jeremiah Swaka**

Male

Makerere University College of Health Science

Master of Medicine in Orthopaedic Surgery

2017 - January 2022

Tuition and support with living expenses

*From Dr Eluzai Hakim*

MB.Ch.B, FRCP Edin, FRCP, DTM&H, Pg.Cert  
Health Research & Dev Consultant Physician,  
Associate Editor South Sudan Medical Journal  
and International Adviser to the Royal College of  
Physicians London on South Sudan.

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**How to assess for bilateral pitting oedema** – see back page.

Extracted with permission from Ministry of Health. 2016. Guidelines for Community-Based Management of Acute Malnutrition. 2nd Edition. Lilongwe, Malawi: MOH. Annex 1-5. p28.

We thank everyone who contributed to this issue especially Geoffrey Buga, Nancy MacKeith, Charles Odera and Grace Juan Soma.



## How to Assess for Bilateral Pitting Oedema



Look and feel for a pit in each foot. Oedema in the feet only is classified as **mild (+) oedema**.

If there is no oedema in the feet, STOP. Nutritional oedema always spreads from the feet upwards.



If oedema is present in the feet look for oedema in the lower legs. Use the same technique as for the feet checking both sides. Bilateral pitting oedema in the feet AND the lower legs is classified as **moderate (+2) oedema**.



If oedema is present in the feet and lower legs, check the hands. Use the same technique. If there is oedema in the feet, lower legs, and hands this oedema is also classified as **moderate (+2) oedema**.



If moderate oedema is diagnosed, check for oedema around the eyes (periorbital oedema). Do not press on the eyes to look for pitting. If there is oedema around the eyes this is classified as **severe (+3) oedema**. Children with +3 oedema are at risk of mortality and are always treated in the NRU.

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.