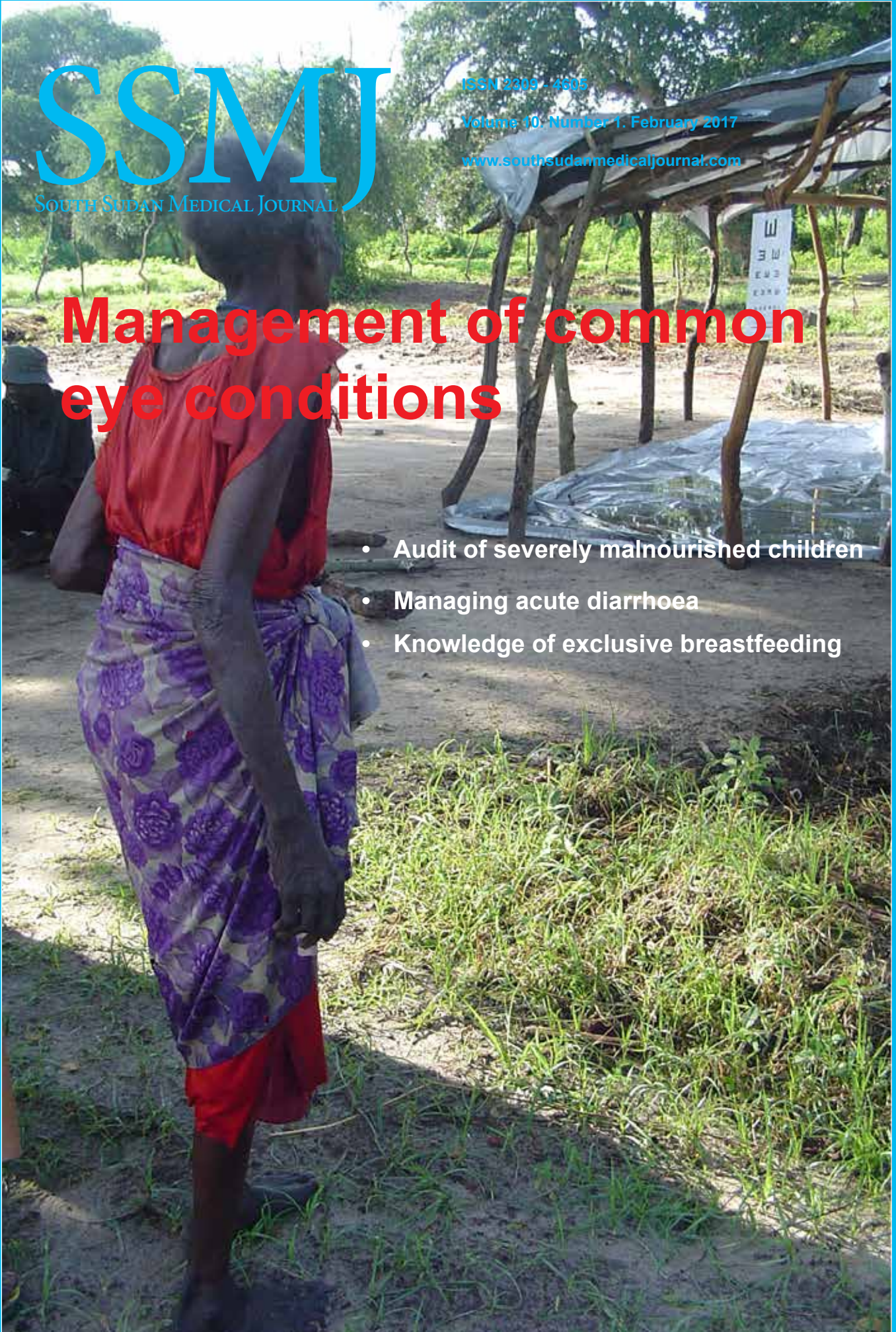


Management of common eye conditions

- Audit of severely malnourished children
- Managing acute diarrhoea
- Knowledge of exclusive breastfeeding



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Children bear the health burden of the conflict in South Sudan

In its appeal for humanitarian assistance for South Sudan, UNICEF is requesting US\$181 million to meet the humanitarian needs of children in the country in 2017 [1]. It painted a bleak picture of how the children of South Sudan bear the brunt of the conflict.

Of the over 3 million people displaced by the conflict since 2013, children make up almost 70% of the refugees. With a devastating economic situation, it is estimated that 40% of the population of the world's newest country are on the verge of hunger, with almost 360,000 children facing severe acute malnutrition.

In most conflict settings across Africa and the world, children almost always pay the ultimate price. In South Sudan, the situation is compounded by the underlying poor health systems even before the conflict. Outbreaks of cholera and measles, in addition to malaria and respiratory infections, cause more problems to children. Even before the conflict, lower respiratory infection was the leading cause of death, causing an estimated 12% of all deaths in 2012 [2].

There are certain aspects of the health system that will need to be strengthened as the South Sudan Ministry of Health focuses on preventing needless deaths of children. From prioritizing immunization services throughout the country which can prevent deaths from preventable diseases [3], to providing nutrition and supplementary service programmes.

OF THE OVER 3 MILLION
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The three articles on the child health situation in South Sudan featured in this issue highlight some of the pressing problems in the health facilities, made worse by the conflict. Severe acute malnutrition (SAM) is on the rise, compounded by the poor economic situation and high rates of infection especially diarrhoea.

Conflicts bring other problems to children: boys get recruited as child soldiers, and girls get exploited sexually, forced into early marriages and child labour. With over 50% of children out of school, their plight is not going to end soon [1]. The humanitarian situation continues to be an obstacle in improving child health services.

By prioritizing child health needs and care, and ensuring competent healthcare workers in the hospitals and primary health care centres, the Ministry of Health can lessen the devastating effects of the conflict on children.

Dr. Edward Eremugo Luka

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1. UNICEF, Humanitarian Action for South Sudan, 2017 https://www.unicef.org/appeals/south_sudan.html
2. WHO, South Sudan statistical profile, 2015 <http://www.who.int/gho/countries/ssd.pdf?ua=1&ua=1&ua=1>
3. Mindra, Godwin, All children should enjoy the benefits of immunization, Editorial *South Sudan Medical Journal*, 2016, Vol 9. No 4.

Audit of care of severely malnourished children aged 6 - 59 months at Al-Sabah Children Hospital, Juba, South Sudan

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BACKGROUND: Malnutrition is a critical public health concern in South Sudan where an estimated 200,000 children aged under five years are at risk of being malnourished. Studies have shown that adequate and timely treatment of these children leads to reduced mortality.

OBJECTIVE: To determine the proportion of children aged 6 – 59 months diagnosed with severe acute malnutrition (SAM) who were appropriately managed according to World Health Organization (WHO) guidelines.

METHODS: A short hospital-based prospective longitudinal survey of children admitted with a diagnosis of SAM to Al Sabah hospital, Juba. One hundred children were enrolled.

RESULTS: Overall, 49% of children had marasmus and tended to be older than those who had kwashiorkor. Common comorbidities at admission were malaria (42%) and gastroenteritis (39%). Of the eight steps of care evaluated, five steps were correctly followed in more than 70% of cases. The proportion of children appropriately managed were 77% in step 1, 59% in step 2, 85.4% in step 3, 98% in step 4, 58% in step 5, 6. 97% in step 7 and 86% in step 8.

CONCLUSION: Adherence to the WHO guidelines for treating SAM in this center was moderate.

Key words: Malnutrition, severe acute malnutrition, audit

Introduction

Severe acute malnutrition (SAM) is the most important risk factor for illness and death among young children being responsible for about half of all their deaths [1].

In the developing countries, 50.6 million children under the age of 5 years are malnourished [2]. One in seven South Sudanese children die before their fifth birthday, mainly from preventable diseases such as diarrhoea and malaria. The burden of disease attributable to malnutrition is also substantial with the malnutrition rate exceeding the World Health Organization (WHO) emergency threshold of fifteen percent [3].

According to the South Sudan Household survey 2010, 31% of South Sudanese children aged under five years are stunted, 23% are wasted and 28% are underweight with wide variations across the states [3]. South Sudan ranks 15th highest in the world in terms of mortality rates for children aged under five years [4].

WHO has developed guidelines which includes 10 steps for the stabilization and rehabilitation of children with SAM [5]. Studies have shown that implementing these WHO evidence-based guidelines can reduce mortality rates to less than 5%, and they have contributed

substantially towards the Millennium Development Goal of reducing the under-five mortality [6,7].

Methodology

The study is a short prospective longitudinal survey that audited the implementation of the WHO guidelines on the management of SAM in children aged 6-59 months during the study period of two months (4th February to 4th April 2015). Children with chronic medical conditions such as cardiac, renal diseases, and cancer that predispose them to malnutrition and patients whom the principal investigator participated actively in their emergency treatment were excluded.

The WHO formula were used to calculate the sample size [8] giving a minimum number of subjects of 96. Consecutive enrolment of the patients who satisfied the study criteria and for whom parents/guardians gave written consent, was done until the desired sample size was achieved.

The collected data were entered using Microsoft Access and analyzed using IBM Statistics® V20. Confidentiality was observed, names did not appear on collected data. Data were checked for wrong entry, double-entered and corrected. Back up was created in an external hard disk,

Table 1. Demographic characteristics of 100 children admitted with SAM

Variable	Frequency
Age, months:	
Below 24 months	82
24 months and above check	18
Gender:	
Male	59
Female	41
Type malnutrition:	
Marasmus	49
Kwashiorkor	36
Marasmic-kwashiorkor	15
	Mean (SD)
Age, months:	
All children	17.0 (± 10.9)
Children with marasmus	25.0 (± 13.7)
Children with kwashiorkor	16.0 (± 10.6)
Children with marasmic -kwashiorkor	20.0 (± 7.0)

only coded data were used to ensure confidentiality. Descriptive data were presented as frequency tables, bar graphs, pie charts and cross tabulation. An outcome was considered significant if the p value was equal or less than 0.05.

Ethical considerations

Approval to carry out the study was given by Kenyatta National Hospital Ethics Review and Research committee and the Directorate of Research and Planning, Ministry of Health, Republic of South Sudan. A written consent was obtained from parent/ guardian for any child to be enrolled into the study.

Results

A total of 102 children with an admission diagnosis of SAM were recruited. Two were excluded: one died within 24 hours of admission and for one the principal investigator actively participated in his emergency treatment.

Out of the 100 remaining children 59 were boys and 41 were girls with a male to female ratio of 1.4:1. Table 1 shows their demographic characteristics. Common co-morbidities at admission were malaria (42%) and gastroenteritis (39%).

The most common co-morbid conditions at admission were malaria and gastroenteritis. Many children presented with more than one co-morbidity, including anaemia and pneumonia. At the out-patient department 64% of children were triaged as priority cases and 19% as emergency cases. Overall 83% of children were appropriately triaged.

Table 2. Management of dehydration in the ward

Management of dehydration n=67

Variable	N (%)
IVFs given wrongly	2 (2.9%)
ReSoMal given (Rehydration solution for Malnutrition)	55 (82%)
Correct volume of ReSoMal given	47 (70%)
Number correctly managed for dehydration. (ReSoMal 10mls/kg)	47 (70%)

Comparing the procedures carried out on the 8 steps on the 100 selected children with those in the WHO guidelines the following results were obtained.

Step 1: Treatment or prevention of hypoglycaemia in the wards

Twenty-seven children had a random blood sugar done. Four had random blood sugars of less than 3 mmol/l and all were given 10% dextrose correctly. Immediate feeding was routinely given with 83 children fed within 30 minutes of arrival in the ward. Therefore, 83% of children were appropriately managed for step 1 according to WHO guidelines (95% CI 76-90).

Step 2: Treat / prevent hypothermia in the wards

Only 54% of children had their temperature taken, of these 41% had a fever and so were not provided with extra warmth. The remaining 59% of children were kept warm as recommended by WHO (95% CI 71%-87%).

Step 3: Treat and prevent dehydration in the wards

The management of dehydration is shown in Table 2. Of the 10 children diagnosed with shock all were given the correct type and volume of intravenous fluids (IVF) and so treated correctly.

Step 4: Correct electrolyte imbalance

All 100 children were fed ready-to use-formula F75 that contains extra potassium and magnesium, and so followed the WHO guideline

Step 5: Treat infections routinely

Ninety-two children were managed with broad spectrum antibiotics but only 58 had correct doses as per WHO guidelines.

Step 6: Correct micronutrient deficiencies

Of the 100 children, 62 (62%) received a high dose of vitamin A on day one, and 58% of them were given the correct dose. Overall 58% of children were appropriately managed for step 6. (95% CI 48.33-67.67)

Step 7: Start feeding cautiously

Table 3. Proportion of children managed according to 8 steps of the WHO guidelines for treating Severe Acute Malnutrition

Step	Percent
Step 1: Treat and prevent hypoglycaemia	83%
Step 2: Treat and prevent hypothermia	59%
Step 3: Treat and prevent dehydration	70%
Step 4: Correct electrolyte imbalance	100%
Step 5: Treat infections routinely	58%
Step 6: Correct micronutrient deficiencies	58%
Step 7: Feed cautiously	97.9%
Step 8: Catch up feeds	97%

Ninety nine children (99) were initially fed F75 (as recommended by WHO). Of these: 97 were fed the correct volume in the initial phase; 88 were fed within 30 minutes of admission; 84 has the route of feeding specified and 94 had their food intake monitored.

Step 8: Rehabilitation / catch up feeds

Nine of the 100 patients died within the first 7 days of admission, and case fatality rate was therefore 9%. Of the 91 patients who were alive on day 7 after admission, 88 were prescribed F100 and 86 were given the correct volume, so 97% were appropriately managed according to the WHO guidelines (95% CI 93.66%-100.34%). Two patients absconded before day 7 after admission, and were therefore lost to follow-up. Table 3 shows the proportion of patients appropriately managed in 8 of the steps of the WHO guidelines.

Discussion

This study compared current practices of care of children with SAM in the malnutrition wards at Al-Sabah Children's Hospital with the WHO guidelines [5].

Prompt diagnosis, treatment and prevention of hypoglycaemia was inadequately done at with 83% who were treated appropriately. Eighty two percent of children were fed within one hour of admission. A higher percentage of patients were appropriately triaged at OPD.

Children with severe malnutrition are susceptible to hypothermia. During this study, temperatures were not routinely taken in critically ill children

Because of the difficulty in diagnosing dehydration and its severity in malnourished children, rehydration fluids should only be given intravenously if children are in shock [5]. Severely malnourished children not in shock should be rehydrated orally using ReSoMal which has low

sodium and high potassium levels [5]. These guidelines were not adequately followed and a number of children not documented to be in shock were prescribed IV fluids both in OPD and the ward. Choice of IV fluids for shock was unsatisfactory in OPD compared to the wards with 11.2% of children being resuscitated with normal saline. Although we do not have evidence for this, it is likely that the use of the wrong rehydration fluids could be explained by differences in knowledge and skills of health workers.

Children with SAM should be given small frequent feeds of a starter formula and continue breastfeeding where applicable. In this study 99% of children were fed with ready-to-use starter formula (F75) and those breastfeeding continued to do so. Constant availability of the RUTF and well-trained professionals to guide their use may explain the success in this case. F75 was always available in the ward unlike in South Africa [6]. Monitoring and computing daily feeds was done for 94% of children unlike Nzioka finding at Kenyatta National Hospital (Kenya) where monitoring of feeds were rarely done [9]. Studies done in other places have shown that activities that require frequent physician and nursing staff bedside presence are often poorly done [10]. Constant availability of the RUTF and well-trained nutritionists to guide their use may explain the success in this case.

In our study most of the children were accompanied by caregivers who were responsible for feeding their children; charting and supervision was done by the nurses and the nutritionists. For the duration of the study, most of the caregivers learnt how to feed their children competently. However, a few were sharing their ward diet with the children. Although the caregivers' diet was not designed for treating malnutrition, we infer that there is a great potential for caregivers to contribute to care of children in view of the shortage of nursing staff, especially if the caregivers are properly counselled and supervised.

The study was not designed to assess staff's knowledge of the WHO guidelines. Study exclusion criteria biased the study towards survivors.

Conclusion

Overall, severe malnutrition was moderately managed at Al Sabah Children's hospital with patients being managed appropriately in more than 50% of cases, poor management was noted in steps concerned with clinician prescription. Major shortfalls in care include delayed seeking of medical care, treatment of hypoglycaemia and hypothermia, and inadequate and basic nursing care such as monitoring of fluids and vital signs. Supply of major commodities was good most of the time.

Shortage of nurses, Doctors and nutritionists and low morale noted in this study compromised quality of care. Availability of adequate skilled, motivated, well trained staff is vital determinant of successful implementation.

There is need to assess the knowledge of the staff of the guidelines and carry out training according to the gaps identified; infrastructural improvement for the malnutrition rooms and improving staffing levels are key to proper implementation of the WHO guidelines and therefore improve quality of care. A follow up study will be needed to find out the level of implementation of WHO guidelines after training.

References

1. UNICEF. Undernutrition contributes to nearly half of all deaths in children under 5 and is widespread in Asia and Africa <http://data.unicef.org/nutrition/malnutrition.html>.
2. World Health Organization. Joint child malnutrition estimates - Levels and trends (2015 edition) <http://www.who.int/nutgrowthdb/estimates2014/en>
3. Scaling up nutrition – South Sudan <http://scalingupnutrition.org/sun-countries/south-sudan>
4. United Nations Children Fund. Level and Trends in child mortality report 2012. http://www.who.int/maternal_child_adolescent/documents/levels_trends_child_mortality_2012.pdf?ua=1
5. Ashworth A, Khanum S, Jackson A, Schofield C. Guidelines for the inpatient treatment of severely malnourished children. World Health Organization. 2003 and Updates on the management of severe acute malnutrition in infants and children WHO 2013 http://apps.who.int/iris/bitstream/10665/95584/1/9789241506328_eng.pdf
6. Ashworth A, Chopra M, McCoy D, et al. WHO guidelines for management of severe malnutrition in rural South African hospitals: effect on case fatality and the influence of operational factors. *Lancet* 2004; 363:1110-1115.
7. Deen JL, Funk M, Guevara V, et al. Implementation of WHO guidelines on management of severe malnutrition in hospitals in Africa. *Bull WHO* 2003; 81:237-243.
8. World Health Organization. Health research methodology: a guide to training on research methods. WHO, 2001, 2nd edition p76.
9. Nzioki C, Irimu G, Musoke R. Audit of Care of Children aged 6 to 59 months admitted with severe malnutrition at Kenyatta National Hospital, Kenya: *International Health* 2009: 91-96.
10. Falbo AR, Filho MB, Cabral JE, et al. Implementation of World Health Organization guidelines for management of severe malnutrition in hospital in north east Brazil. *Cad. Saude. Publica*, Rio de Janeiro, 22: 561-570.

GUINEA WORM DISEASE NEARS ERADICATION

Guinea worm disease, or dracunculiasis, is a parasitic disease caused by the nematode worm *Dracunculus medinensis*. People become infected when they drink water contaminated with copepods (water fleas), which are the vector of the disease. When the copepods are dissolved by gastric juice, larvae of *dracunculus* are released, and penetrate the stomach or intestine. Mating between male and female worms occurs in connective tissue about 3 months after infection, after which male worms die. Female worms migrate, usually to lower limbs, about 8–10 months after infection. Emergence of the worm through the skin to shed larvae causes an intense burning and itching sensation. Patients may try to relieve symptoms by immersing the lesion in water sources that are also used for drinking, which in turn allows larvae to infect copepods and continue the life-cycle. The disease is seldom fatal, but the only form of patient management is the slow extraction of the emerging female worm by winding it around a stick, which can take weeks during which time the patient may be too incapacitated to carry on activities of daily living.

Africa was once plagued with guinea worm disease, but it began to disappear as water treatment improved. Even in 1986 there were an estimated 3•5 million cases annually. However, the past 30 years have seen a decline in cases to just 22 in 2015. Only four countries are now affected: Chad, Ethiopia, Mali, and South Sudan (5 cases). There is no drug treatment or vaccination – only simple effective preventive measures which include stopping people from drinking water contaminated with copepods by providing safe water sources, filtering water through a fine mesh, boiling, or treating water sources with a larvicide to kill copepods. People with emerging guinea worms are prevented from entering water sources by community level case detection and guarding water supplies.

The Carter Center has coordinated funding, persuaded companies to donate larvicides and materials for water filters, liaised with governments, and even organised a 6 month “guinea worm cease fire” during Sudan’s civil war.

See http://www.cartercenter.org/health/guinea_worm/index.html and The Lancet Infectious Diseases [http://dx.doi.org/10.1016/S1473-3099\(16\)00020-7](http://dx.doi.org/10.1016/S1473-3099(16)00020-7)

Management of acute diarrhoea among children aged 6 - 59 months admitted at Juba Teaching Hospital

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INTRODUCTION: Diarrhoea is a leading cause of mortality and morbidity in children under five worldwide and accounts for 42.9% of under-5 mortality in South Sudan. Clinical outcomes for diarrhoea correlate with the quality of hospital care.

METHODOLOGY: The standard WHO/IMCI for assessment of health workers' performance in the management of illnesses in children under 5 years was adapted and used in the study. Questionnaires and interviews were used to collect data on health workers' knowledge and practice in the management of acute diarrhoea. Descriptive analysis was used to determine the means, frequencies and proportions of the variables.

RESULTS: Thirty nine health workers were interviewed and 202 medical records of children admitted with acute diarrhoea between March and June 2014 were examined. The majority (75.74%) of the children were 6-24 months old. Most assessments were incomplete; the commonest sign assessed was sunken eyes (75.12%) and the least assessed was ability to drink/breastfeed (34.32%). Seventy five percent of patients were classified correctly according to WHO guidelines and 61% of health workers administered fluid therapy correctly. Health workers' knowledge of how to assess the hydration state was poor (below 50%).

CONCLUSION: There was inadequate assessment and documentation of the signs and symptoms of dehydration and inappropriate use of rehydration fluid therapy in the children admitted with acute watery diarrhoea. Regular in-house training and feedback and provision of supplies should be given to the clinicians in order to improve the quality of care.

Key words: acute diarrhoea, assessment, South Sudan

Introduction

Most deaths of children under 5 years old are due to conditions that can be prevented or treated with access to simple, affordable interventions. The leading causes of death are pneumonia, diarrhoea and malnutrition [1]. The quality of care provided in low-income countries is often poor. More than half of the diarrhoea cases are complicated by malnutrition. The World Health Organization (WHO) has guidelines for treating diarrhoea [2].

Diarrhoea has remained among the top five causes of mortality and morbidity in South Sudan, particularly in infants and children aged below five years – among whom the death rate is 104/1000 live births. The prevalence of diarrhoea among children aged under five years is 42.9% in South Sudan [3], compared to Kenya where it is 17.0% [4].

The government of South Sudan introduced the

Integrated Management of Childhood Illness (IMCI) in 2007 included in the basic package of health and nutrition services [5]. However, only four out of 10 counties are implementing this strategy to some degree, mainly concentrating on improving case management skills and health care delivery systems. With funding from WHO, UNICEF and other partners, training has been provided for health workers but is reaching some counties only partially. Overall the implementation of the IMCI strategy is inadequate [6].

Therefore, the primary objectives are:

- To determine the proportion of children aged 6-59 months with acute diarrhoea at JTH who are assessed for clinical signs of dehydration and classified
- To determine the proportion of children aged 6-59 months with acute diarrhoea correctly prescribed IV fluids and/or ORS for the management of dehydration as per WHO guidelines

The secondary objectives are:

- To describe the knowledge of health workers with regards to the assessment and classification of diarrhoea and the clinical indications of rehydration fluids in the management of children with acute diarrhoea.
- To describe the views of health workers on availability of commodities necessary for management of acute diarrhoea.

Methodology

The study was cross-sectional with two parts:

1. A hospital based retrospective audit of records of children aged 6-59 months admitted with acute diarrhoea at JTH between March and June 2014, and
2. Interviews of health workers assessing their knowledge on the management of acute diarrhoea in children aged 6-59 months.

Using the Fisher formula $n = (Z^2 \times p \times (1-p)) / d^2$

the sample size of 170 was estimated for the audit files. Z = critical value at 1.96, P = proportion of records to be 50%, d = degree of precision / sample error 7.5%. 10% of the estimated sample size was added to cater for missing records, and this brought the sample size to 187.

There were 60 health workers running the paediatrics departments. All health workers who had managed a child with diarrhoea and dehydration in the past 3 – 12 months prior to the study period were interviewed.

The medical records of all patients who had been admitted during the study period with acute diarrhoea were obtained. Children who met the inclusion criteria were included consecutively till the required sample size was met. Informed written consent was obtained.

All data were computerized, cleaned and corrected for outliers, and transferred into Microsoft Access database and then analysed using IBM-SPSS software version.

Ethical approval was provided by the Kenyatta National Hospital, University of Nairobi, Ethics and Research Committee, and the Directorate of Research and Planning, Ministry of Health of the Republic of South Sudan.

Limitations

- It was not possible to verify whether or not the health worker documented every assessment he/she made.
- Some records may be lost, thus a 10% addition to the sample size was included to overcome this.
- Self-reported data is subject to recall and reporting biases.

Results

The study examined 202 medical records of children admitted to TH with acute diarrhoea between March and June 2014. The majority (75.74%) of the children were 6-24 months old, 12.38% were 45-59 months old and 10.8% were 25-47 months old. The mean age was 14.79 months (SD: 11.22). There were 98 (52.9%) males and 87 (47.0%) females.

Co-morbidity was identified in 122 (60.40%) of the 202 patients. The most common was malaria with 90 cases (73.77%) followed by pneumonia with 24 cases (19.67%) and others (septicaemia and urinary tract infection).

The mean duration of diarrhoea was 3 days (SD=1.92) and the mean duration of vomiting was 3 days. (SD: 1.56). Documented clinical features of acute watery diarrhoea are presented in Table 1. Table 2 shows the classification by health workers of children according to their degree of dehydration.

Health workers' practices with regards to hydration fluid administration was assessed and the findings are in Table 3.

Thirty nine members of staff were interviewed to assess their knowledge of the management of acute diarrhoea to:

- ascertain their adherence to WHO guidelines and
- determine the adequacy of the facility and equipment availability for the management of acute diarrhoea.

Seventeen (41.3%) of the health workers interviewed were aged between 31 and 40 years; 29 (74.4%) were female and 10 (25.6%) were male. There were 2 (5.13%) consultants, 12 (30.8%) medical officers, 6 (15.4%) interns and 17 (43.6%) nurses. All the health workers interviewed had managed a child with acute diarrhoea but only 13 (33.3%) had had training in IMCI. Table 4 shows the knowledge of the health workers on the danger signs indicated in IMCI.

On the signs of dehydration, 37 (94.9%) of the health workers named sunken eyes, 35 (89.74%) skin pinch, 5 (12.82%) irritability and 25 (60.10%) other signs such as weight loss, dry mouth, sunken fontanel and dry skin.

Discussion

This study sought to determine the level of adherence by health workers to the national guidelines on the diagnosis and treatment of acute watery diarrhoea in children. The majority of the children admitted to JTH with acute diarrhoea were aged between 6-24 months a finding similar to a study in Garissa, Kenya [7]. We found that the commonest sign assessed was sunken eyes and the least assessed was ability to drink/breastfeed, which was not the case in Garissa.

Table 1. Clinical signs assessed by health workers and their findings (n=201 – 1 case file missing)

Clinical sign	Assessed n (%)	Findings n (%)
Sunken eyes	151 (75.12%)	Present 108 (71.52%) Absent 43 (28.48%)
Skin pinch	111 (55.22%)	Immediate 53 (47.75%) Slow/prolonged 58 (52.25%)
Level of consciousness	124 (61.69%)	Alert 111 (91.12%) Altered consciousness 11 (8.87%)
Ability to drink/breastfeed	69 (34.32%)	Able to drink /breast feed 46 (66.67%) Unable to drink/breast feed 23 (33.33%).

The majority of patients were correctly classified according to WHO guidelines, much higher than the Garissa study despite the fact that the health workers there had been trained in IMCI and thus the expectation was that they would adhere better to the WHO guidelines.

Fluid management is key to the outcome of the children admitted for diarrhoea. Correct hydration fluid therapy was prescribed to? Less than half the patients-with no dehydration (43%), some dehydration (37%) and severe dehydration (20%) (from Table 3). Tanzanian study showed that 73.3% of patients with no dehydration or some dehydration had correct rehydration fluid administered [8]. This better performance in Tanzania could be due to the fact that 52% of the health workers had had training in IMCI while in JTH only 3.3% had been trained. There was also an inappropriate use of intravenous fluid (IVF) at JTH. IVF is more expensive than ORS, causes pain to the patients and requires closer monitoring which may be difficult when staffing numbers are low.

This study found that most patients without dehydration were not prescribed ORS, whereas all the patients with severe dehydration were given the correct fluids. In the Garissa study IVF was administered to 9% of the patients' dehydration and almost a third of the patients with a diagnosis of some dehydration [7]. This shows that health workers in JTH followed the guidelines in the management of severe dehydration.

One hundred and twenty two (60.40%) of our patients had a co-morbidity, malaria being the most common. This is similar to the Garissa study [7] where 80.6% had co-morbidity of which 54% had malaria. This study's findings could be due to the malaria endemicity in the country, whereas malaria is not endemic in Garissa.

Our health workers had some knowledge of the

Table 2. Health worker classification of the degree of dehydration (n=198)

Classification of dehydration	Health worker's classification of dehydration n %	Correct classification (Subset of number classified in column 1) n (%)
No dehydration	83 (41.91%)	70 (84.33%)
Some dehydration	62 (31.31%)	70 (84.33%)
Severe Dehydration	25 (12.63%)	22 (88%)
Other	28 (14.14%)	
Total		145 (75.68%)

management of acute diarrhoea on the background of their limited training in IMCI. Irritability was the least recognized sign of dehydration but knowledge about sunken eyes and skin pinch was good

An Ethiopian study [9] found that 54% health workers recognised shock as a feature of dehydration but our findings were much lower at 5.1%. Some of the patients were not classified using terms consistent with the guidelines which was disappointing given the IMCI teaching.

Despite many challenges, most, although not all, of the commodities needed for the management of acute diarrhoea were available at JTH.

Conclusions

There was inadequate assessment and documentation by the health workers of the signs and symptoms of dehydration in the children admitted with acute watery diarrhoea compared to the WHO guidelines.

There was inappropriate use of rehydration fluid therapy compared to the WHO guidelines.

Apart from ORS and the IV fluids the supplies needed in the management of acute watery diarrhoea at the Juba Teaching Hospital were inadequate.

Recommendations

1. Regular in-house training and feedback should be given to the clinicians and other health workers to improve the quality of care, particularly in the management of diarrhoea and its resultant dehydration.
2. Guidelines and protocols for the management of acute watery diarrhoea should be available and easily accessible in the wards and out-patient department.

Table 3. Correct classification with the correct choice of hydration fluid according to WHO (n=103)

Classification of dehydration	Correct choice of hydration fluid n (%)
No dehydration	44 (42.72%)
Some dehydration	38 (36.89%)
Severe Dehydration	21 (20.39%)

- The commodities needed for the management of acute diarrhoea should be made available.

References

- UNICEF/WHO 2009 Diarrhoea: Why children are still dying and what can be done. UNICEF/WHO p5 6 7. http://apps.who.int/iris/bitstream/10665/44174/1/9789241598415_eng.pdf
- WHO. 2005. The treatment of diarrhoea: A manual for physicians and other serious health workers. 4th Revision. WHO, Geneva. <http://www.who-2005-apps-who.int>
- Ministry of Health, South Sudan Household Survey of 2010, August 2013 <http://static1.1.sqspcdn.com/static/f/750842/25554023/1413444076180/SS+HHS+2010+Final+2010+Report.pdf?token=YkhogtKPjsGXxEZXde0P2xmxOTE%3D>
- Kenya National Bureau of Statistics, Kenya Demographic and Health Survey 2008- 2009, June 2010 Chapter 8; p136. <http://apps.who.int/medicinedocs/documents/s17116e/s17116e.pdf>
- Ministry of Health, South Sudan Basic Package of health and nutrition service for South Sudan. January 2009. <http://docplayer.net/9884924-Ministry-of-health-government-of-southern-sudan-basic-package-of-health-and-nutrition-services-for-southern-sudan.html>
- Rajkotia Y, Boulenger S, Pressman W 2007 The Health Systems 20/20 Project. USAID. United States Agency for International Development, South Sudan Health System Assessment. pvi, vii, 29 http://healthsystemassessment.org/wp-content/uploads/2012/06/Sudan_GAVI_Version_9_08_FIN_.pdf
- Weru M. (unpublished). Audit of management of diarrhoea among children aged 2 - 59 months admitted to Garissa Provincial Hospital, Kenya. Nairobi University.
- Nicholas DW et al. 2009. Why first-level health workers fail to follow guidelines for managing severe disease in children in the Coast Region, the United Republic of Tanzania. Bulletin of the World Health Organization. 87:99-107 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2636200/>
- Araya M, Mark S, Geert Jan D and Roman B Knowledge and performance of the Ethiopian health extension workers on antenatal and delivery care: a cross-sectional study, Human Resources for Health 2012, 10:44. <http://www.human-resource-health.biomedcentral.com/articles>

Table 4. Health workers' knowledge of danger signs

Danger sign known by health worker	n	Percent %
A child with a change in conscious level/ irritability	7	17.95
A child who vomits everything	18	46.15
A child who is unable to drink or breastfeed	6	15.38
Child with convulsions	16	41.03
Don't know	12	30.77
Others	5	12.82

INTERGROWTH-21st

The International Fetal and Newborn Growth Consortium for the 21st Century, or INTERGROWTH-21st, is a global, multidisciplinary network of more than 300 researchers and clinicians from 27 institutions in 18 countries worldwide and coordinated from the University of Oxford. It is dedicated to improving perinatal health globally and committed to reducing the millions of preventable newborn deaths that occur as a result of preterm birth or poor intrauterine growth.

This website provides clinicians and researchers access to the INTERGROWTH-21st Global Perinatal Package. This package is comprised of new, globally-validated standards and practical training resources. The following standards are available to download now:

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Knowledge and practice of exclusive breastfeeding among women with children aged between 9 and 12 months in Al-Sabah Children Hospital, Juba, South Sudan

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INTRODUCTION: Breastfeeding is an important tool for preventing childhood illnesses, and obesity, and hypertension later on in life, and it reduces the cost of food for the family and the country. Appropriate practices that support exclusive breastfeeding in the first six months reduce childhood morbidity and mortality.

METHODOLOGY: 384 mothers with children aged 9 to 12 months attending the immunization and paediatric outpatient clinics were interviewed. Statistical Package for Social Sciences (SPSS) was used for data handling. Descriptive statistics and univariate logistic regression were used to analyse the data.

RESULTS: The majority of mothers were aged between 21 – 25 years (43.5%), had 2 - 4 children (55.5%) and primary education (48.2%). Most mothers had started breastfeeding within the first hour of delivery (76.8%), and knew that breastfeeding was nutritious to the baby. Parity and mother's level of education were significant factors associated with exclusive breastfeeding ($p < 0.05$). There was no statistically significant association between occupation, age of the mother, mode of delivery and exclusive breastfeeding ($p > 0.05$). There was no statistical difference in rate of exclusive breastfeeding in mothers attending the OPD and the immunization clinic (p value=0.09).

CONCLUSION: Most mothers knew the benefits and definitions of exclusive breastfeeding. The early measures supporting breastfeeding are well practiced. Parity and mothers' education significantly affected exclusive breastfeeding.

Keys words: Exclusive breast feeding, child, nutrition

Introduction

Breast milk is the optimal food for infants. The World Health Organization (WHO) recommends that infants are breastfed exclusively (EBF) for their first six months, and then start complementary feeding while continuing to breastfeed for a minimum of two years [1].

The 2010 Sudan Household Health Survey [2] reported that only 45% of babies are exclusively breastfed for their first 6 months probably because of inadequate information on the importance of early initiation and giving only breast milk, inadequate family and community support, lack of counseling and mothers' heavy workloads keeping them away from their children [3].

The primary objective of this study was to assess the practice of EBF during their babies first 6 months among mothers with infants now aged between 9 and 12 months attending the immunization and the outpatient clinics at

Al-Sabah Hospital, Juba. Secondary objectives were to:

- Assess mothers' knowledge of EBF.
- Identify factors affecting the success of EBF.

Methodology

This was a cross-sectional descriptive hospital-based study conducted at Al-Sabah Hospital from September 1st to October 20th 2014. The study population was women with children aged between 9 and 12 months attending the immunization and the paediatrics outpatient clinics. Consecutive sampling was done on mother/child pairs until the sample size of 384 was reached.

A questionnaire was used to obtain information on socio-demographic status, birth related events, knowledge, and practices related to breastfeeding during the first six months, sources of breastfeeding education and family support.

A Statistical Package for Social Sciences (SPSS) was

used for data entry and analysis. Descriptive analysis is presented in terms of mean, median. Frequencies are reported as numbers and percentages. Five point Likert scale was applied to questions on knowledge, ranging from strongly agreed (1) to strongly disagreed (5). The mean and SD was calculated for each answer. Univariate analysis was done.

Ethical approval was given by the Kenyatta National Hospital, University of Nairobi Ethics and Research Committee and the Directorate of Research and Planning, Ministry of Health, South Sudan. Consent was obtained from all mothers whose confidentiality was ensured.

Results

The median age of the 384 mothers was 23 years, IQR=20 - 26. 54.2 % of their children were females.

The rate of EBF was 63.2%. The majority (70%) of the mothers had skin-to-skin contact with their babies immediately after birth, 76.8% started breastfeeding in the first hour, and 98.1%. 'roomed in' with their babies. 40.6% of mothers gave prelacteal feeds. Only few (36) were Exclusive breast feeding, child, nutrition not breastfeeding during the period of study, of which 75% stated that child refused by himself. Only 4.4% of the mothers stopped breastfeeding due to maternal breast problems.

The mothers' knowledge about breastfeeding was assessed using the Likert scale (where 1 = strongly agree and 5 = strongly disagree) and given as means and SDs.

Most mothers agreed that:

- breastfeeding is nutritious to the baby (mean: 1.15, SD=0.53);
- increases mother-baby bonding (mean 1.18, SD 0.46);
- protects babies from infection (mean 1.25 SD 0.66);
- HIV can be transmitted via breast milk (mean: 1.57, SD: 0.66).
- babies should be breastfed on demand day and night (mean: 1.04, SD: 0.22), from both breasts at each feed (mean: 1.06, SD: 0.27) and with good attachment to the breast (mean: 1.28, SD: 0.4).
- that a cup and spoon (mean: 1.74, SD: 0.77) and not a bottle should be used for feeding expressed milk (or formula) although use of expressed breast milk was low (mean 3.15, SD: 1.06).
- bottle feeding can cause diarrhoea (mean: 1.72, SD: 0.68).
- the definition of EBF was 'giving only breast milk (and modern medicines only if prescribed)' (mean: 1.39, SD: 0.54).

Table 1. Characteristics of the mothers

Maternal data	n	Percent (%)
Mother's age (n=340*)		
16 – 19 years	37	10.8
20 – 29 years	263	77.3
30 – 39 years	40	11.8
Mode of delivery		
Vaginal (SVD)	370	96.4
Caesarean section (CS)	14	3.7
Parity (n=353**)		
1	137	38.8
2-4	196	55.5
Above 4	20	5.7
Level of Education		
None	53	13.8
Primary	185	48.2
Secondary	112	29.2
Tertiary	34	8.9
Occupation		
Housewife	324	84.4
Salaried employee	34	8.9
Self-employed	24	6.3
Student	2	0.5
Marital status		
Single	112	29.2
Married	261	67.9
Divorced	10	2.6
Widowed	1	0.3
Religion		
Christian	369	96.1
Muslim	15	3.9
ANC visit		
Yes	370	96.4
No	14	3.7
Number of ANC visits (n=348)		
1	11	3.1
2	30	8.6
3	55	15.8
> 4	252	72.4
Place of delivery		
Hospital	225	58.6
Health Centre	81	21.1
Home	78	20.3

* excluding 40 missing data

** excludes 31 missing data

*** excludes 36 missing data

Table 2. Univariate analysis of factors affecting the success of exclusive breastfeeding

Variable	Category	Variable Category				Chi square / *F	P value
		Yes		No			
		N	%	N	%		
Age	16-19 years	26	70.3%	11	29.7%	3.990	0.136
	20-29 years	219	83.3%	44	16.7%		
	30-39 years	34	85.0%	6	15.0%		
	>=40 years	0	0.0%	0	0.0%		
Level of Education	None	46	93.9%	3	6.1%	14.358	0.002
	Primary	142	82.1%	31	17.9%		
	Secondary	79	73.8%	28	26.2%		
	University	30	96.8%	1	3.2%		
	Others	0	0.0%	0	0.0%		
Occupation	Housewife	250	81.7%	56	18.3%	0.917	0.632
	Salaried Employee	28	87.5%	4	12.5%		
	Self Employed	19	86.4%	3	13.6%		
	Student	0	0.0%	0	0.0%		
	Others	0	0.0%	0	0.0%		
Marital Status	Single	95	88.0%	13	12.0%	3.408	0.182
	Married	202	80.2%	50	19.8%		
	Divorced	0	0.0%	0	0.0%		
	Separated	0	0.0%	0	0.0%		
	Widowed	1	100.0%	0	0.0%		
Religion	Christian	285	82.1%	62	17.9%	1.074	0.300
	Muslim	13	92.9%	1	7.1%		
	Others	0	0.0%	0	0.0%		
ANC Visit	Yes	289	83.0%	59	17.0%	1.155	0.282
	No	7	70.0%	3	30.0%		
Number of ANC visits	1	11	100.0%	0	0.0%	22.254	<0.0001
	2	30	100.0%	0	0.0%		
	3	51	92.7%	4	7.3%		
	>4	122	72.6%	46	27.4%		
Mode of Delivery	SVD	281	82.2%	61	17.8%	1.736	0.784
	CS	12	92.3%	1	7.7%		
Place of Delivery	Hospital	176	82.2%	38	17.8%	0.249	0.883
	Health Centre	56	81.2%	13	18.8%		
	Home	64	84.2%	12	15.8%		
	Others	0	0.0%	0	0.0%		
Parity	1	127	96.2%	5	3.8%	76.250	<0.0001
	2	65	69.1%	29	30.9%		
	3	47	97.9%	1	2.1%		
	4	16	42.1%	22	57.9%		
	>5	13	72.2%	5	27.8%		
Mean mothers' age		22.77		24.10		2.509	0.114
Parity		2.03		2.95		23.828	<0.0001

Table 3. Logistic regression of factors affecting the success of exclusive breastfeeding

	Coefficient	Standard error of coefficient	P value	OR	95% C.I. for OR	
					Lower	Upper
Mother's age	.057	.032	.072	.944	.887	1.005
Parity	.559	.121	.000	1.749	1.380	2.217
Education level	.483	.205	.018	1.621	1.085	2.423

Adjusting for mother's age, women with fewer children and those with lower level of education were more likely to exclusively breastfeed.

Most mothers knew that and that the recommended duration for EBF was six months (84.9%).

The univariate and multivariate analysis of the factors affecting the success of breastfeeding among mothers are shown in Tables 2 and 3.

Adjusting for mother's age, women with fewer children and those with lower level of education were more likely to exclusively breastfeed.

Discussion

The study showed that more mothers tend to breastfeed their infants for the first six months than previously reported [2]. The factor that support the success of EBF in Tanzania and Kenya is starting within the first one or two hours after delivery [(4 5)]. We found that of those who did not start breastfeeding in the first hour had assumed that there was no milk and 7% reported that colostrum was harmful to the baby

More than 70% of the mothers had skin-to-skin contact with their babies immediately after birth, much higher than the 39.7% in the study in California [6]. Other good practices were not offering prelacteal feeds and rooming-in with babies, which were similar or better than in other studies [4,7,8]. Most of the children got sick at some point during their first 6 months but only 20 mothers stopped breastfeeding during the period of sickness. The fear that mothers' breast milk can cause diarrhoea or aggravate a child's illness contributed to this.

Our mothers had not expressed breast milk. This practice is not accepted by most of the mothers, partly because they did not know about it or thought the milk would be bad if kept for long. Most mothers started complementary feeding after six months of age (67.7%).

Forty one mothers had stopped breastfeeding at the time of the study. Child's refusal to breastfeed or mother becoming pregnant were the frequent reasons given – also a common finding in Tanzania [9, 4].

Mothers tended to breastfeed longer where there was support from husbands or provision of work-based designated areas for breastfeeding.

Most mothers knew the advantages of breastfeeding, that HIV could be transmitted in milk, the definition of EBF and proper techniques of breastfeeding - all indications of good ANC practices and family support.

Some studies have shown that women who had a vaginal delivery were more likely to breastfeed exclusively [9]. However, no association was found in this study, as similarly reported in Kenya [10]. Widespread use of spinal anaesthesia for Caesarean Section (CS) deliveries could play a role in allowing mothers to initiate breastfeeding within one hour of birth; also the myth that CS delivery affects mothers' belly shape makes them work hard on EBF so as ensure quick uterine involution and later on a small belly.

This study found that parity, mother's level of education, age and status were associated with EBF. A longer duration of EBF was associated with first time parenthood [10] and level of education. The lower the level of education the more likely the mother was to exclusively breastfeed; however, the majority of university-educated mothers exclusively breastfed. Other studies contradict this assertion [11].

There were no significant association with marital status or rate of EBF. Infants exclusively breastfed should be protected against infection, so we should expect less sickness compared to non-exclusively breastfed babies. But in this study no difference was found.

Conclusion

Knowledge on breastfeeding was generally good, although use of expressed breast milk was low. Early practices that support exclusive breastfeeding were done by the majority of the mothers. Parity and maternal level of education affect the success of exclusive breastfeeding.

Recommendations

1. Carry out more training and awareness campaigns to maintain the high rate of EBF.
2. Conduct house-to-house surveys to establish more in-depth understanding on the practices and knowledge of EBF.
3. Advocate the use of expressed breast milk.

Study limitations

1. Recall bias: some mothers could not recall all the details of their practices in the first six months.
2. The clinical sample of women represented a group which might be more compliant and better informed about infant feeding than a random population sample of women.
3. Being more informed, mothers who come to the hospital might give the desired answers even if they do not practice.
4. The population studied might not represent the whole country, as representatives of some of the states were too small

References

1. World Health Organization 2016. Infant and young child feeding. Fact sheet. Updated September 2016 <http://www.who.int/mediacentre/factsheets/fs342/en/>
2. Sudan Household Health Survey 2010 http://reliefweb.int/sites/reliefweb.int/files/resources/MICS4_Sudan_2010.pdf
3. UNICEF Press release. Breastfeeding. South Sudan. 2013. https://www.unicef.org/esaro/5440_13132.html
4. Shirima R, Gebre M, Greiner T. Information and socioeconomic factors associated with early breastfeeding practices in rural and urban Morogoro, Tanzania 2001 *Acta Paediatr.* 2001 90(8):936-42. <https://www.ncbi.nlm.nih.gov/pubmed/11529546>
5. Ganu D. Assessing exclusive breastfeeding knowledge and practices among mothers of Kajiado District of Kenya, Kenya 2013 Am Public Health Assoc 141st annual meeting <https://apha.confex.com/apha/141am/webprogram/Paper284120.html>
6. Bramson L et al. Effect of early skin to skin mother contact during the first three hours following birth on exclusive breastfeeding during maternity hospital stay, *J Hum Lact:* 2010 26 (2) 130-137
7. Radwan H. Pattern and determinants of breastfeeding and complementary feeding practices of Emirati mothers in the United Arab Emirates, *BMC Public Health* 2013,13 :171
8. Salih MA, El Bushra HM, Satti SA, Ahmed MA, Kamil IA. Attitude and practices of breastfeeding in Sudanese urban and rural communities, Sudan, 1993. US National Library of Medicine National Institutes of Health.
9. Kuyper E, Vitta B, Dewey K. Implication of Caesarean section delivery on breastfeeding outcomes and strategy to support breastfeeding., *Alive and Thrive Technical Brief*, issue 8, Feb 2014 <http://www.health-e-learning.com/resources/articles/275-implications-for-caesarean-delivery>
10. Naanya V, Young mothers, first time parenthood and exclusive breastfeeding in Kenya, *African Journal of Reproductive Health*, 12,(3) Dec. 2008
11. Grummer-Strawn LM, Shewly K. Progress in protecting, promoting and supporting breastfeeding. 1984-2009, *Breastfeeding Med* 2009; 4: S31-9

OPTION B+ MONITORING & EVALUATION FRAMEWORK FOR ANTIRETROVIRAL TREATMENT FOR PREGNANT AND BREASTFEEDING WOMEN LIVING WITH HIV AND THEIR INFANTS

Over the past decade, Prevention of Mother to Child HIV Transmission (PMTCT) programmes have rapidly evolved from delivering a single prophylactic drug to mothers to providing lifelong care and treatment for both mothers and children living with HIV. Lifelong treatment approaches-widely known as 'Option B+'-are expanding from pilots to universal implementation as revised national treatment guidelines are scaled up across generalized epidemic settings. This resource is intended for use among national M&E officers; PMTCT, paediatric, MNCH and HIV Care and Treatment programme managers; and other stakeholders (including donors, implementing partners, and civil society) in countries with generalized HIV epidemics and countries implementing the Option B/ B+ approach to treatment. Using this framework, stakeholders can review, adapt and update current monitoring systems and continuously evaluate programmes, maximizing the potential impact of lifelong treatment programs to improve health outcomes and prevent HIV infections for women, their children and their families.

See <http://www.emtct-iatt.org/m-and-e-framework/>

Management of common eye conditions in a primary health care setting: A guide for South Sudan health workers

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Prevention of blindness

South Sudan has a huge burden of blindness with an estimated prevalence in excess of 1.5% and it is a common reason for patients attending a primary care facility [1]. Seventy five percent of this blindness can be prevented or treated by properly trained middle cadre eye health worker working with simple diagnostic tools in a primary health care setting or by referring to secondary care in a timely manner. In addition to the common causes of visual loss South Sudan suffers with the burden of two infectious diseases, Trachoma predominantly to the East of the Nile and Onchocerciasis to the West of the Nile [2]. It is therefore crucial that the following simple measures are applied at a community level to prevent eye disease and avert blindness.

1. A diet rich in vitamin A and proteins: (green leafy vegetables, yellow fruits, fish, milk, beans).
2. Personal and environmental hygiene: (regular hand and face washing, proper disposal of garbage, human and animal waste and maintenance of a clean family environment).
3. Prevention of eye injuries: (education on vehicle seat belt usage and prevention of injuries in the home and workplace).
4. Improve uptake of childhood immunization.
5. Reduction of neonatal infection: (routine application of tetracycline ointment immediately at birth).
6. Early referral and prompt treatment of serious eye diseases or injuries.
7. Avoidance of both traditional eye medicine and sharing of medication between people.
8. Improvement in management of chemical injury: (immediate flushing of eyes with clean cold water or milk).

Symptoms of eye disease

Some eye diseases, for example cataract, glaucoma and diabetic retinopathy may be present for a long time before symptoms develop, so patients present late with advanced disease. Population wide screening for these conditions would enable early detection, treatment and prevention of sight loss. All adults over the age of 40 years ideally should have a checkup by an eye care worker every two years.

Ophthalmic diagnosis is established firstly by listening to the details of the patient's complaint, both in terms of visual symptoms and visual function, before examination and investigation. Specific symptoms as listed in Table 1 are particularly helpful in reaching a diagnosis.

Examination of eyes

Equipment required

In a primary health care setting the following simple equipment is sufficient for examination of the front half (anterior segment) of the eye where 80% of eye problems occur:

Essential equipment

- Visual acuity chart and pinhole cover.
- Torch.
- Fluorescein dye drops or strips.

Preferable equipment

- Magnifying loupe.
- Ophthalmoscope with a blue filter.
- Local anaesthetic and dilating eye drops.

STEP 1: Assessing visual acuity – see Figure 1

Diagnosis of eye disease begins with testing distance vision (visual acuity) using the modified Snellen "Tumbling E" eye chart, or picture chart. Every health worker should know how to measure and interpret visual acuity, the single most important test in eye examination.

Table 1. Common presenting problems and some helpful questions to aid diagnosis

Pain	Is it light sensitive?	Does it feel like sand or grit?	How severe is the pain?
Itching	What makes it worse?	Any other parts of the body itchy?	Is it seasonal?
Swelling/ Lumps	How did it start?	Where is the swelling?	What makes it worse?
Discharge	What colour is it?	Is it watering or thick discharge?	
Redness	What part of the eye is red?	What makes it worse?	Is it painful?
Vision	Is the whole of the vision cloudy or just parts?	Is it worse for distance or near?	Did it occur suddenly or slowly?
Double vision or eyes movement problems	Constant or intermittent?	Does it get better when one eye is closed?	Are the images side by side or on top of each other?
Problem with children's eyes	When and how did it first start?	Do they seem to see as other children do?	Any other medical or developmental problems?
Floaters	Are new or getting worse?	Are they affecting vision?	Associated with flashing lights?

The following steps should be followed:

1. Place the visual acuity chart on a wall with good lighting or hang it on a tree outside
2. Sit or stand the patient at a distance of 6 meters away from the chart. (If there is no tape measure, walk 6 steps from the chart to determine where the patient should stand)
3. Ask the patient to cover the left eye with the palm of the hand, point out the letters or symbols in each line and let the patient respond by either naming the letters or showing the direction to which the characters of the symbol are pointing. Continue this process until the patient can no longer identify the letters or pictures correctly.
4. Identify the last line of letters the patient was able to read correctly (labeled with a number e.g. 6, 9, 12, 18, 24, etc.)
5. Write the visual acuity as a fraction
 Visual acuity Fraction =
Distance patient sits from the chart (usually 6 meters)
 The smallest line of letters patient able to read clearly
 For example 6/24
6. Repeat the test on the left eye by covering the right eye
7. The test is repeated with the patient looking at the chart through a pinhole, which may show an improvement in the acuity measurement. The pinhole only allows parallel focused light through and reveals the potential visual acuity with corrective glasses or contact lenses.

8. If the patient cannot see any letters on the chart ask if they can count the number of fingers on one hand held at about a meter away. The acuity is recorded as 'count fingers' (1/CF as measured at 1 meter)
9. If the patient cannot count your fingers but can see shadows when you wave your hand in front of them, this is recorded as 'Hand Movements' (1/HM).
10. If the patient cannot see hand movements then use a torch to shine a light in the eye and record the visual acuity as 'Perception of Light' (PL) or 'No Perception of Light' (NPL).

A good visual acuity is when the patient can read the 12 line or smaller (6/12, 6/9 or 6/6). Patients who can only see larger letters above the 12 line should be referred to an eye specialist. Patients with no perception of light (NPL), rarely benefit from medical or surgical intervention but (if both eyes are similarly affected) require a needs assessment for visual rehabilitation when available.

STEP 2: Inspect the eye

The eye is inspected with the help of a light and magnification when available (loupes or ophthalmoscope dialed up to +10 or +20). The eyelids should close without exposing the eyeball, the conjunctiva white or lightly pigmented and the cornea clear. The pupil should be black, round and of equal size in both eyes and constrict equally to light. From a distance of about 1 meter, with the ophthalmoscope, reflected light in the pupil ('red reflex') should be symmetrical. When asked to follow a finger, left and right, up and down the eyes should move together in parallel and the patient should not report double vision. Any abnormal findings should be documented and reported.



Figure 1. Checking visual acuity in the community
(credit Karinya Lewis)

STEP 3: Exam the cornea with fluorescein

The health of the cornea is vital to preserve vision and must be carefully inspected. Fluorescein is an orange dye that stains any defect in the surface layer (epithelium) of corneal and conjunctival cells. The epithelial defect becomes easily visible as it fluoresces luminous yellow under a blue light.

To stain the cornea:

1. Apply 2 drops of local anaesthetic drops on the conjunctival sac.
2. Wait one minute, extend the neck, ask the patient to look up and pull down the lower lid to expose the lower fornix (gap between eyelid and eyeball).
3. Take a strip of fluorescein and put the impregnated tip in the fornix to dissolve the fluorescein in the tear film (or install a fluorescein drop if available in which case anaesthetic drops are not required).
4. Remove the strip and examine the cornea with the blue filter of the ophthalmoscope.

Patients complaining of pain, photophobia, tearing, itching and red eyes often have corneal abrasions or infective ulcers. An ulcer with typical branching appearance may be due to Herpes Simplex Viral Keratitis (HSK) which must not be treated with steroids but rather antivirals to avoid permanent damage to sight (see Caution below).

STEP 4: Evert the lid and examine tarsal conjunctiva

Lid eversion is an important skill for the primary eye care worker. It permits examination of the tarsal conjunctiva under the upper eye lid and aids in the diagnosis of trachoma, follicular conjunctivitis and hidden foreign bodies which cause corneal abrasions.

To evert the lid:

1. Let the patient be seated
2. Instill fluorescein into the lower lid fornix as described above
3. Extend the neck of slightly and ask the patient to look down
4. Hold the upper lid margin (usually gripping the eye lashes) between the thumb and index finger of your right hand and pull it down gently
5. Place the index finger of the left hand or cotton tipped applicator held in the left hand on the skin crease and flip the lid to expose the inner surface of the lid exposing the tarsal plate.
6. Inspect the conjunctiva and note blood vessels and presence of follicles which appear as white yellow pin head swellings on the tarsal plate. . The presence of 5 or more follicles indicates presence of trachoma and lacerations or foreign bodies will fluoresce

Some predisposed patients may develop severe acute glaucoma following dilation of the pupils, so only appropriately trained primary case workers should complete the eye examination with digital assessment of the eye pressure and ophthalmoscopic examination of the retina and optic nerve.

Management of common eye conditions see Figure 2

Eye conditions which should be referred immediately include:

- Perforating or penetrating eye injuries or retained vegetative matter
- Sudden or unexplained loss of vision
- A white pupil in a child
- A child whose eyes are not straight
- Protrusion of the eye ball
- Painful red eye unresponsive to initial treatment and vision rapidly deteriorating

Caution: Avoid use of topical steroid preparations in primary care settings. Some antibiotic eye preparations contain steroids and may be given for an infectious condition. Steroids cause raise in intraocular pressure which is difficult to treat and may lead to blindness. Steroids can worsen fungal or viral ulcers of the cornea and reduce the ability of wounds to heal. Conditions needing steroids should first be evaluated and confirmed by an Ophthalmologist.

Conjunctivitis

Conjunctivitis presents as redness over the white of the eye often associated with discharge. The vision is usually



Figure 2. Child with leukocria (credit Karinya Lewis)



Figure 3. Right eye blind from Trachoma, left eye dense white cataract (credit Karinya Lewis)

Table 2. Differential diagnosis of the red eye

Diagnosis	Symptoms	Signs	Treatment
Bacterial Conjunctivitis	Yellow/green discharge, swollen eye lids, mild redness, no pain	Normal vision, Conjunctiva inflammation, purulent discharge	Tetracycline/ chloramphenicol ointment
Allergic conjunctivitis	Recurrent itchy & tearing eyes with seasonal variation	Normal vision, brown discoloration of conjunctiva, limbal follicles	Lubricant eye drops, antihistamine eye drops
Trachoma	Dirty face, Foreign bodysensation, tearing eyes, discharge	Inflamed eye, follicles on tarsal conjunctiva, in-turned lashes, corneal scars, reduced vision	Hygiene, lubricant eye drops, Tetracycline ointment, azithromycin tablet, trichiasis surgery, (SAFE)
Acute angle closure glaucoma	Severe pain, halos around lights, may vomit, reduced vision, dilated fixed pupil	Peri-limbal redness, reduced vision, dilated fixed pupil, may have intumescent cataract or Uveitis	Refer to eye specialist
Iritis/Uveitis	Pain, headache, photophobia	Redness around limbus, reduced vision, small irregular pupil, secondary cataract	Refer but consider treating systemic conditions if present such as Onchocerciasis, leprosy, syphilis.
Corneal foreign body	Pain, gritty FB sensation, tearing & photophobia	Generalized redness, FB visible on cornea	Chloramphenicol and Refer
Traumatic corneal Perforation or blunt injury	History of injury, pain & photophobia	Reduced vision, laceration of cornea, iris prolapse, Blood level in the eye	Eye pad, systemic antibiotics tetanus and refer
Floaters	Are new or getting worse?	Are they affecting vision?	Associated with flashing lights?

unaffected. Conjunctivitis can be caused by bacteria, viral infection, Trachoma or allergy.

It is important to avoid rubbing the eyes as this may worsen the condition and encourage spread to other people. Promotion of regular hand and face washing of children at home and in schools by the primary eye care worker is paramount, as a dirty face in a child is the most important risk factor for transmission of trachoma.

Other risk factors include unavailability of water, dusty environment and overcrowding.

Treat with Azithromycin tablets and tetracycline eye ointment, especially in areas where Trachoma is widespread. Often the long term effect of Trachoma conjunctivitis is in-turning of the eyelashes causing corneal scarring. In-growing eyelashes can be removed but for long-term management, referral for eyelid surgery is crucial. See Figures 3 and 4.

Table 3. Distinguishing features of conjunctivitis

Symptom	Bacterial	Viral	Allergic	Trachoma
Discharge	purulent	watery	mucoid	watery
Itching	none	some	severe	some
Recurrence	unusual	unusual	seasonal or in certain environments	persistent

Table 4. Treatment of newborn conjunctivitis

Drug	Dose	Frequency	Duration
Tetracycline %1 ointment		Prevention: Single application within 24hrs of birth	Treatment: once a day for 7 days
Kanamycin injection IM	25mg/kg	Once	Single dose
Erythromycin orally	16mg/kg	3 times a day	5 days

Note: Parents should also be treated for sexually transmitted disease (STD)

Table 5. Management of traumatic eye conditions

Condition	Symptoms and signs	Treatment	Comment
Conjunctival hemorrhage	Red spot on the white of the eye, no pain or visual loss, history of blunt trauma, or may be spontaneous.	Reassurance that it will heal without danger to the eye.	If there is pain or loss of vision, refer immediately. Check for high blood pressure.
Conjunctival foreign body (FB)	Scratchy or FB sensation with lid movement. Watery eye Eversion of eye lid may reveal a FB on tarsal conjunctiva.	Apply anaesthetic drops. Remove FB with cotton tipped applicator and apply tetracycline ointment twice daily for 3 days.	Corneal staining with fluorescein may reveal scratch lines suggesting foreign body embedded in the tarsal plate.
Corneal foreign body (FB)	Often due to FB hitting eye during grinding or welding.	Apply topical anesthesia and attempt removal with cotton tipped applicator	If unsuccessful, pad the eye and refer to eye unit for removal using Slit lamp.
Corneal abrasion	History of trauma, pain and tearing. Fluorescein staining shows linear epithelial abrasion	Exclude FB under eyelids. Reassure, pad and tetracycline ointment for 3 days.	If not improving on antibiotics after 2 days then REFER
Corneal perforation	Laceration of the cornea with iris prolapsed out of the wound. Cloudy cornea. Blood in the anterior chamber (hyphema). Cataract.	REFER after Tetanus toxoid 0.5ml, systemic antibiotics, tetracycline eye ointment and eye shield.	Urgent referral if blood fills the whole anterior chamber to avoid corneal staining and loss of vision.
Chemical burns	History of splashed household detergent, aerosol or petrol. Severe pain, photophobia and blurred vision	Copious irrigation with copious amount of water, milk and REFER	Do not use human breast milk often expressed into the eye in these situations. HIV transmission is a particular risk.
Corneal ulcer	Pain, photophobia, reduced vision, redness of the eye and grey patch on the cornea	REFER	Educate about the danger of using traditional eye medicine for treating any eye condition



Figure 4. Advanced trachoma- ingrowing lashes causing a red eye and blindness from scarring (credit Karinya Lewis)

New born conjunctivitis

New born (neonatal) conjunctivitis occurs within 28 days of birth and is usually due to gonococcal or chlamydial infection. It is a common cause of ocular disease and blindness in children.

Prevention may be achieved by good antenatal care, prevention of sexually transmitted infection in pregnant mothers and ensuring that delivery occurs in hospital under the supervision of a qualified midwife. Immediately after birth Tetracycline ointment should be applied to the baby's eyes by the attending nurse. Established infection may be treated as in Table 4

Traumatic eye conditions

Trauma is an important cause of ocular injury and sometimes blindness in rural farming communities and in all areas due to accidents. Vegetative injury with thorns, grass and brooms predisposes to fungal infections. Community education in the prevention of injury is an important activity of the primary eye worker. Common traumatic conditions of the eye are presented in Table 5 along with suggested treatment and action.

Sight impairment is a huge burden on an individual

and their family. In many cases correct management and early referral for eye problems can result in prevention of blindness. Where this is not possible, visual rehabilitation so that a person may function independently is possible with the right help. It is advisable to know where your nearest specialist eye care worker is located and how to contact them. As a primary health care worker it is imperative to develop the skills of history taking and examination of eyes, in order to communicate effectively with the specialist eye care worker who may be able to give appropriate advice over the phone and improve the outcome for the patient.

Location of eye units in South Sudan

1. Juba Teaching Hospital, Unity Avenue, Box 88 Juba
2. Martha Clinic, Anglican Diocese of Yei, Yei
3. Wau Teaching Hospital Eye Department, Wau State, Wau
4. Malakal Teaching Hospital Eye Unit, Upper Nile State, Malakal

References

1. Ngondi, J., Ole-Sempele, F., Onsarigo, A., Matende, L., Baba, S. (2007) Correction: Prevalence and Causes of Blindness and Low Vision in Southern Sudan. *PLoS Medicine* 4(6): e227. doi:10.1371/journal.pmed.0040227
2. Tizazu T, Mburu FM. Prevalence and causes of vision loss in Southern Sudan. *Soc Sci Med.* 1983;17(22):1785-8

Additional Reading

- Vision 2020 National Eye Care Plan for South Sudan 2008, Ministry of Health, Republic of South Sudan
- World Health Organization. Strategies for prevention of blindness in national programmes: a primary Health Care Approach. Second E

Many thanks to everyone who helped to prepare this issue especially Ajibola I. Abioye, Brendan Affle, Charles Bakheit, Nancy McKeith, Ben Parkin, Simon Taylor-Robinson, and Andrew Watson.

Obituary: Dr. Ayul Deng Ajak

There are very few university professors who leave a mark on their students. This is especially true in medical school, when young people, eager to learn the craft of taking care of human lives, passed through their theoretical learnings in basic sciences, into the clinical realm of surgery, paediatrics and obstetrics and gynaecology. Not many people are prepared for the transition, but these exceptional professors help make it smooth and easy.

Dr. Ayul Deng Ajak was one of them. As one of the few professors of Obstetrics and Gynaecology in the College of Medicine, University of Juba between 1991 and 2000. He was soft spoken, with very humble demeanour which made him everyone favourite professor. His classes were well attended, as he explains the complexities of the female reproductive system, its diseases and the processes from fertilization to child birth.

Dr. Ayul was born in Malakal in 1955. He started his career following completion of his medical studies at the Faculty of Medicine, University of Khartoum in 1982. He worked in Malakal Civil Hospital between 1984 and 1986.

He completed his Master of Science in Obstetrics and Gynaecology from the University of Khartoum in 1991, and then joined the University of Juba as a lecturer. He worked as a gynaecologist at Omdurman Military Hospital.

During his time at the University of Juba, Dr. Ayul served as the Deputy Dean, College of Medicine for 5 years. In 2000, he shifted to Upper Nile University as the Assistant Professor and later as Associate Professor of Obstetrics and Gynaecology and Dean of the College.



Dr. Ayul Deng Ajak

In both the Universities of Juba and Upper Nile, Dr. Ayul served with grace and professionalism. From the lecture theatres to the bedside training of medical students, he ensured his students understood their roles as medical professionals who will one day be saving lives in the country. Many of his students had gone on to further their studies in varied specializations in the field of medicine.

Dr. Ayul served as a distinguished member of the Sudan Medical Specialization Board since 2004. He will be missed by his colleagues in the medical fraternity and former students.

Dr. Ayul died on 31 December, 2016. He is survived by his wife and five children (one girl and four boys).

May he rest in peace.

RECOMMENDATIONS FOR PREVENTION AND TREATMENT OF MATERNAL PERIPARTUM INFECTIONS

This brief provides highlights and key messages from World Health Organization's recommendations for prevention and treatment of maternal peripartum infections, including policy and program implications for translating the guidelines into action at the country level. The ultimate goal of the WHO recommendations is to improve quality of care and to reduce preventable death and disability associated with peripartum infection for mothers and newborns. This brief (see – <http://bit.ly/1L8O1Zv>) is intended for policy-makers, programme managers, educators and providers. See the guidelines at http://apps.who.int/iris/bitstream/10665/186171/1/9789241549363_eng.pdf?ua=1

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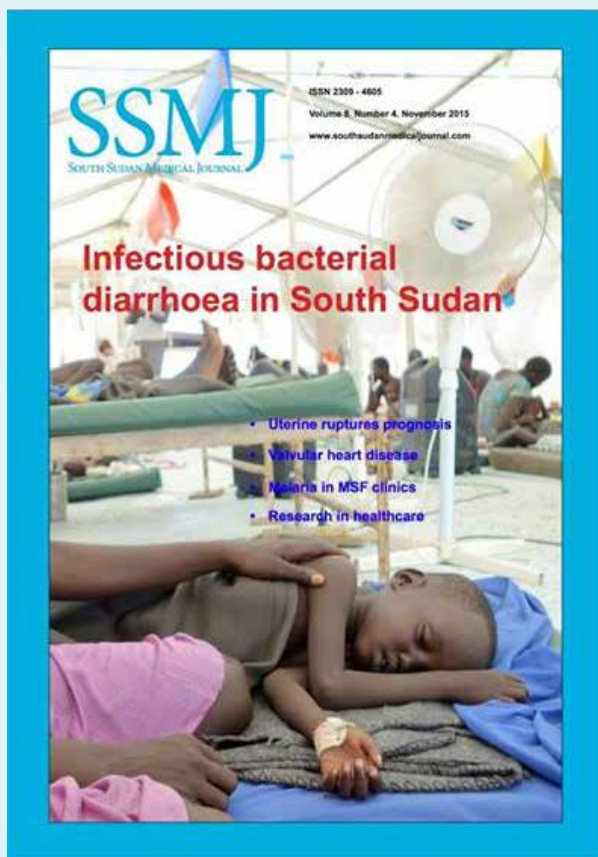
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