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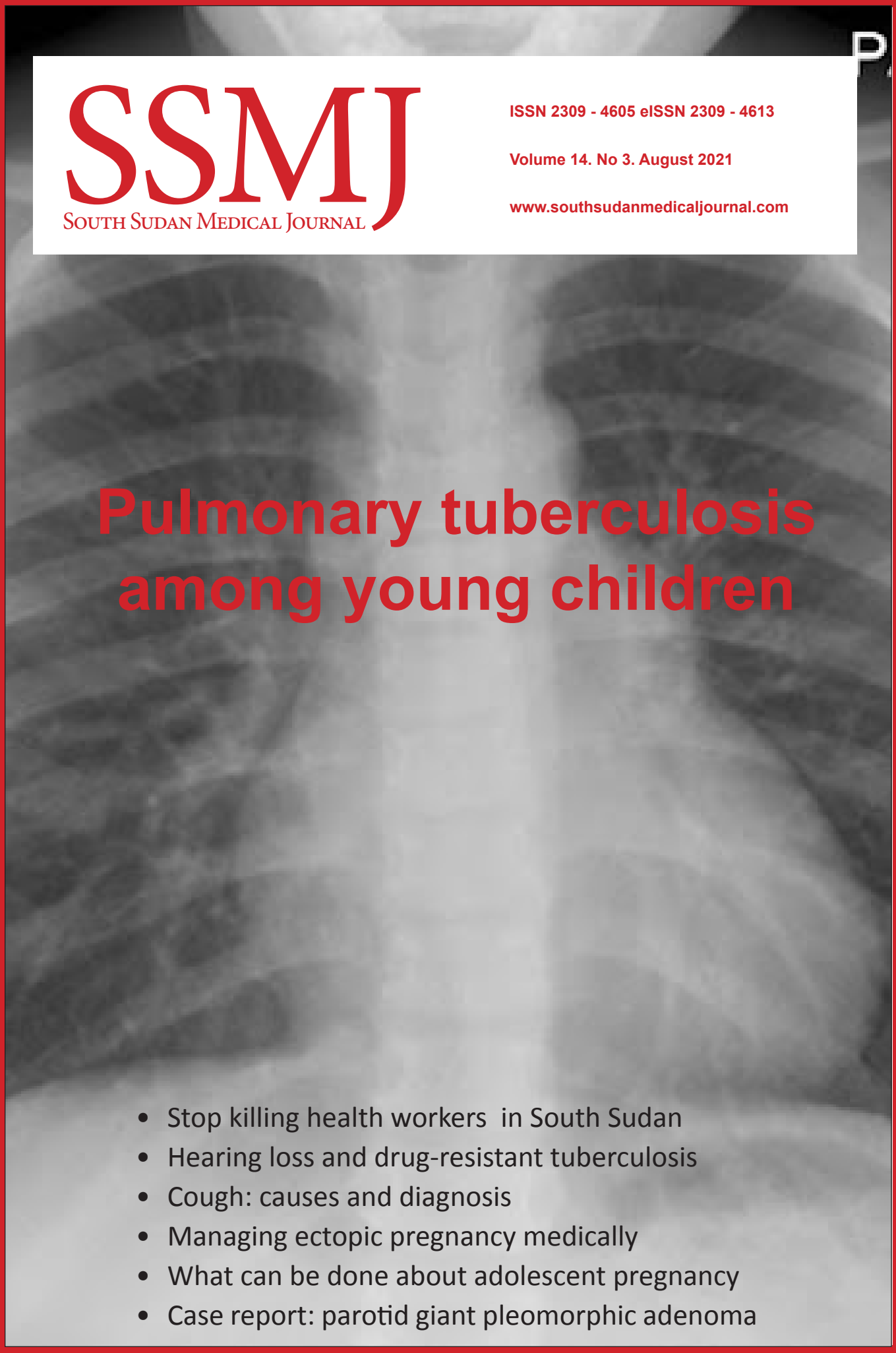

Pulmonary tuberculosis among young children

- Stop killing health workers in South Sudan
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FRONT COVER: This posteroanterior (PA) chest x-ray of a pediatric patient.

Stop killing healthcare workers in South Sudan

Dr Edward Eremugo Kenyi
Editor-in-Chief
South Sudan Medical Journal

As South Sudan marked the 10th anniversary of independence from Sudan on 9 July 2021, the healthcare professionals were mourning the brutal murder of a medical doctor at his duty station. Dr Louis Edward Saleh, who was working at the Ganyiel PHCC in Panyijiar County of Unity State for the International Rescue Committee (IRC), was killed in cold blood within the health facility on 21 May 2021.

The government condemned the killing of Dr Louis.[1] The UN Office for the Coordination of Humanitarian Affairs (OCHA) Humanitarian Coordinator in South Sudan[2], and the South Sudan Doctors' Union (SSDU) also condemned the killing and called for investigations and justice.[3] However, to date, the perpetrators of this heinous crime have not been apprehended.

Shortly afterward, the healthcare fraternity was shocked again to learn that Dr Dominic Pitia, who worked for Care International as the Emergency Health Manager in Akobo, Jonglei State, was found dead in his room on 27 July 2021, in a similarly unclear circumstance. This killing drew widespread condemnation from local and international organizations. Another statement from the SSDU on 28 July 2021 noted that this "killing or mistreatment of health workers would affect the availability of health professionals to provide health services to communities in remote areas where there is no proper law enforcement and access to justice."[4]

Other humanitarian workers have continued to be killed in different parts of the country while delivering services to needy communities.[5,6] According to OCHA, a total of 126 humanitarian workers, mostly South Sudanese, have lost their lives while providing critical assistance to people across the country since the conflict broke out in late 2013.

The targeting of healthcare workers in South Sudan must stop. Healthcare and humanitarian workers are there to serve our communities. They do not distinguish patients by their race, ethnicity, culture, language, or geographical location. They are there to save lives, and they should be protected, a responsibility that falls squarely on the Government, be it local or state.

We call on the Government to provide security for healthcare and humanitarian workers as they deliver life-saving care to the needy and suffering people of South Sudan. It is time for us to stand together with all health workers, call for an end to these heinous attacks, and urgently demand the arrests of the criminals.

The time for action is now.

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Pulmonary tuberculosis among young children with severe pneumonia at Al Sabah Children's Hospital, Juba, South Sudan

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Abstract

Background: Tuberculosis is a major public health problem worldwide. It can present in an acute form especially in endemic settings, which might lead to missed and delayed diagnosis, prolonged hospital stays, and increased mortality in children. South Sudan has a high prevalence of tuberculosis in the adult population. However, there is no published data on paediatric tuberculosis. We aimed to determine the prevalence and factors associated with pulmonary tuberculosis in children admitted with pneumonia in Al Sabah Children's Hospital, South Sudan.

Method: This was a cross sectional study of 404 children aged 2 to 59 months admitted with severe pneumonia from June-October 2018 at Al Sabah Children's Hospital. We excluded children on anti-TB treatment. Data were collected using a pretested questionnaire which captured socio-demographic characteristics, clinical history, physical examination, and laboratory investigations. Sputum examination for Mycobacterium tuberculosis was performed for all participants using X-pert MTB/RIF. Additional investigations included Chest X-ray and blood count.

Results: We recruited 404 children, out of which 78 (19.3%) had pulmonary tuberculosis. Of these, 13 (16.7%) were bacteriologically confirmed while 65 (83.3%) were clinically diagnosed. The factors significantly associated with pulmonary tuberculosis were age above two years [AOR 2.32 (95% CI 1.04-5.17)] p value 0.039, positive HIV Status [AOR 24.2 (95% CI 2.88-202.62)] p value 0.003, severe acute malnutrition [AOR 15.67 (95% CI 6.68-36.73)] p value <0.001, lack of BCG immunization [AOR 3.09 (95% CI 1.06-9.03)] p value 0.038, and contact with a known tuberculosis patient [AOR 55.14 (95% CI 10.12-300.6)] p value <0.001.

Conclusion: There is a high burden of pulmonary tuberculosis in children presenting with severe pneumonia. There is a need for screening for pulmonary tuberculosis in children with any of the associated factors to improve early diagnosis and treatment.

Key words: Severe paediatric pneumonia, pulmonary tuberculosis (PTB), South Sudan

Citation:
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Introduction

Tuberculosis (TB) is a major public health problem globally. It ranks fourth among the top infectious disease killers, after acute respiratory infections, diarrhoeas, and human immunodeficiency virus (HIV) infection/acquired immunodeficiency syndrome (AIDS).[1] According to World Health Organization (WHO), approximately 10 million people developed TB in 2017, of which 1.0 million (10%) were children.[2]

Pneumonia is a major cause of morbidity and mortality in infants and young children. It is the single largest infectious cause of death in children worldwide and it accounts for 16% of all deaths of children under five years old.[3-6] Some deaths from pneumonia may follow delayed diagnosis of TB since TB presentation can mimic severe pneumonia from other causes especially in infants and young children. Most deaths due to pneumonia (70%) occur in Southeast Asia and sub-Saharan Africa where TB is endemic.[6]

In 2014, sub-Saharan African countries reported a TB prevalence of 281 per 100,000 of the population which is more than double the global average of 133 per 100,000.[7] A study in Uganda reported a reduction in childhood TB incidence in Kampala between 2009 and 2010. However, childhood TB cases were much higher at 7.5 % during the same period compared to the national average of 2.5 % in the world TB reports of 2010 and 2011.[8]

South Sudan is among the top 15 countries with the highest pneumonia related mortality

accounting for 20% of deaths due to pneumonia.[9,10] TB is endemic in South Sudan with a prevalence twice the global prevalence of 133 per 100,000.[11] According to the National TB Programme (NTP), TB notification has increased from 2,955 cases in 2008 to 8,856 in 2014. In addition, the incidence of notified smear-positive pulmonary TB (PTB) cases was 37 per 100,000 population.[11] Two thirds of TB cases were identified in four of the ten States of South Sudan with Central Equatorial State carrying the highest burden (38%).[11] However, there was no information regarding paediatric TB.

South Sudan is one of the countries with poor health indicators because of the ongoing conflict, violence, instability and underdevelopment. People are internally displaced and it has been estimated that one in four people in South Sudan, mainly children and women, had been forced to flee their homes. This subjected them to vulnerability to diseases without reliable access to medical care. The rationale for this study was to generate data to fill the knowledge gap on the burden of PTB in the paediatric population in South Sudan. The generated data will be used to develop strategies and guide healthcare workers to support these children effectively.

Method

This was a cross sectional study from June to October 2018 at Al Sabah Children's Hospital.

Al Sabah Children's Hospital, the only one in the country, is located in Central Equatoria State, in Juba. It remains the only facility specializing in a number of paediatric services, including an expanded programme of immunization (EPI), treatment of severe acute malnutrition with medical complications, outpatient and inpatients medical services, and comprehensive HIV services. The hospital receives patients from all over the country.

Participants were children aged 2 to 59 months who fulfilled the WHO case definition for severe pneumonia. The children, whose caretakers gave informed consent, were consecutively enrolled. Very sick patients were stabilized before enrolment. Those on anti TB treatment were excluded. A pre-tested questionnaire was administered by the principal investigator (PI) and a trained research assistant. Demographic characteristics and risk factors for PTB were obtained from the caretakers.

A thorough examination was carried by the PI and/or a medical doctor who was the study coordinator. Weight and length were taken using calibrated standard Salter scale and stadiometer accurate to 100g and 0.5 cm respectively. Nutritional status was assessed using the WHO gender specific weight/ height Z score.

Laboratory investigations

Complete blood count was done using Beckman Coulter Act Diff 5 CP (Cap Pierce) Haematological Analyzer at Oromo Clinical and Diagnostic Laboratory. HIV serology was carried out on participants above 18 months old and on the mothers for the participants who were below 18 months. Participants who had other relatives as their primary caretakers were tested for HIV using the rapid diagnostic kits regardless of their age. Sputum induction

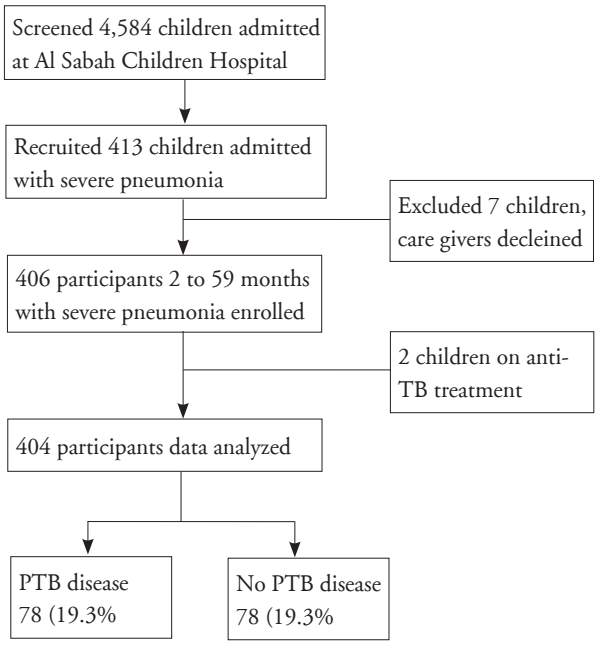

Figure 1: Study participant recruitment flow chart

Table 1. Demographic characteristics of children aged 2 to 59 months presenting with severe pneumonia (N=404)

Factors	n (%)
Age	
2 - 24 months	301(74.5)
25 - 59 months	103(25.5)
Sex	
Female	221(54.7)
Male	183(45.3)
***Payam of residence**	
Juba	49(12.1)
Kator	76(18.8)
Munuki	149(36.9)
*Others	130(32.2)
HIV status	
Positive	13(3.2)
Negative	391(96.8)
Previous history of pneumonia	
Yes	114(28.2)
No	290(71.8)
BCG immunization status (Vaccine)	
Yes	378(93.6)
No	26(6.4)
BCG Immunization Status (Scar)	
Yes	352(93.1)
No	26(6.9)
Contact with known TB patient	
Yes	71(17.6)
No	333(82.4)
Contact with chronic cough person	
Yes	97(24.0)
No	307(76.0)
Fever	
Yes	394(97.5)
No	10(2.5)
Lymph nodes enlargement	
Yes	112(27.7)
No	292(72.2)
Nutritional status W/H Z score (SD)	
Normal/Mild (>-1 to -2)	256(63.3)
*MAM (<-2 to -3)	49(12.1)
*SAM (<-3)	99(24.5)
Hb (g/dl)	
Normal ≥ 11	59(14.6)
Mild anaemia 10-10.9	91(22.5)
Moderate anaemia 7 to 9.9	205(50.7)
Severe anaemia < 7	49(12.1)
Gene X-pert	
Positive	13(3.2)
Negative	391(96.7)
Chest X-ray	
Normal	301(74.5)
Abnormal	83(20.5)
Poor quality	20 (5)

**Payam is the fourth administrative level in government structure.*

**Others; Northern Bari, Rajaf, Kondokoro.*

** MAM = moderate acute malnutrition, SAM = severe acute malnutrition*

was undertaken in all cases after explaining the procedure and its safety to the caretaker and after obtaining informed consent. The samples were transported to Juba Teaching Hospital laboratory where they were processed on the X-pert MTB/RIF Cepheid 4 module machine platform.

Radiological investigations

All participants had antero-posterior chest radiographs taken in two different centres The X-rays were read for features of TB by two independent radiologists and a radiology technician.

The main outcome measure in this study was the diagnosis of pulmonary TB.

Operational definitions of a pulmonary TB case

Bacteriologically confirmed PTB are those with positive gene X-pert MTB/RIF

Clinically diagnosed PTB:

- In HIV uninfected patient: At least two of the following: physical signs and symptoms suggestive of PTB, CXR consistent with PTB, history of exposure to TB patient.
- In HIV infected patients: At least one of the followings: contact with smear or X-pert positive TB patient, physical signs and symptoms or CXR suggestive of PTB.

Table 2. Bivariate analysis of factors associated with PTB in children presenting with severe pneumonia

Factor	Total n (%)	No PTB	PTB (%)	Unadjusted Odds Ratio (95% CI)	p-value
Child Factors					
Age in months					
2 – 24	301(74.5)	252(83.7)	49(16.3)		
25 – 59	103(25.5)	74(71.8)	29(28.2)	2.02(1.19-3.41)	0.009
Sex					
Female	221(54.7)	179(81)	42(19)		
Male	183(45.3)	147(80.3)	36(19.7)	1.04(0.64-1.71)	0.866
HIV Status					
Negative	391(96.8)	323(82.6)	68(17.4)		
Positive	13(3.2)	3(23.1)	10(76.9)	15.83(4.24-59.06)	<0.001
WBC (×10^3/µL)					
<12	127(31.4)	107(84.3)	20(15.75)		
>12	277(68.6)	219(79.1)	58(20.9)	1.42(0.91-2.48)	0.221
Previous Pneumonia					
No	290(71.8)	235(81)	55(19)		
Yes	114(28.2)	91(79.8)	23(20.2)	1.08(0.63-1.86)	0.782
BCG Immunization Status (Scar)					
Yes	352(93.1)	290(82.4)	62(17.6)		
No	26(6.9)	16(61.5)	10(38.5)	2.92(1.27-6.75)	0.012
Nutritional Status W/H Z score (SD)					
Normal/Mild >-1to -2	256(63.3)	234(91.4)	22(8.6)		
MAM <-2 to -3	49(12.1)	45(91.8)	4(8.2)	0.95(0.31-2.87)	0.921
SAM <-3	99(24.5)	47(47.5)	52(52.5)	11.77(6.53-21.20)	<0.001
Maternal Factors					
Educational Level					
≥ Secondary	78(19.3)	70(89.7)	8(10.3)		
< Secondary	326(80.7)	256(78.5)	70(21.5)	2.39(1.10-5.21)	0.028
Employment Status					
Housewife	270(66.8)	221(81.9)	49(18.2)		
Self Employed	108(26.7)	85(78.7)	23(21.3)	1.22(0.7-2.13)	0.482
Formal Employment	26(6.4)	20(76.9)	6(23.1)	1.35(0.52-3.55)	0.538
Household Cigarette/ Shisha Smoking					
No	206(51)	170(82.5)	36(17.5)		
Yes	198(49)	156(78.8)	42(21.2)	1.27(0.77-2.09)	0.342

Environmental Factors					
Contact with known TB patient					
No	333(82.4)	298(89.5)	35(10.5)		
Yes	71(17.6)	28(39.4)	43(60.6)	13.08(7.24-23.61)	<0.001
Contact with chronic cough person					
No	307(76.0)	269(87.6)	38(12.4)		
Yes	97(24.0)	57(58.8)	40(41.2)	4.97(2.93-8.42)	<0.001

Statistical analysis

The Kish-Leslie formula was used to calculate the sample size. The minimum sample size derived for objective one (burden of PTB in children with severe pneumonia) was 403. This sample size was sufficient to observe statistical significance at a 95% level of confidence for both study objectives. A minimum sample size of 116 with at least 58 TB cases was sufficient to explore associated factors.

The data were entered into a computer using Microsoft Access 2016 and was analysed using STATA version 15. For continuous variables, means (SD) and medians (IQR) were used. For categorical variables proportions and percentages were used. Multivariate analysis using logistic regression was carried out on variables with p-value of less than 0.05 for bivariate analysis, to adjust for confounding and collinearity. Variables with a p-value of less 0.05 were considered significant at multivariate.

Results

Participant demographic characteristics

We screened 4,584 children aged 2 to 59 months, 406 children with severe pneumonia were enrolled and data for 404 were analysed. (Figure 1). The median age was 14 months; 54.7% of the participants were females; 36.9% were from Munuki Payam; 3.2% were HIV positive. Among these, only one was internally displaced. The majority of the participants (97.5%) had fever. Most had no lymphadenopathy; 24.5% were severely malnourished. Abnormal chest X-ray findings (airway compression, soft tissue density suggestive of lymph nodes, air space opacification, nodular picture, pleural effusion, cavities) were reported in 20.5%. Socio-demographic characteristics are summarized in Table 1.

Prevalence of PTB in children presenting with severe pneumonia

The prevalence of PTB among children aged 2 to 59 months presenting with severe pneumonia was 19.3%. Sputum induction for gene X-pert test was performed to all participants, however, only 16.7% who were diagnosed with PTB had positive results. While 83.3% of the participants were clinically diagnosed through a combination of symptoms and signs consistent with TB, contact with known TB patient, and chest X-ray suggestive of TB.

Factors associated with pulmonary TB in children presenting with severe pneumonia

In children with severe pneumonia, significant clinical association with pulmonary TB at bivariate analysis were found in the following subgroups: age above 24 months, positive HIV status, absence of scar of BCG vaccination, severe acute malnutrition, maternal educational level below secondary, and contact with both chronic cough and known TB patient (Table 2). Using multivariate analysis, the factors that remained independently associated with PTB were: age above 24 months, positive HIV status, absence of scar of BCG vaccination, and contact with known TB patient (Table 3).

Discussion

The prevalence of PTB in children in this study was one child in every five cases of severe pneumonia. This showed that pneumonia is a major public health problem in children under five years of age in South Sudan. It is one of the major causes of hospital admissions for children and accounts for 20% of the mortality in the under five-year-olds.[9] Some of the mortality due to pneumonia could be attributed to PTB since the presentation of these two diseases are similar. This might result in delay in diagnosis, prolonged hospital stays and increase mortality.

The high prevalence of PTB might reflect the ongoing transmission in the community since children acquire the infection from the adult population. The prevalence found in this study is similar to18.9% recorded in Uganda.[6] These studies were done in children with severe pneumonia, in an urban setting and in government referral public hospitals. The children who visited these health facilities were mostly of low socio-economic status who were unable to afford private care. However, our finding is lower than the 23% prevalence reported in a study in

Table 3. Multivariate Analysis of Factors associated with PTB in children presenting with severe pneumonia

	Bivariate		Multivariate Model	
Factors	**Unadjusted Odds Ratio (95% CI)**	**p-value**	**Adjusted Odds Ratio (95% CI)**	**p-value**
Child Factors				
Age in months				
2-24	1			
25-59	2.02(1.19-3.41)	0.009	2.32(1.04-5.17)	0.039
HIV Status				
Negative	1			
Positive	15.83(4.24-59.06)	0.000	24.2(2.88-202.62)	0.003
Nutrition Status W/H Z score (SD)				
Normal/Mild>-1 to -2	1			
MAM <-2 to -3	0.95(0.31-2.87)	0.921	0.822(0.23-2.98)	
SAM <-3	11.77(6.53-21.20)	0.000	15.67(6.68-36.73)	<0.001
Maternal Factors				
Educational Level				
≥ Secondary	1			
< Secondary	2.39(1.1-5.21)	0.028	1.35(0.47-3.92)	0.575
Health System Factors				
BCG Immunization Status (Scar)				
Yes	1			
No	2.92(1.27-6.75)	0.012	3.09(1.06-9.03)	0.038
Environmental Factors				
Contact with known TB Patient				
No	1			
Yes	13.08(7.24-23.61)	0.000	55.14(10.12-300.6)	<0.001
Contact with Chronic Cough Person				
No	1			
Yes	4.97(2.93-8.42)	0.000	0.35(0.68-1.84)	0.216

Bangladesh. The differences could be attributed to the fact that the study in Bangladesh enrolled malnourished children who had severe pneumonia.[4] Malnutrition is a known cause of immune suppression and it increases the risk for both progression of TB infection and reactivation of latent TB.

Factors associated with PTB in children presenting with severe pneumonia

In this study, age above two years was associated with PTB. Age of the child affects its risk of TB exposure as older children interact more with adults. They may be exposed to infectious cases of TB at home or in the community. On the other hand, younger children, especially infants, interact with fewer adults in their family units suggesting that contact could be other community members apart from their mothers. Our findings are similar to a study done by Robin et al in South Africa which showed 10% of TB cases notified to the national tuberculosis control program were of children aged less than fifteen years. Of these, 66% were less than five years.[12] Other studies done in Uganda and Congo showed contrary results where they found that TB is more likely to occur in children under two years of age.[6,13]

HIV positive children were 24 times more likely to develop PTB compared to their counterparts who were HIV negative. HIV destroys CD4+ cell and T cell mediated immunity which is critical in fighting against TB bacilli. In the absence of CD4+ cells, the body remains vulnerable to a wide range of infections including TB. Our finding is consistent with other studies which found that HIV is a risk factor for paediatric TB.[14,15] In addition, HIV prevalence among children with TB was found to be as high as 60% in countries with high HIV prevalence.[16] Further, another study in Uganda found a prevalence of 49% of TB/HIV in an area of high burden of paediatric HIV. However, another study in Uganda found no association between HIV and TB.[6,17]

Children who were severely malnourished were 16 times more likely to suffer from PTB than those who had normal nutritional status. Severe acute malnutrition is a known cause of immune suppression affecting both innate and adaptive immune responses. Malnutrition also causes thymic atrophy which results in depletion of CD4+, CD8+ and thymocytes and increases the risk for infections. These findings are in keeping with a study done by Chisti et al and a review article by Padmanesan et al.[18, 19] A study by Nantongo et al found a 35% prevalence in children who had both moderate and severe acute malnutrition.[6]

Children who had not received BCG immunization were three times more likely to develop PTB compared to those who had received the vaccine. Recent studies found BCG vaccination to be protective against TB infection. [20,21] Two different systematic reviews also found BCG vaccination to be protective against TB.[21,22] Furthermore, there is evidence that supports vaccinating children soon after birth to prevent infection and disease especially in countries with a high TB burden.[21,22] However, the findings of our study is contrary to studies done in Uganda and India which found no association between BCG immunization and TB.[6,14]

Contact with patients who had tuberculosis was found to be associated with PTB. This is important finding because paediatric TB reflects the ongoing transmission in the community and children represent 10% of overall TB prevalence. On the other hand, isoniazid prophylaxis was found to be effective in reducing the risk of developing tuberculosis among children who had positive TB contacts by 59%.[23] In this study, none of the participants who had positive contacts with known TB patients were given INH prophylaxis. Findings of this study are similar to that reported in Uganda and India.[4,6] Other studies have also described the association between contact with TB cases and development of TB disease in children.[14,19]

Displacement, both internally and externally, is known to increase the risk of airborne infections such as TB. This results from increase in population density, disruption and poor access to health facilities.[28] In South Sudan, approximately 40% of the pre-war population are displaced either within the country or as refugees to the neighbouring countries.[29] In this study, there was no association between PTB and displacement, only one of the participants was internally displaced. This could be attributed to the fact that most of the displaced population is still in the refugee camps and medical services are provided within the camps.

Several studies have measured the socio-economic status using parental educational level, income and occupation. [24,25] In this study, low maternal education was the measure of low socio-economic status, and it suggested an association with PTB in children presenting with severe pneumonia but did not reach conventional significance. Low socio-economic status is associated with overcrowding, poor living conditions, poor knowledge and health seeking behaviour which in turn are associated with increased risk of diseases including TB.[26, 27]

Conclusion

We found a high prevalence of PTB among children admitted with severe pneumonia at Al Sabah Children's Hospital in Juba, South Sudan. Children with severe pneumonia were more likely to have PTB if they were above two years of age, HIV positive, have severe acute malnutrition, have not received BCG immunization or had contact with known TB patients.

Ethics approval and consent to participate

Approval to conduct this study was obtained from the Department of Paediatrics and Child Health, Makerere University College of Health Sciences. Ethical approval was obtained from Makerere University College of Health Sciences School of Medicine Research Ethics Committee (SOMREC). Approval was also obtained from the Ministry of Health in the Republic of South Sudan and permission was sought from Al Sabah Children's Hospital in Juba, South Sudan.

Written informed consent was obtained from parents/ guardians of eligible participants. Consent forms for caregivers were translated into Arabic. For purposes of confidentiality only study specific serial numbers were used instead of names of the participants. The data were coded and accessible only to the research team.

Consent for publication: Not applicable

Competing interests: None

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WHO warns that HIV infection increases risk of severe and critical COVID-19

15 July 2021

A new WHO report, 'Clinical features and prognostic factors of COVID-19 in people living with HIV hospitalized with suspected or confirmed SARS-CoV-2 infection' (https://apps.who.int/iris/bitstream/handle/10665/342697/WHO-2019-nCoV-Clinical-HIV-2021.1-eng.pdf) confirms that HIV infection is a significant independent risk factor for both severe/ critical COVID-19 presentation at hospital admission and in-hospital mortality. Overall, nearly a quarter (23.1%) of all people living with HIV who were hospitalized with COVID-19, died.

The report is based on clinical surveillance data from 37 countries regarding the risk of poor COVID-19 outcomes in people living with HIV (PLHIV) admitted to hospital for COVID-19.

It found that the risk of developing severe or fatal COVID-19 was 30% greater in PLHIV compared to people without HIV infection. Underlying conditions such as diabetes and hypertension are common among PLHIV. Among male PLHIV over the age of 65 years, diabetes and hypertension were associated with an increased risk of more severe and fatal COVID-19. These conditions are known to put people at increased risk of severe disease and death.

This highlights the need for PLHIV to stay as healthy as possible, regularly access and take their ARV medications and prevent and manage underlying conditions. This also means that people living with HIV – independent of their immune status - should be prioritized for vaccination in most settings. An informal WHO poll revealed that out of 100 countries with information, 40 countries have prioritized PLHIV for COVID-19 vaccination.

Later this week, WHO will also release updated Guidelines on HIV prevention, testing, treatment, service delivery and monitoring. These guidelines provide over 200 evidence-informed recommendations and good practice statements for a public health response to the prevention, testing, and treatment of people living with HIV. These recommendations help to ensure that people with HIV can start and continue treatment during times of service disruption as a consequence of the COVID-19 pandemic.

"The report released today will have important policy implications – providing data to confirm that HIV is a risk for poor outcomes from COVID-19 – and increases the urgency to see all PLHIV on treatment and with access to COVID-19 vaccinations." said Dr Meg Doherty, Director of WHO's Global HIV, Hepatitis and STI Programmes.

HIV continues to be a major global public health issue, having claimed 34.7 million lives so far. To reach the new proposed global 95–95–95 targets set by UNAIDS, countries need to redouble efforts to avoid increasing HIV infections due to HIV service disruptions during COVID-19 thereby slowing down the public health response to HIV.

Hearing loss among patients on treatment for drug-resistant tuberculosis in Uganda

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Abstract

Introduction: Second-line injectable therapy using aminoglycosides (AG) like kanamycin, amikacin or capreomycin is associated with irreversible hearing loss. We aimed to determine the incidence and predictors of hearing loss among patients with drug resistant tuberculosis (DR-TB) who received AG.

Method: This was a retrospective cohort study conducted at the tuberculosis treatment unit of Mbarara Regional Referral Hospital (MRRH). All adult patients with a diagnosis of DR-TB between March 2016 and December 2019 were candidates for inclusion in the study. Hearing loss was defined as a hearing threshold of >20 decibels (dB) at any test frequency in at least one ear. The incidence and predictors of hearing loss were analysed using multivariable Cox model. A p-value of ≤0.05 was considered as statistically significant. Data analysis was done using STATA version 13.

Results: The estimated rate of developing hearing loss was 107 per 1000 person months. Thirty-seven (52.9%) of 70 DR-TB patients experienced some degree of hearing loss, of which 25 (67.6 %) developed mild, 5 (13.5%) moderate, and 3 (8.1%) severe hearing loss. Male sex (HR 2.05, CI 1.03-4.10, p-value 0.041), increasing age (HR.5.17, CI 1.42-18.87, p-value 0.013) and high BMI (HR 3.31, CI 1.15 - 9.53, p-value 0.026) were significant predictors of new onset of hearing loss.

Conclusion: The incidence of hearing loss among DR-TB patients was high, with the majority having a mild hearing loss. Patients who were male, older, overweight and/or obese were more likely to develop AG-induced hearing loss.

Key words: Drug resistant tuberculosis, hearing loss, Uganda, aminoglycosides

Introduction

Tuberculosis (TB) still accounts for the highest mortality from any infectious diseases worldwide, even surpassing HIV/AIDs.[1] Uganda has an incidence of TB of about 20/100,000 population where the prevalence of Multi-Drug Resistant TB (MDR –TB) in 2015 was estimated to be 1.6% among newly diagnosed TB cases and 12% among previously-treated cases.[2]

Drug resistant TB poses a threat to effective control due to the difficulties in diagnosis, the requirement for chemotherapy for up to two years, increased cost (up to 100 times more expensive than drug susceptible TB) and the use of more toxic second line drugs that are associated with increased adverse effects.[3] The World Health Organization (WHO) 2016 DR-TB treatment Guidelines included recommendations on the use of a standardized shorter treatment regimen (sSTR) of 9 -12 months for patients with Rifampicin Resistant (RR)/ MDR-TB which includes the injectable drugs.

The WHO 2019 guidelines recommend that the modified bedaquiline-based therapy (a drug regimen which includes bedaquiline as the major drug), all oral shorter regimens (mSTR) may be used with close monitoring. Some groups of patients can still be put on the sSTR which includes the injectable drugs.[4]

Citation:
Lodiong et al, Hearing loss among patients on treatment for drug-resistant tuberculosis in Uganda. South Sudan Medical Journal 2021;14(3):80-84 DOI: https://dx.doi.org/10.4314/ssmj.v14i3.3

At least 60% of patients on MDR-TB therapy will experience adverse events.[5] Amongst the most serious side effects is irreversible ototoxicity which is caused by injectable second line agents,[6] that are administered for a minimum period of six months as per the guidelines. Amikacin, kanamycin and capreomycin are ototoxic mainly through the loss of cochlear and/or vestibular sensory hair cells.[7] The irreversible destruction of sensory cells in the cochlea leads to permanent hearing loss. It begins with the basal cochlea outer hair cells (responsible for high frequency sound) and then spreads to the apex (responsible for low frequency sound). Reactive oxygen species (free radicals) acting as mediators of the aminoglycoside (AG) toxicity appear to trigger cell death. [8]

In 2016 the Ugandan national guidelines for the treatment of DR-TB recommended the use of a bedaquiline-based injection-free shorter treatment regimen (the 'modified shorter regimen', mSTR), but based on the severity of the disease and the eligibility criteria for the mSTR, most groups of patients are still being put on the injection-based regimen. There are limited data in our setting on the ototoxic effect of these injectable drugs among the DR-TB patients. This study focused on the incidence and predictors of hearing loss among DR-TB patients treated with the injectable AG based regimen.

Method

This was a retrospective cohort study, which aimed to determine the incidence and predictors of hearing loss in DR-TB patients, it was conducted in Mbarara Regional Referral Hospital TB unit in south-western Uganda. We used a retrospective cohort of 118 participants who were treated with injectable AG-based regimen between March 2016 and December 2019 who had received AG for at least six months. Patients with pre-existing hearing loss or without baseline and at least one follow-up audiometry report were excluded, leaving 70 participants whose information we analysed.

Hearing was tested at 125Hz, 250Hz, 500Hz, 1000Hz, 2000Hz, 4000Hz and 8000Hz frequencies. Hearing loss was defined as a hearing threshold of >20 decibels (dB) at any test frequency in at least one ear. Hearing was measured by averaging the hearing thresholds at each visit for each ear separately. Hearing loss was categorized into mild (21 – 40 dB), moderate (41 – 70 dB), severe (71 – 90 dB) and profound (>=91 dB).

Data were entered into Microsoft Excel version 10 and imported into STATA version 13. Baseline characteristics and degree of hearing loss were described in frequencies and percentages. We took the point of hearing loss to be at the first observation of hearing loss. Incidence rate for hearing loss per 1000 person-months were defined as the number of patients with hearing loss divided by the person-months at risk of hearing loss. We calculated the hazard ratios (HRs) and 95% confidence intervals (CIs) using Cox proportional hazards regression analysis. We checked the assumptions of the Cox model graphically and with statistical tests.

Table 1. Baseline characteristics

Characteristics	N=70 (%)
Male sex:	47 (67.1)
Age (years):	
15 – 30	18 (25.7)
31 – 45	36 (51.3)
46 and above	16 (22.9)
Body Mass Index (kg/m2):	
Normal (18.5 – 24.9)	39 (55.7)
Underweight (<18.5)	19 (27.1)
Overweight/Obese (>25)	4 (5.7)
Missing	8 (11.4)
History of smoking	5 (7.1)
History of alcohol consumption*	24 (34.3)
Positive HIV status	44 (62.9)
History of previous TB infection	27 (38.6)
Second- Line Anti-TB Drugs:	
Kanamycin	61 (87.1)
Capreomycin	9 (12.9)
Haemoglobin:	
Normal	
12-15.5g/dl for females and 13.5-17.5g/dl for males	47 (67.1)
Anaemic	
<12.0g/dl for females and <13.5g/dl for males	23 (32.9)
Creatinine:	
Normal (0.6 – 1.1 mg/dl)	65 (92.9)
High	2 (2.9)
Missing	3 (4.3)
Gene Xpert Severity:	
Low	38 (54.3)
High	29 (41.4)
Missing	3 (4.3)
Smear Severity:	
Paucibacillary	54 (77.1)
Multibacillary	14 (20.0)
Missing	2 (2.9)

**Any amount of alcohol*

Table 2. Degree of hearing loss

Degree of hearing loss (>20dB)	n (%)
Bilateral mild hearing loss (21 – 40dB)	25 (67.6)
Bilateral moderate hearing loss (41 – 70dB)	5 (13.5)
Bilateral severe hearing loss (71 – 90dB)	3 (8.1)
Mixed hearing loss* (mild and moderate)	4 (10.8)

**Means the patient's degree of hearing loss in left ear is different from the loss in the right ear*

Results

We extracted 118 files for patients who were treated for DR-TB from the TB record centre. Eighteen patients had no audiogram records, 14 had no baseline audiogram and 16 had no follow-up audiograms, so 70 patients were enrolled, all of them were assessed on a monthly basis until the end of the sixth month. There were 47 (67.1%) males. Fifty-one percent were aged between 31 – 45 years; 44 (62.9%) were HIV positive and 61 (87.1%) were on kanamycin. Twenty-nine (41.4%) had high gene x-pert severity (i.e., high load of Mycobacterium tuberculosis complex detection in Xpert) and 54 (77.1%) had paucibacillary smear severity (i.e., low bacterial load of Mycobacterium tuberculosis in the sputum smear). The baseline characteristics are shown in Table 1.

Twenty-five patients (67.6%) developed mild, five (13.5%) moderate, three (8.1%) severe and four (10.8%) mixed (mild/ moderate) hearing loss (Table 2). Twenty-five patients (67.6%) had bilateral and 12 (32.4%) had unilateral hearing loss (8 in the right ear and 4 in the left ear).

The estimated rate of developing hearing loss was 107 per 1000 person months (CI 77 - 147); the minimum time for developing hearing loss was two months and the mean was four months (as shown in Kaplan Meier curve - Figure 1). The cumulative incidence over a period of six months was 52.9% (37 out of 70 patients developed hearing loss).

In the adjusted multivariable Cox model, male sex, older age and high BMI ≥25kg/m2 were associated significantly with hearing loss (Table 3).

Discussion

Our study showed a hearing loss incidence of 53% after the injectable phase which is similar to the study of Harris et al in South Africa which found 58% hearing loss among their cohort.[9] This is probably because of the similarities in the patients' characteristics. In our study, however, HIV infection did not predict hearing loss during DR-TB treatment, which conflicts with the finding of Harris et al[9] who demonstrated a strong positive association with HIV infection.

Table 3. Predictors of hearing loss

Characteristics	AHR (95% CI)	p-value
Sex:		
Female		
Male	2.05 (1.03-4.10)	0.041
Age (years):		
15 – 30		
31 – 45	5.17 (1.42 - 18.87)	0.013
46 and above	4.85 (1.30 - 18.27)	0.020
Regimen:		
Capreomycin		
Kanamycin	0.53 (0.20 - 1.40)	0.201
Previous TB:		
No		
Yes	0.77 (0.39 - 1.50)	0.428
HIV status:		
Negative		
Positive	0.87 (0.36 - 2.13)	0.765
BMI (kg/m2):		
Normal (18.5 – 24.9)		
Underweight (<18.5)	1.10 (0.92 - 4.24)	0.081
Overweight/Obese (≥25)	3.31 (1.15 - 9.53)	0.026
Creatinine:		
Normal (0.6 – 1.1 mg/dl)		
High	0.73 (0.13 – 4.01)	0.713
Gene X.pert Severity:		
Low		
High	0.96 (0.41 – 2.23)	0.938
History of alcohol consumption*:		
No		
Yes	1.42 (0.66 – 3.10)	0.371
Smoking History:		
No		
Yes	2.70 (0.71 – 10.12)	0.146

Key: AHR: Adjusted Hazard Ratio, CI: Confidence Interval
**Any amount of alcohol*

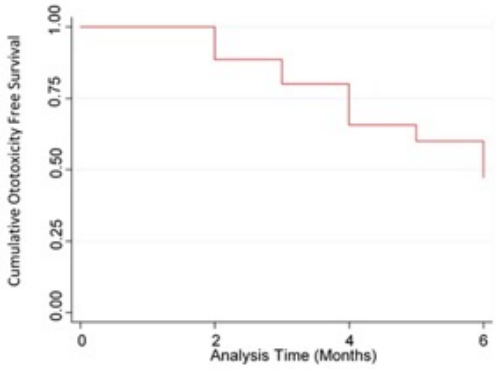

Figure 1. Kaplan-Meier Hearing Loss Estimate

In our study male sex, increasing age and high BMI predicted new onset hearing loss. Sharma et al also found that males were more likely to develop hearing loss than females.[10]

Hong et al. in South Africa also reported that older age and obese patients are at a higher risk of developing hearing loss.[11] Ageing leads to a decrease in hair cells in the cochlea and reduction in endogenous protective mechanisms such as antioxidants which may increase the susceptibility to ototoxic effects.[12] Obesity may lead to hearing loss as adipose tissue secretes pro-inflammatory cytokines causing inflammation and end-organ damage.[13]

We also found that 67.6% of our cohort developed mild hearing loss. A prospective study of DR-TB patients treated with injectable AG in Pakistan reported that 60% of their patients developed mild hearing loss.[14] However, our study might have underestimated the degree of occurrence of hearing loss because of missing follow-up audiograms. In another prospective study in Zambia, 46% of patients developed severe hearing loss at the end of the AG treatment which is much higher than our 8.1%.[15] The prospective nature of their study may have facilitated regular audiometry checks throughout the study period.

Conclusion and recommendation

Over half of the DR-TB patients in our study developed a degree of hearing loss after six months of treatment. The majority developed mild hearing loss and the minimum time for the occurrence of hearing loss was two months. Male sex, older age, and overweight (BMI>=25 m2) predicted hearing loss.

Therefore, based on our findings, we advocate the use of the new non-aminoglycoside medicines e.g., bedaquiline.

Conflict of Interest: None

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Free online handbooks on hospital care in low resource settings and areas of armed conflict and displacement

These have been developed since April 2020 by the UK-based charity **Maternal & Childhealth Advocacy International (MCAI).**

Handbooks 1 and 2 involve the care of children with serious illnesses and injuries, including adolescent girls who are pregnant. They are part of a curriculum for a new task sharing programme to train the first ever six paediatric clinicians in Liberia in partnership with UNICEF, WHO and the Ministry of Health. They have been edited and authored by experienced volunteer doctors and nurses working in hospitals and emergency care centres in low resource settings and areas of armed conflict and displacement throughout the world.

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Figure 1. Front page of Handbook 1 of 2.

Ectopic pregnancy managed medically at St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia

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Abstract

Background: Ectopic pregnancy, a pregnancy in which the embryo implants outside the endometrial cavity, is an important cause of maternal mortality, especially in developing countries. It can be managed medically using methotrexate. In Ethiopia, limited evidence exists regarding the treatment outcome of this approach.

Methods: This retrospective study was conducted based on medical records of ectopic pregnancies managed medically using methotrexate. The data of women who had unruptured ectopic pregnancy and who were managed medically in the study period at St. Paul's Hospital Millennium Medical College were included. Data were extracted from patients' medical records and analysed using SPSS software.

Results: During the 5-year period 2015 to 2019, 81 women with unruptured ectopic pregnancy were managed medically using methotrexate with 93.8% (n=76) success. Methotrexate was administered intramuscularly to all patients in either single dose or multiple doses. Five out of the 81 patients underwent surgical intervention for either ectopic rupture or persistent ectopic mass. There were no fatal complications.

Conclusion: Methotrexate is a successful and safe alternative to surgical management of unruptured ectopic pregnancy in our settings. It should be given a trial in patients who meet the selection criteria in a setting ready for emergency surgical intervention and blood transfusions.

Key words: Ectopic pregnancy, methotrexate, medical management, beta hCG, Addis Ababa.

Introduction

An ectopic pregnancy (EP) results from implantation outside the uterine cavity.[1] It is an obstetric emergency. Undiagnosed it leads to rupture and haemorrhage. Despite the improvement in diagnostic techniques haemorrhage from EP remains the leading cause of pregnancy-related maternal mortality in the first trimester, accounting for 4% of all such deaths.[2] The recurrence rate is as high as 15%.[3,4] Studies in Ethiopia reported a higher incidence among 20 to 29-year-olds and unmarried and nulliparous women.[1,5,6] Ethiopia is among the countries with a high incidence with the EP being the leading cause of death in the first trimester.[7,8]

Research indicates that medical management of EP is a possible alternative to surgery. Methotrexate (MTX) seems to be the preferred medication. Medical management avoids the complications of surgery and anaesthesia and reduces costs. Most of these studies were conducted in developed countries with different settings and practices.[9]

Citation:
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Medical management using MTX is being practiced in some referral hospitals in Ethiopia but there is no information on effectiveness. Studies conducted on EP in in Ethiopia [1,5,6] have not addressed its surgical or medical management outcomes. This study focused on treatment outcomes, with the hope that the results will inform decisions on the management of unruptured EP, as well as being a reference for future research.

Methodology

This retrospective study was based on medical records of EP patients managed medically using MTX at St. Paul's Hospital Millennium Medical College from January 1st 2015 to December 31st 2019. All patients with unruptured EP, who were given MTX (50mg/dose by intramuscular injection) as initial treatment, were included. Medical record numbers were extracted from the medical registry books in wards and emergency outpatients. The patients' charts were retrieved and data were extracted, using a structured and pretested format, and after confirmation of accuracy and completeness, were analysed using SPSS software.

Results

Eighty-one patients had been managed using MTX. The diagnosis of EP was made with trans-abdominal and transvaginal sonography and serum beta human chorionic gonadotropin (hCG). Table 1 shows that most of the women (60.5%) were aged 20 to 29 years, with only four (4.9 %) under 20 years; most were married (86%), 39% were nulliparous, 26.0% each were para 1 and para 2 and above. None had a recorded history of pelvic inflammatory disease. Twelve women (14.8%) had a history of EP for which unilateral salpingectomy was done, and 13 (16%) had at least one abortion.

Three patients (3.7%) presented with abdominal pain only. The remainder presented with either amenorrhoea alone or with lower abdominal pain. None had vaginal bleeding. The gestational age of the fetus was below eight weeks in 40.7% (n=33) and equal or greater than 8 weeks in 45.7% (n= 37) based on the last menstrual period (LMP). Eleven patients had unknown LMP dates but claimed to have had amenorrhoea for not more than two months.

The pre-treatment serum beta hCG levels for most of the patients (70.4%) was below 5,000 iu, with the levels above 10,000 iu for 8.6%. No foetal cardiac activity was seen on ultrasound for all patients and the gestational sac (GS) diameter was below 3.5 cm for most (93.8%,). One patient had a GS diameter above 4 cm.

MTX was given intramuscularly to all patients in either a single dose (60.5%) or multiple doses if the beta hCG did not reduce (39.5%). Leucovorin, a drug to alleviate side effects of methotrexate, was given to all patients who had multiple doses. However, only two patients had mild vomiting.

Of the 81 patients, five (6.2%) underwent surgical intervention (two for ectopic rupture and three for persistent EP).

All with successful medical treatment (93.8%) were discharged within ten days. The serum beta hCG levels at the time of discharge were below 1,500 iu for most (90.8%).

Table 1. Details of the pre-treatment patients' information (N=81)

Variables		n (%)
Maternal age groups (years)	below 20	4 (4.9)
	20 – 29	49 (60.5)
	30 and above	28 (34.6%)
Marital status	Single	11 (14)
	Married	70 (86)
Parity	Nulliparous	39 (48.1)
	Para 1	21 (26.0)
	Para 2 or greater	21 (26.0)
Gestational age (weeks)	< 8	33 (40.7)
	>8	37 (45.7)
	Unknown	11 (13.6)
History of abortion	Nil	68 (84)
	1	8 (9.9)
	2	2 (2.5)
	3 or more	3 (3.6)
History of EP	Yes	12 (14.8)
	No	69 (85.2)
Presenting complaint	Amenorrhoea	42 (51.9)
	Abdominal pain	3 (3.7)
	Both	36 (44.4)
Gestational sac diameter	< 3.5cm	76 (93.8)
	3.5 - 4cm	4 (4.9)
	> 4cm	1 (1.2)
Foetal cardiac activity on ultrasound	Present	0 (0)
	Absent	81 (100)
Pre-treatment Serum beta hCG i.u.	< 1,000	23 (28.4)
	1000 - <5,000	34 (42)
	5,000 - 10,000	17 (21)
	>10,000	7 (8.6)

Table 2. Details of the treatment and outcomes

Variables		n (%)
MTX dose protocol	1 dose	23 (28.4)
	2 doses	26 (32.1)
	3 doses	8 (9.9)
	4 doses	24 (29.6)
Leucovorin	Given	31 (38.2)
	Not given	50 (61.8)
Side effects	Yes	02 (2.6)
	No	74 (97.4)
Treatment outcome	Discharged	76 (93.8)
	Ruptured	2 (2.5)
	Persistent	3 (93.7)
Period of hospital stay	7 days or less	31 (40.8)
	>7 days	45 (59.2)
Serum Beta hCG on discharge	< 1,000	61 (80.3)
	1,000 - <1500	8 (10.5)
	> 1,500	7 (9.2)
Serum Beta hCG on the 1st visit	< 15 iu	20 (26.3)
	< 500 iu	45 (59.2)
	500 - < 1000 iu	11 (14.5)
Serum Beta hCG on 2nd visit	<15 iu	49 (64.5)
	15 iu - < 200 iu	27 (35.5)
	200 - < 500 iu	00 (0)
GS diameter on discharge	< 3.5 cm	76 (100)
	> 3.5 cm	00 (0)
GS diameter on the 1st visit	< 2 cm	76 (100)
	> 2 cm	00 (0)
GS diameter on the 2nd visit	< 0.5 cm	63 (82.9)
	0.5 - < 1 cm	13 (17.1)

The first post-treatment visit was after one week from discharge and the serum beta hCG levels were all below 1,000 iu with most below 500 iu and the gestational sac (GS) diameter reduced by more than 50% of the pre-treatment size. The second post-treatment visit a week later found serum beta hCG levels were below 200 iu for all patients. The GS had disappeared for most patients. See Table 2.

After 5 patients underwent surgical intervention, only 76 patients remained on treatment and follow up.

Discussion

The success of medical management of EP using MTX was 93.8%.[9] If selection criteria were strictly followed, we would have concluded that the treatment outcomes between single and multiple doses is comparable.[9,10,11] Fifty three percent of patients in the single dose regimen group required a second dose of MTX, a rate higher than reported in India and Jordan.[12,13] This was dictated by the unsatisfactory reduction of the serum level of beta hCG after the first. In this study, the failure rate was 6.2%, similar to a meta-analysis of previous studies[9] but lower than reported in India.[12] For the five patients for whom medical management was unsuccessful, the pre-treatment serum beta hCG levels were above 15,000 iu for three patients, while the GS size was above 4 cm for the fourth patient. The size of the ectopic mass and beta hCG levels were in the recommended ranges[11,15] for medical treatment in only one patient who underwent surgery for ruptured EP.

Although such levels of serum beta hCG and the size of ectopic mass were reported to affect the success rate of medical management[10,14,15], treatment using MTX was given a trial in these patients, probably because four of them had a unilateral salpingectomy for previous EP. None of them required blood transfusion. It is observed from this study that, the earlier the gestational age, the lower the pre-treatment serum hCG and the smaller the GS diameter, the more rapid the rate of decline of the serum hCG and the resolution of the ectopic mass and therefore, the earlier the hospital discharge. So the levels of serum beta hCG above 10,000 iu and the ectopic mass size greater than 3.5 cm were the identified factors affecting the success rate of this treatment.

Longer hospital stays (more than 7 days for 59% of patients) and costs for the medication (especially for those who completed all four doses) and serial investigations were the drawback of this treatment. There was no serious morbidity reported and no fatalities.

Conclusion

We have confirmed that MTX in our setting is a successful alternative to surgical management for patients with unruptured EP who meet certain criteria. We expect success rate to be higher if strict selection of patients were made based on these criteria.

Although treatment was successful in many patients whose pre-treatment serum beta hCG levels were above 5,000 iu, we agree with previous studies that reported serum beta hCG levels to be the most important determinant for treatment success and recommend levels of 5,000 iu or below to be used as the main selection criterion.

Our study included a small sample size and did not address long term outcomes of this treatment option. Therefore, we recommend that further research with larger numbers is undertaken with attention to long term outcomes. Early

detection of EP before tubal rupture gives the obstetrician an opportunity to give medical treatment a trial. We recommend proper counselling of patients at high risk for EP to seek early ante-natal attention.

Finally, we recommend this medical approach to be carried out in settings ready for emergency surgical intervention and blood transfusion. All patients were placed on follow-up.

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What can be done about adolescent pregnancy in South Sudan?

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Abstract

Introduction: The World Health Organization (WHO) defines 'adolescents' as individuals aged 10-19 years. The national family planning policy of South Sudan states that "by the age of 19, one out of three girls is already married or in union; and the same proportion has already started childbearing". The causes of adolescent pregnancy can be attributed to social, cultural, political and health systems gaps.

Objective: This review article looks at the contributory factors for adolescent pregnancy in South Sudan, the effects of these pregnancies and describes some solutions and recommendations.

Method: A direct search was conducted in Google scholar and other search engines looking at titles such as teenage/adolescent pregnancy in South Sudan, adolescent pregnancy in Africa, effects of adolescent pregnancy, and interventions to combat teenage/adolescent pregnancy.

Results: The contributory factors for adolescent pregnancy in South Sudan are sociocultural where the need for dowries, forced and arranged marriages, gender based violence are examples, economic and political factors; where poor implementation or inadequate adolescent policies, illiteracy and poverty are major factors, failure of health systems; where the unavailability of health services such as the provision of contraceptives for adolescents and scarcity of teenager/adolescent-friendly health clinics; and individual factors where adolescents reported desire to be mothers, societal recognition and peer pressure. In addition to all of these, rape and sexual slavery are reported as causes of adolescent pregnancy.

Conclusions: Causes of adolescent pregnancy in South Sudan are multifactorial. The country needs to adopt the published guidelines from WHO on reduction of adolescent pregnancy and learn from experiences of countries that showed a greater reduction. The utilization of interventions made through research and evidence-based information which are suitable to South Sudan context are crucial.

Key words: Adolescent pregnancy, teenage pregnancy, review, contributory factors, recommendations, South Sudan

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Introduction

The World Health Organization (WHO) defines 'adolescents' as individuals aged 10-19 years.[1] It is estimated that approximately 12 million girls aged 15–19 years and at least 777,000 girls aged under 15 years give birth each year in developing regions.[2]

Globally, babies born to adolescent girls constitute about 11% of all births, and 95% of these are found in developing countries.[3] In Africa, the estimated prevalence of adolescent pregnancy is 18.8%; a higher prevalence is observed in

the East African sub-region (21.5%) and the lowest is in the North Africa (9.2%).[3]

The national family planning policy of South Sudan has stated that "by the age of 19, one out of three girls is already married or in union; and the same proportion has already started childbearing".[4] South Sudan is among the top ten countries with the highest prevalence of adolescent pregnancy, the others being Burkina Faso, Central African Republic, Chad, Guinea, Malawi, Mali, Mozambique, Niger and Bangladesh.[5] The prevalence of adolescent pregnancy can exceed 70%.[6] The causes can be attributed to social, cultural, political and health systems.

The aim of this review is to find contributory factors that are unique to South Sudan, to look at the effects of these pregnancies and to describe some solutions and recommendations. Adolescent pregnancy is a public health problem which has taken its legitimacy from the common norms, customs, and tribal rules of the South Sudanese communities.[4,5,6]

Method

A direct search was conducted in Google scholar and other search engines looking at titles such as teenage/adolescent pregnancy in South Sudan, adolescent pregnancy in Africa, effects of adolescent pregnancy, and interventions to combat teenage/adolescent pregnancy.

Results

Why adolescent pregnancy is high in South Sudan

Sociocultural factors play major role. In South Sudan these include the need for dowries, gender base violence, respect for tradition and norms of marriage, lack of parental care, and lack of communication and supervision (Figure 1).[4,5,6,7]

Additionally, poor implementation or inadequate adolescent policies, weak laws prohibiting forced marriage, widespread illiteracy among adolescent girls, lack of job opportunities, poor skills and poverty, and lack of food are amongst the economic and political factors associated

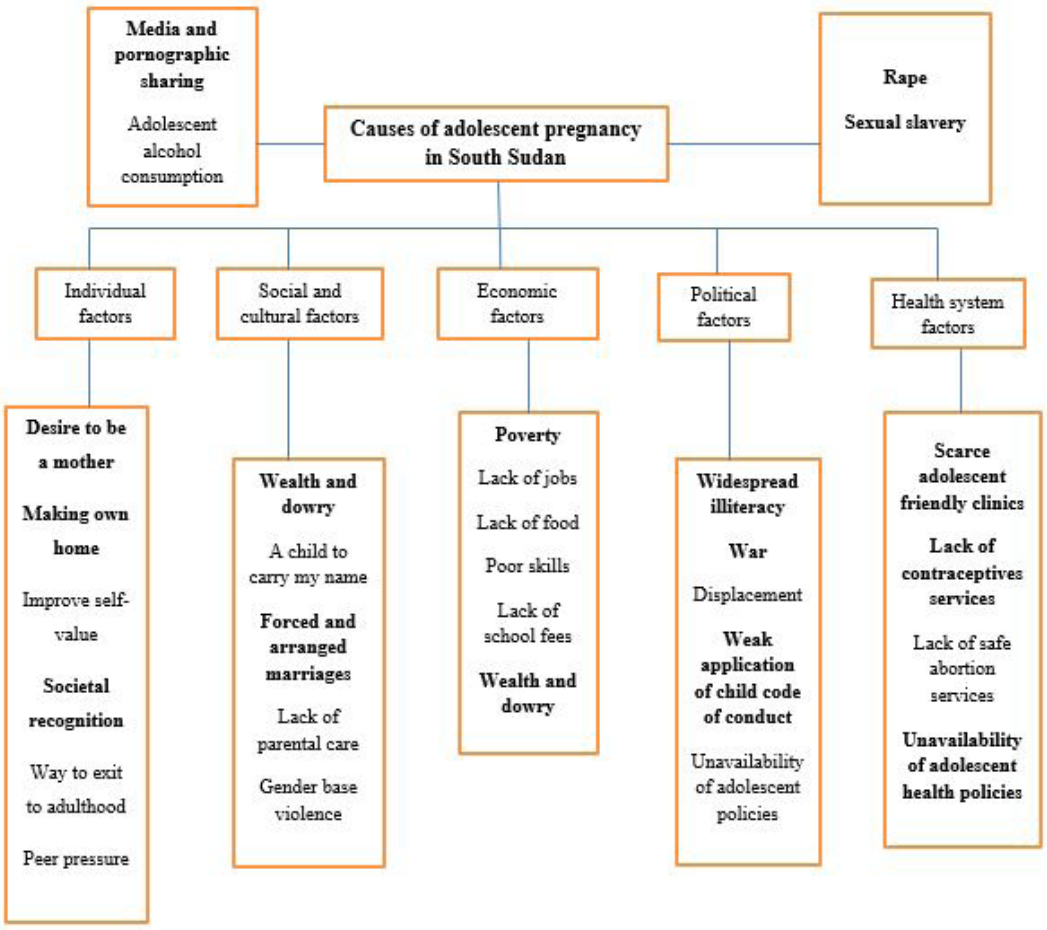

Figure 1. Determinants of adolescent pregnancy in South Sudan

with this practice.[4,5,6,7]

Moreover, failure of, and the unavailability of health services, such as the provision of contraceptives for adolescents, psychosocial counselling and scarcity of teenager-friendly health clinics contribute to this problem.

The displacement of civilians during war time has accompanied issues such as rape and sexual slavery. Reluctance of adolescent girls to discuss their choices of sexual life and the presence of dysfunctional families are hindering the fight against adolescent pregnancy.[6,7]

Adolescents like to be respected and recognized by others; factors such as desire to be a mother, making their own home, improve self-value, societal recognition and peer pressure are examples of the individual factors.[4] These factors are more prevalent in societies living in rural settings and lacking opportunities for girl education.

In Uganda, Manzi, et al found that the factors driving early adolescent pregnancy were a knowledge gap, poverty, influence from peer groups and incitement with gifts.[8] A study by Ochen et al in Lira, Uganda reported that early alcohol consumption, being married, lack of control over sex and peer pressure were significantly contributing to early adolescent pregnancy.[9] In Kenya, contributory factors reported for early adolescent pregnancy were poverty, community customs on gender roles and the value of girls, violence, inability to access formal education, and societal isolation.[10] Additionally, access to, and sharing of, pornographic media among adolescents can lead them to initiate sexual activities at an early age.[11]

The effects of adolescent pregnancy

Adolescent pregnancy leads to early school drop-out, divorce, rejection by parents, stigmatism, and sometimes if the baby is unwanted, abortion.[5] Furthermore, adolescent girls who become pregnant or who have children are often reported to have been emotionally and sexually abused; their children have low birth weight, malnutrition and they lack mental well-being with high risk of mortality.[12] Moreover, girls who have become pregnant through unprotected sex are at high risk of acquiring sexual transmitted diseases including HIV; these have substantial health risks to them and their babies. Adolescent pregnancy significantly contributes to maternal mortality and perinatal and infant mortality, and to the vicious cycle of ill-health and poverty.[13]

Solutions

Government sectors should collaborate with their national and international partners to bridge the gaps and to ensure appropriate and sustainable interventions to reduce adolescent pregnancy. A greater budget needs to be allocated to sectors involved with adolescent health.

The South Sudan constitution defines people aged less than 18 years as minors. This implies that teenage/adolescent girls who are involved in sexual relations should be protected by law. Customary practices sometimes run contrary to an adolescent's rights, hindering her healthy choices and directly increasing the prevalence of early pregnancy. A debate with tribal leaders and chiefs in South Sudan is required to examine these issues and arrive at a consensus.[14] Additionally, a review is essential with practical implementation of laws (e.g. South Sudan "Child Act, 2008") that are meant to protect the rights of children and adolescents.

Educating girls delays the age of early pregnancy. Schooling for girls needs to be prioritized, through provision of more resources and improved partnership between organizations. In addition, schools, churches, community gatherings and families should introduce child and adolescent sex education that is appropriate to their mental development and culturally sensitive.[15,16]

Prohibiting all forms of gender-based violence, including child-forced marriage through awareness programmes, reporting and establishing community-led initiatives, such as community protection committees, would help to combat this issue.[6] Campaigns for activities that help to elevate women and girls from poverty, (such as marketing and productive skills) as well as the promotion of gender equity in job seeking, and creating gender-sensitive programmes which are directed towards vulnerable community groups (e.g. those in internal displaced camps, refugees, and families living on the street). Health Services such as adolescent-friendly clinics need to be established and integrated into primary health care, and contraceptive and counselling services should be made accessible. Provision of laws and policies integrating contraceptive and other health services are essential.[16,17,18,19]

WHO has produced a guideline to help low-income countries reduce early pregnancy and poor reproductive outcomes among adolescents. This identifies six interventions to address this practice and has provided an analytic framework for policy makers and programme managers with emphasis on utilizing the interventions that are suitable and individualized to a country's circumstances.[20] These are: - preventing early marriage; - preventing early pregnancy through sexuality education; - increasing education opportunities and economic and social support programmes; - increasing the use of contraception; - reducing coerced sex; - preventing unsafe abortion; and increasing the use of prenatal care childbirth and postpartum care.[20,21]

The United Kingdom is an example where interventions since 2000 have reduced adolescent pregnancy by 62% and 65% for girls aged under 18 years and 16 years respectively. The illustrated interventions in the United Kingdom Teenage Pregnancy Prevention Framework

includes targeted prevention for young people at risk; support for parents to discuss relationships and sexual health; relationships and sex education in schools and colleges; and support for pregnant teenagers and young parents.[22] Public Health England acknowledges the need for multiple agencies to address early adolescent pregnancies and it states that "teenage pregnancy is more than a health issue" in that it involves socio-economic factors as well.[22]

Recommendations for South Sudan

- Develop policies for preventing adolescent pregnancy that are endorsed by the leadership of South Sudan Parliament and spearheaded by Ministries such as Health; Culture, Youth and Sport; Gender, Social Welfare and Religious Affairs; Education and Information.
- Review and implement laws that are supposed to protect child and adolescent rights taking into consideration the customs practiced by chiefs and traditional leaders and availing of opportunities for legal and social protection against forced marriage and sexual exploitation.
- Mobilize community leaders to lead the fight against adolescent pregnancy, ensuring their proper enlightenment and provision of appropriate tools.
- •Campaign for girls' education and increase retention in primary and secondary school with the promotion of appropriate and sensitive sex education.
- Reduce all forms of gender base violence, encourage community protection committees to stop child marriage, develop a reporting system led by community leaders and supported by governmental and non-governmental organizations.
- Mobilize activities such as marketing and productive skills to support adolescents, addressing their specific needs (jobs, shelter, cloth, sanitary pads, and food), and ensure gender equity.
- Encourage promotion of programmes that target vulnerable groups such as families living on the street, or in internal displacement camps, and refugees.
- Establishing adolescent-friendly health services and integrating them into the primary health care system and introduce contraceptive and counselling services.
- Give extra support to adolescent mothers living with HIV and their babies.[23]
- Encourage conducting qualitative and quantitative studies on areas of adolescent health and wellbeing.

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KAMPALA/UGANDA - 18 JUN 2021

Covid-19 poses a major threat to the life and welfare of refugees in Uganda

A recent UNHCR/World Bank phone survey reveals the devastating toll of Covid-19 on the living conditions of refugees in Uganda and highlights the need for strengthened support to refugee communities, to mitigate the suffering inflicted by the pandemic, UNHCR said in a press release Thursday.

The survey shows that refugees in Uganda were faring far worse than their host community on key dimensions to welfare, such as employment, food security, and mental health. It adds to UNHCR's recording of an alarming increase in the number of suicides among refugees, linked to the pandemic's disastrous socio-economic impact.

"Food insecurity among refugees, measured as the share of households that have run out of food, was much higher than among their host communities (64 versus 9 percent). Refugees were forced to reduce the amount and frequency of meals eaten in a day. According to UNHCR's own data, negative coping mechanisms such as survival sex and child marriage became more common during the pandemic because of severe economic hardship and reduced food assistance,"

See more at here

The MAMI Care Pathway Package: A resource to support the management of small and nutritionally at-risk infants under six months of age and their mothers (MAMI)

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Abstract

Globally, millions of infants under six months (u6m) are small and nutritionally at-risk, but many do not get the care they need to survive and thrive. Although the 2013 World Health Organisation (WHO) guidelines for severe malnutrition management recommend outpatient care for clinically stable infants u6m, most national guidelines still recommend inpatient care for all infants u6m. To help put the WHO recommendations into action, the MAMI Global Network has developed the MAMI Care Pathway Package – a resource to facilitate the screening, assessment, and management of small and nutritionally at-risk infants u6m and their mothers. The Package uses an integrated care pathway approach and is designed to embed within and support Integrated Management of Childhood Illness (IMCI). By improving continuity of care and facilitating patient management, the MAMI Care Pathway Package aims to help health workers improve outcomes for infants and mothers worldwide while also simplifying their care.

Keywords: MAMI, care pathway, at-risk infants, wasting

Citation:
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Introduction

The burden of small and nutritionally at-risk infants under six months

Nearly half of all child deaths are due to undernutrition and infants u6m are the most vulnerable.[1,2] In low- and middle-income countries (LMICs), about 1 in 5 infants u6m is small and nutritionally at-risk.[3] They may be born small and at risk (low birth weight: small for gestational age and/or pre-term infants) or may develop nutritional risk after birth (growth faltering, wasting, stunting, and/or underweight infants).

These infants are at higher risk of sickness, death, and poor development. Globally there are an estimated 8.5 million infants u6m who are wasted and an even greater number who are small and nutritionally at-risk.[4] In South Sudan, about 23% of children under five years are wasted.[5]

The critical gap in care for small and nutritionally at-risk infants u6m and their mothers

Despite the millions of infants and their mothers in this situation worldwide, many do not get the care that they need to survive and thrive. This is because there is a serious gap in care for these infants and their mothers, especially in community services and after the new-born period. Neonatal services often have limited involvement after six weeks of age, while services for the management of wasting are designed for children from age six months. Routine infant and young child feeding (IYCF) counselling is not sufficient to meet their more complex needs. Most current national malnutrition guidelines make recommendations

for inpatient care for this vulnerable group, but since this has high costs and opportunity costs, many families struggle to access this care.[6,7] Many of these infants are clinically stable and could be managed in outpatient care that is more accessible for families and a more appropriate setting for the type of support they need. However, despite being recommended in the 2013 WHO guidelines for the management of severe malnutrition, outpatient care for infants u6m is rarely available; countries need more guidance on how to put the recommendations into practice, more evidence of what works in their context, and how and what are the resource needs.

The MAMI Global Network

In 2010, the MAMI Global Network (formerly the MAMI Special Interest Group) was formed by the Emergency Nutrition Network (ENN) to bring attention to the burden and care gap in the management of small and nutritionally at-risk infants u6m and their mothers (MAMI). The MAMI Global Network involves local, national, and international collaborators working together to improve policy, evidence, and practice. The vision of the MAMI Global Network is that "every small and nutritionally at-risk infant u6m and their mother is supported to survive and thrive."

The MAMI Care Pathway Package

To help put this vision into action and to support health workers to manage cases that were presenting to their health facilities and programmes, the MAMI Global Network developed the first version of the C-MAMI Tool in 2015. The most recent version, redesigned as the MAMI Care Pathway Package, was released in May 2021 (Version 3). This update was informed by the latest evidence and experiences of putting previous versions into practice. The MAMI Care Pathway Package is a package of resources that was co-created by members of the MAMI Global Network, co-led by ENN and the London School of Hygiene and Tropical Medicine (LSHTM). It provides practical, field-orientated guidance on how to screen, assess, and support small and nutritionally at-risk infants u6m and their mothers. Support materials help practitioners put this into practice. The MAMI Care Pathway Package will be formally tested in a randomised controlled trial in Ethiopia (2021-2024).

Guiding principles of the MAMI Care Pathway

- The MAMI Care Pathway always considers the infant and mother together because infant wellbeing is inextricably linked to maternal wellbeing.
- The MAMI Care Pathway is about 'bridging', linking with, and using existing systems and services. Since there are many possible underlying causes of growth faltering/anthropometric deficit in this age group, effective management is not just about nutrition/breastfeeding support. It also involves health, mental health, and social interventions to provide more holistic care for at-risk infants u6m and their mothers.
- It helps put the 2013 WHO guidelines for the management of severe malnutrition into practice and is designed to embed within IMCI, an established approach to child health implemented by families, communities, and health facilities.
- The MAMI Care Pathway is based on an integrated care pathway approach that considers the processes, resources, and participation needed to support infants and mothers from initial screening through to exit from care.
- While in some settings the MAMI Care Pathway can be used directly or 'off-the-shelf', it will often require context-specific adaptation to fit with local needs and resources that already exist.
- The MAMI Care Pathway is relevant across development and humanitarian settings and different contexts. It also links treatment and prevention: treating a small and nutritionally at-risk infant u6m in the short-term aims to prevent that individual from developing even more serious nutritional disorders such as stunting and wasting in later childhood.

How does the MAMI Care Pathway work in practice?

The MAMI Care Pathway promotes identification, assessment, and support of infants u6m and their mothers at every community and health service contact point. There are many opportunities after birth to identify small and nutritionally at-risk infants and offer support. For example, infants with low birthweights can be identified for community follow up, while infants attending for vaccinations come into contact with health services several times before six months of age. It is important to take these opportunities to identify at-risk infants u6m and mothers, to provide or refer for appropriate support, and to monitor their progress.

The MAMI Care Pathway has three key stages: rapid screening, assessment, and support and management. Each stage is supported by user guides and forms for frontline health workers (Figure 1). These materials can be used directly or may inform adaptations to existing materials and resources already used by health workers.

Contents of the MAMI Care Pathway Package

There are three core materials in the MAMI Care Pathway Package :

1. User guides: these serve as training materials/references

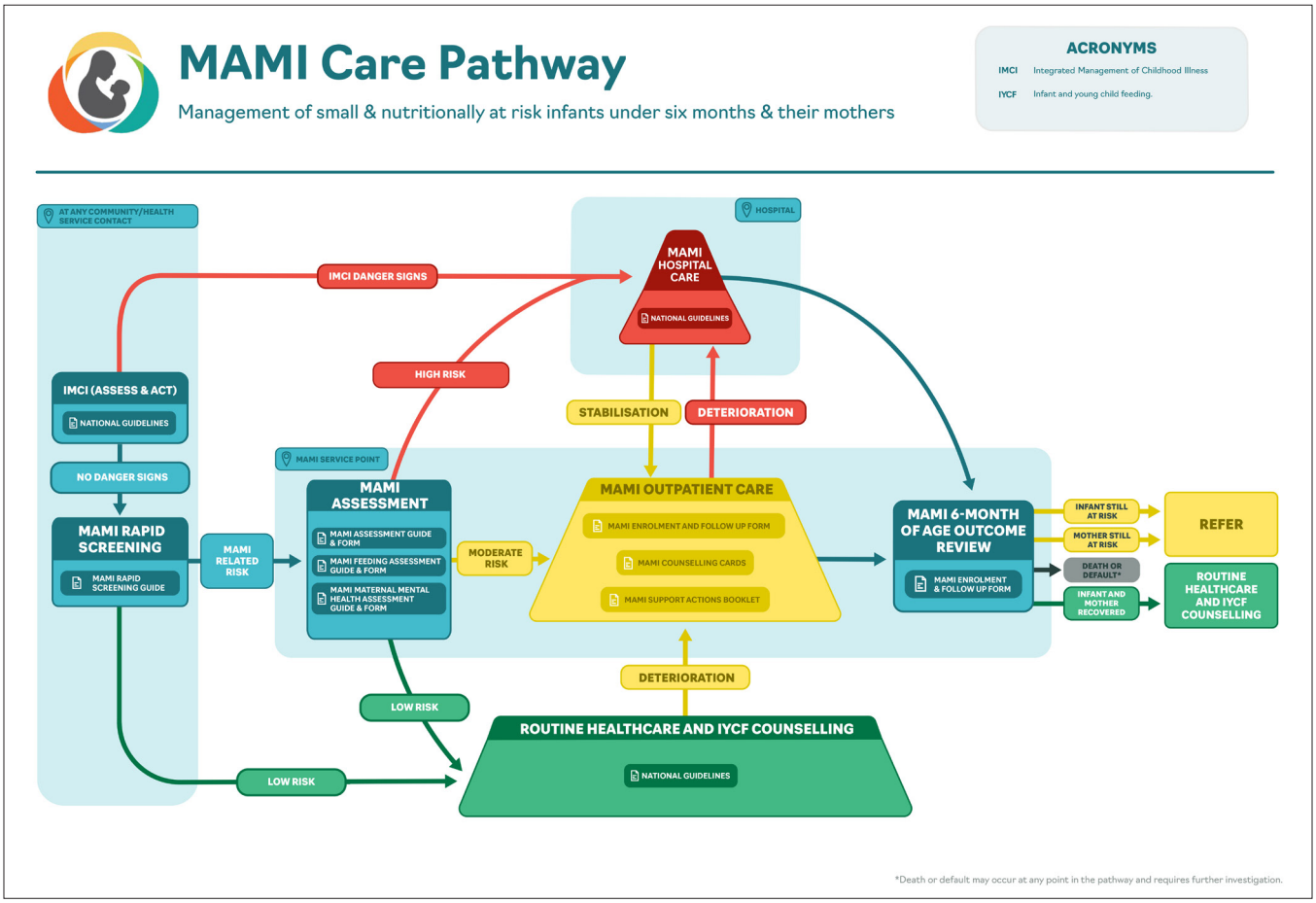

Figure 1. An overview of the MAMI Care Pathway Package. Source: MAMI Care Pathway Package.

and are formatted in the style of IMCI. For example, see The MAMI Rapid Screening guide formatted in IMCI style at https://www.ennonline.net/attachments/3890/MAMI-Rapid-Screening-Guide.pdf.

2. Forms: to help healthcare workers gather key patient data and help them manage patients. For example, see The MAMI Assessment Form at https://www.ennonline.net/attachments/3896/MAMI-Assessment-Form.pdf.

3. Counselling cards and support actions booklet: to facilitate assessment and management by frontline health workers. These are largely based on the UNICEF IYCF counselling cards that draw upon WHO resources and experts, with MAMI-specific additions. Again, these may be adapted or used to complement existing materials.

https://www.ennonline.net/attachments/3905/MAMI-Counselling-Cards-(standard-version-horizontal).pdf

Benefits of the MAMI Care Pathway

The MAMI Care Pathway benefits multiple stakeholders at multiple levels.

First and foremost, it benefits small and nutritionally at-risk infants u6m and their mothers by improving the quality and continuity of care that they receive, helping them to survive and thrive. Improving the health and nutrition of infants u6m has short- and long-term benefits for these infants, their families, and for wider society.

It also benefits frontline health care workers by:

- Increasing job satisfaction by offering easy-to-follow guides and solutions to deal with complex problems.
- Helping ensure that serious underlying conditions are not missed – a situation that can create stress for health workers.
- Reducing patient workload by allowing health workers to identify and focus on the infants and mothers with the highest needs and intervening early so as to prevent more complex, time-consuming problems later on.
- Recognising that referral services can be limited or delayed and that health workers need a simple 'how to' guide for immediate support.

For service managers and trainers, the MAMI Care Pathway Package provides a ready-made suite of materials

and resources to help implement improved care for infants u6m and their mothers. It also makes it easier to audit services and monitor performance.

Policy makers and researchers also benefit – the package translates existing policies for front-line field use; helps generate evidence that is needed for future scale-up; and bridges existing services, especially across health and nutrition.

Conclusion

The MAMI Care Pathway is an integrated care pathway that aims to improve the care of small and nutritionally at-risk infants u6m and their mothers. It provides implementation guidance and materials to help put this care into practice. It sometimes requires adaptation to different contexts. To help fill the gap in care for these infants and their mothers, it is critical to document and share experiences of adapting and implementing the MAMI Care Pathway Package in different contexts. This will help build the evidence of what works and how and will be used to develop future versions.

- The MAMI Care Pathway Package is available online at https://www.ennonline.net/mamicarepathway.
- Orientation videos on the MAMI Care Pathway Package are available on the MAMI Global Network Youtube channel. See Part 1 MAMI Care Pathway Package Overview presentation (20 mins); Part 2 MAMI Care Pathway Package Overview presentation (10 mins) and MAMI Care Pathway Package webinar recording (1 hour 30 mins)
- Share your experiences and become part of global action on MAMI by joining the MAMI Global Network. Contact the MAMI Global Network Coordinator, mami@ennonline.net
- Ask urgent questions on the dedicated MAMI page of ENN's online technical forum, en-net, https://www.en-net.org/forum/19.aspx.

The authors declare no conflict of interest.

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Back-to-basics. Cough: causes and diagnosis

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Abstract

Cough is a common complaint and may be a feature of serious underlying disease. A working knowledge of the mechanisms and differential diagnoses is crucial. A carefully taken clinical history followed by a thorough physical examination will often lead to a correct conclusion and confirmatory investigations and in turn to appropriate management.

Key words: Cough, mechanism, causes, history, examination.

Introduction

'Cough' may not seem an interesting subject to the physician but it is at best annoying to patients (and families) especially if nocturnal, and at worst very distressing particularly if associated with dyspnoea, copious sputum, haemoptysis and/or pain.

Coughing is a natural way to rid the airways of irritants and secretions, besides being a sign of a serious disease has given rise to expressions about it in Africa: "A man coughing blood is like a cow with rinderpest."

Cough mechanism

The cough mechanism is set off by the stimulation of irritant receptors, which occur in the nose and sinuses, around the vocal cords, carina and the larger airways, and also the eardrums, diaphragm, pericardium and stomach. These receptors have afferent nerves via the Vth, IXth and Xth cranial nerves to the brain. The efferent side of these reflexes leads to:

- inspiration,
- glottic closure,
- diaphragmatic relaxation,
- intercostal and abdominal muscle tension,
- rise of intrathoracic pressure up to 200mm Hg.,
- glottic opening and
- invagination of the tracheobronchial membrane
- so narrowing the airway with
- rapid expulsion of air i.e., a cough
- carrying mucus with it.

In the light of this mechanism, it becomes clear why so many conditions may be associated with a cough and how the cough mechanism, which is itself often protective to the airway, may be impaired. For example, pain following abdominal surgery may reduce abdominal muscle tension, the force of a cough and so reduce mucus clearance predisposing to pulmonary infection.

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Causes

There is a useful rule to observe when considering the cause of a cough: if the cough has been present for four weeks or more always investigate for pulmonary tuberculosis. This is especially important in countries like South Sudan where tuberculosis (TB) is common.

The differential diagnosis may be reviewed from knowledge of the cough receptor sites:

1. Upper respiratory tract:

a. Viral infections: cough may last for months.
b. Sinusitis
c. Allergic rhinitis
d. Laryngeal lesions including inhalation of irritants.
e. Wax or any foreign body against the tympanic membrane
f. Upper airway cough syndrome (used to be called post-nasal drip syndrome).

2. Pulmonary structures:

a. Bronchial asthma especially in children
b. Inflammation: bronchitis, bronchiectasis, smoke irritation, migrating larval stages of parasites (e.g., hookworm, hydatid disease), malaria, TB, lung abscess
c. Foreign bodies and tumours including Kaposi sarcoma in the immunocompromised patient.
d. Any cause of increased secretions.
e. Heart failure with pulmonary oedema, pulmonary emboli and secondary tumours.
f. Any other cause of interstitial lung disease: collagen diseases (e.g. rheumatoid disease, systemic lupus erythematosus, scleroderma), drugs (e.g. nitrofurantoin, amiodarone).

3. Other:

a. Diaphragmatic, pericardial and gastric receptors are probably of little importance.
b. Gastro-oesophageal reflux and either aspiration or irritation of the vocal cords
c. Psychogenic.
d. Treatment with angiotensin converting enzyme inhibitors (ACEI).

In South Sudan important causes, and types, of cough are:

1. Unilateral or bilateral pleural effusion.
2. Pneumocystis jirovecii pneumonia or Kaposi sarcoma in immuno-compromised patients, the cough is usually dry
3. Large pulmonary balls of hydatid disease.
4. Persistent cough in children is almost always a sign of bronchial asthma
5. Hydro- and pyo-pneumothorax coughing.
6. Suppurative lung abscess should include pyopneumothorax which produces pus in sputum if there is pulmonary-bronchial fistula.

Special points to note in the history

1. **Times when the cough is worse:** cough at night may indicate heart failure, bronchial asthma or aspiration from gastro-oesophageal reflux; cough at meal times may suggest aspiration. Being woken with paroxysmal cough is usually due to reflux.

2. **Bronchial hyperreactivity:** Cough triggered by dust, fumes, temperature change, cold air e.g. cough variant asthma.

3. **Triggers:**

a. **Exertion or laughing:** interstitial lung disease or bronchial asthma.
b. **Environmental change:** houses and pets: may suggest an allergic cause.
c. **Medication:** beta-blockers and ACEI. Interstitial lung disease may be caused by many drugs (e.g., anticancer drugs, penicillins, non-steroidal anti-inflammatory drugs) and present with cough.

4. **Sputum production:** Post-nasal drip and bronchitis often create morning sputum. Purulent sputum usually suggests bacterial infection but eosinophils in large numbers may give rise to similar appearances. Large volumes of purulent sputum suggest bronchiectasis.

5. **Haemoptysis:** TB, bronchiectasis, tumours, pulmonary embolism and bronchitis.

6. **Sneezing and rhinorrhoea:** allergic rhinitis.

7. **Dry mouth, from mouth breathing, change or loss of sense of smell:** chronic rhinitis.

8. **Gastro-oesophageal reflux symptoms or dysphagia:** oesophageal disease. Note that symptoms of reflux may be absent if on antacid treatment, but the non-acidic refluxate may still cause cough

9. **Joint pains and/or swelling:** connective tissue disorders.

10. **Pointers to acquired immunodeficiency:** unexplained cough, often dry, may be a presentation of Pneumocystis jirovecii pneumonia or Kaposi sarcoma.

11. **COVID-19** has become a major global concern and frequently presents with a persistent cough, change of sense of smell and taste, and fever.

Special points to note on examination

1. Deep expiration precipitating the cough suggests bronchial asthma.
2. Deep inspiration precipitating the cough suggests interstitial lung disease.?
3. Types of cough:
   a. "Wet": bronchial asthma, bronchitis.
   b. "Brassy": tumour.
4. Increasing cough during examination and clearing when the patient is not aware of being observed may suggest a psychogenic cause.
5. Impacted ear wax.
6. Nasal passages: polyps, mucopurulent discharge, signs of inflammation.
7. Tender maxillary sinuses.
8. Goitre and other neck masses.
9. Rales and rhonchi especially if localised.
10. Finger clubbing with malignancy, lung abscess, bronchiectasis and occasionally with tuberculosis.
11. Central cyanosis and/or anaemia.

Careful clinical assessment will provide a working diagnosis in most cases and special investigations (such as those listed below) often are not needed especially where facilities are lacking.

Sputum examination: Look at it!!! Are there any signs of blood? A rusty looking specimen may suggest a pneumococcal pneumonia. Microscopy will differentiate bacterial infection from eosinophilia: consider TB and fungi.

Chest X-ray: A normal X-ray does not exclude tuberculosis, tumour, foreign body or bronchiectasis. In areas where it is known to occur, hydatid disease may produce large pulmonary "balls". An unsuspected (hydro- or pyo-) pneumothorax may present with cough. A lung abscess associated with a broncho-pulmonary fistula gives rise to large amounts of purulent sputum.

Respiratory function tests: the simplest is to observe the patient exercising e.g., walking the length of a ward or climbing stairs. The inability to complete sentences without added inspirations during ordinary conversation is abnormal. Exercise may induce wheezing in bronchial asthma. Peak expiratory flow (PEF) measurement is helpful, but spirometry is better. PEF meters are small, relatively inexpensive and the measurements at least give some quantitative idea of progression. Without such equipment ask the patient to blow out a lighted match from five inches and with the mouth open.

Treatment

It is not the purpose of this article to describe the treatment of all the causes of cough:

1. Treatment should be directed at the specific cause.
2. Removal of an allergen or irritant is usually very effective: cigarette smoking is an important example.
3. "Bronchitis" that does not respond to antibiotics should suggest an obstructing lesion.
4. A cough associated only with sputum should not be suppressed.
5. A distressing cough with an irreversible cause (e.g., metastatic malignancy) should be suppressed using:
   a. A simple linctus or
   b. Humidified air (steam inhalation but care to avoid scalding) or
   c. Codeine phosphate 30-60mg. 6-8 hourly (but be aware of the constipating effect)
   d. Kindness and reassurance: a patient is often more afraid of the cause of the cough than the cough itself.
6. Aggressive management of oesophageal reflux may be needed because H2 blockers or proton pump inhibitors will not affect proteases. So, raising the head of the bed, avoiding eating late at night may be helpful.
7. Trial of inhaled steroid may help manage cough variant asthma.

Explaining to a patient the cause of the cough and its prognosis and treatment is important. In South Sudan patients are most scared if they have haemoptysis, with some believing that they will not survive for long after the episode. Many people with bronchial asthma resist nebulized treatment and need to be persuaded to accept it.

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Giant pleomorphic adenoma of the parotid gland: a case report

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Abstract

Pleomorphic adenomas account for the majority of parotid masses, typically arising in the tail of the gland and enlarging slowly. Most are 2 to 6 cm in size when resected. We report the resection of a benign mixed tumour of the left parotid gland with a history of bleeding. The resected tumour measured 21 cm in diameter, weighed 1.81 kg, and on pathologic examination was a benign mixed tumour without malignant degeneration. The implications of this unusual case for the management of mixed tumours are discussed with a review of the literature.

Key words: Giant pleomorphic adenoma, parotid tumour, neck mass, Namibia

Introduction

About 80% of parotid masses are benign and of these, 80% are pleomorphic adenomas. They are slow-growing, painless in the preauricular or retromandibular area with no associated facial paralysis. Treatment consists of excision with wide margins, typically via superficial parotidectomy. Parotid tumours are surgically removed because there is always a risk of malignant degeneration. Also, if there is excessive growth this leads to facial deformities, ulceration, bleeding and functional problems.[1-3]

There is a move at present to consider a more conservative surgical approach for parotid tumours. However, parotid pleomorphic adenomas have a multicentric growth. Hence with very conservative treatment the risk of recurrence is high. Further surgery then more complicated since the facial nerve is difficult to identify and separate. If there is subsequent malignant change it may be necessary to scarify the facial nerve with a radical parotidectomy and postoperative radiotherapy.

This unusual case presented to the maxillofacial surgery service at Oshakati Intermediate Hospital of Namibia prompted us to re-evaluate the behaviour of these benign mixed tumours. We propose that this case, demonstrated sufficient morbidity to justify the early excision of all pleomorphic adenomas, despite surgery being difficult and the risk of bleeding. When these tumours grow massively, they are accompanied by neoformation of blood vessels with increased bleeding during parotidectomy.[4-,6]

The relatively low risk of malignant transformation is a factor to consider when planning surgery. Tumours of this large size are uncommon and require a working knowledge of the anatomy and approach to surgery.[7,8]

Case Report

An 83-year-old woman complained of bleeding from a lump on her face. She reported no past illnesses and had not consulted a clinician for ten years apart from traditional healers. She stated that the mass had slowly enlarged over a long period. It had not troubled her until one of the nodular areas had broken down and begun to bleed.

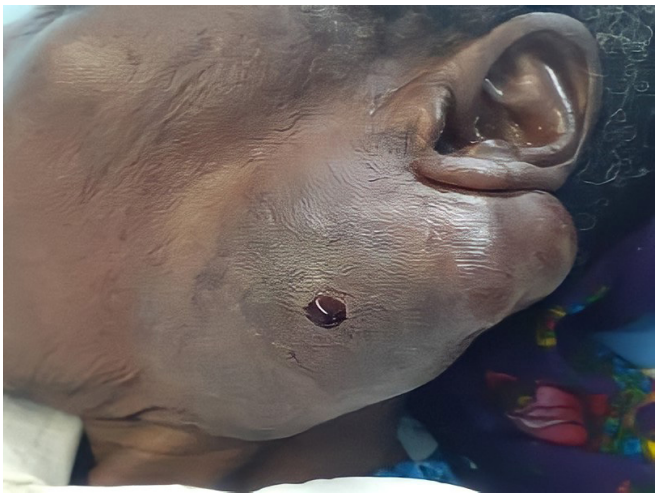

Figure 1. The patient at initial examination, showing a large, multinodular left parotid mass extending from the ear into the neck.

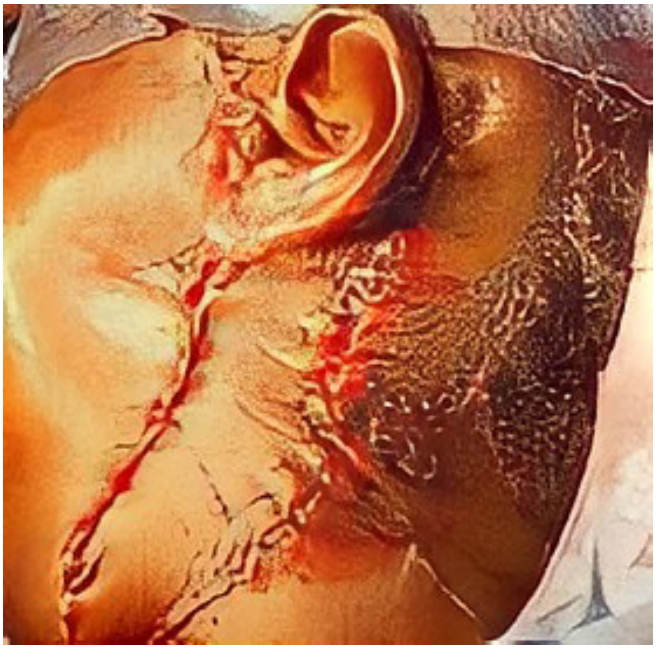

Figure 2. View after surgery showing the posterior flap to close the wound

Clinical examination on admission revealed an elderly woman with a massive left sided facial tumour (Figure 1). It was nodular, soft to palpation, lobulated, painless, well circumscribed; tensely cystic in places, and had prominent veins surrounding the mass. The ear lobe was displaced upwards and the tumour extended onto the neck. The surface was focally necrotic with bleeding (Figure 1). There were no cranial neuropathies and the remainder of the physical examination was normal.

She was admitted for assessment and preparation for surgery. Haematological tests (Table 1), a coagulation screen, renal and liver tests were normal.

Table 1. Routine blood tests

Test	Result	Reference
White blood cell count	6.34	3.39-8.86×10^9/L
Haemoglobin	12.80	11.1 – 14.7 g / 100ml
Platelets	207	171-380×10^9/L

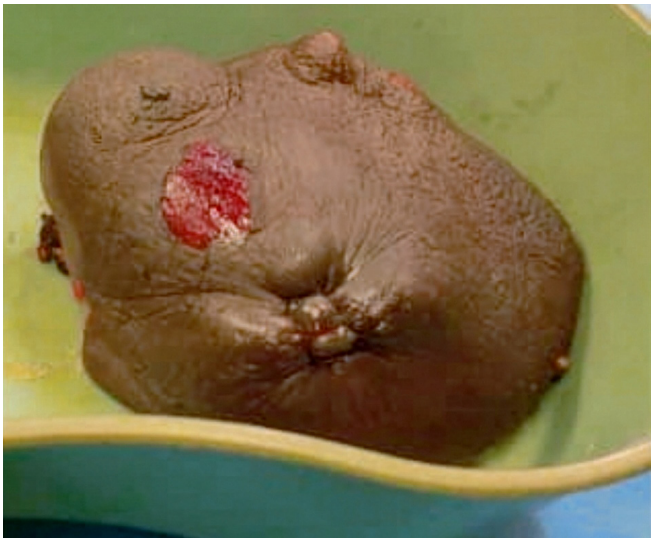

Figure 3. The excised tumour.

A CT scan was taken to check the relationship of the tumour with the great blood vessels and the nerve structures in the neck. Involvement of these structures would markedly increase the risk of surgery.

The CT scans showed no close relationship to the great vessels or the parapharyngeal space (not shown as the images were of too low resolution to publish). The patient was cross-matched in case blood transfusion became necessary.

Surgery was performed under general anaesthesia with oral intubation. Parotidectomy technique was difficult because of bleeding and maintaining haemostasis.

The mass was removed conserving the integrity of facial nerve, which it was identified and properly dissected during the surgery. The wound was closed successfully by creating a posterior rotation flap to achieve a primary closure (Figures 2 and 3).

Histological examination revealed a pleomorphic adenoma with no evidence of malignancy – see Surgical Histology Report.(Table 2.)

The facial nerve function remained intact, no blood transfusions were needed, and postoperative recovery was uneventful.

After seven days, the patient was well but some borders of

Table 2. Surgical Histology Report

Clinical details	Tumour 20 cm in diameter, bleeding, mobile, encapsulated, lobulated, fixed to the skin, surface ulcerated.
Macroscopy	Tissue mass 70/30/60 cm with overlying ulcerated nodular skin. On cut section is haemorrhagic nodular tumour with cystic space.
Microscopy	Section shows overlying epidermis, benign salivary gland and lymphoid tissue with relatively well a circumscribed tumour. The tumour is mainly composed of tubular structures lined by a double layer of epithelium and myoepithelial cells. Papillary structures, cystic spaces, haemorrhage and fibrosis are also noted throughout the tumour. No features of malignancy.
Diagnosis	Left parotid gland tumour: Pleomorphic adenoma.

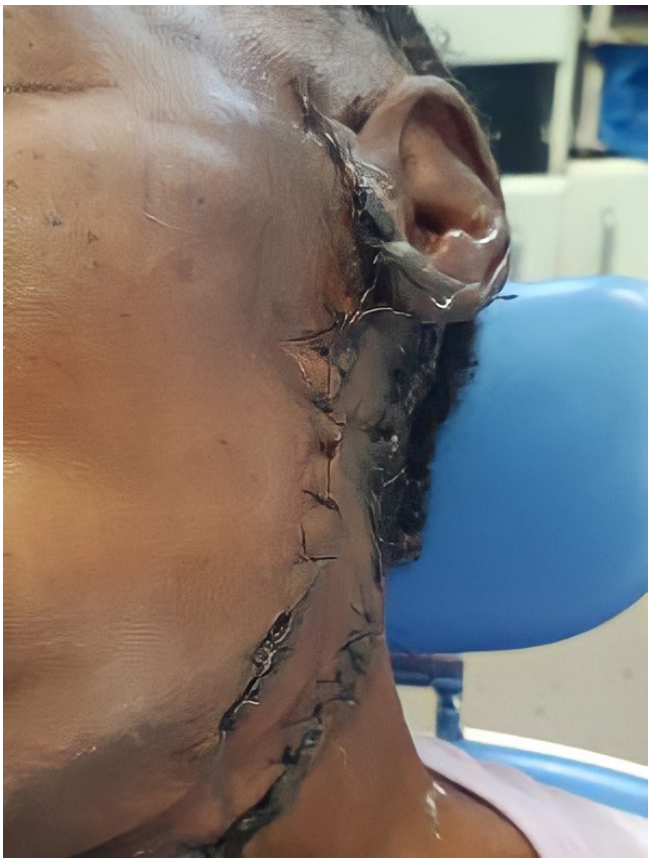

Figure 4. Seven days postoperative, showing vitality of the skin flaps apart from necrosis at the border due to tension of the wound.

the wound became necrotic and were removed. (Figure 4). The patient was discharged from the maxillofacial service and a follow-up was arranged for three months later, but the patient never returned to the hospital, probably because her village was more than 300 km away.

Discussion

This case presents several unusual features. At 1.83 kg, the parotid mass is a big tumour. One review of massive pleomorphic adenomas was published by Short and Pullar in 1956 who reported a similar tumour weighing 2.3 kg tumour. This includes the case reported by Spence in 1863 which is an important and successful resection of a mixed tumour larger than 1 kg. A common theme that runs through many of the reported cases is the patients' fear of the surgery and the culture of seeing traditional healers. This was a factor with our patient.[9,10]

Our patient's presenting complaint had been of bleeding and leakage of turbid fluid from the mass; usually caused by necrosis of the tumour on the surface which did not have enough blood supply.

Spontaneous infarction of benign mixed tumours is unusual and raises concern about malignant change. In massive tumours, however, even slow growth eventually outstrips the blood supply, resulting in haemorrhagic degeneration of the central portion of the mass.[11,12]

The cyst is lined only with necrotic debris, as was the case in our specimen. This distinguishes such cystic spaces from true cysts within pleomorphic adenomas, which arise from squamous metaplasia or abnormal ductal elements within the mass. While haemorrhagic degeneration in a parotid mass should always raise the index of suspicion for malignancy, our case and others like it suggest that central necrosis in benign tumours is rare only because most are resected while still small.[13,14]

With surgery of this complexity, it is important to have a thorough knowledge of the anatomy of the local structures. The parapharyngeal space lies medial to the parotid gland and includes:

- Maxillary artery and ascending pharyngeal artery
- Glossopharyngeal nerve (IX)
- Vagus nerve (X)
- Internal carotid artery.
- Internal jugular vein in the carotid sheath.

- Accessory nerve (XI)
- Hypoglossal (XII)
- Sympathetic trunk and superior cervical ganglion of the trunk.
- Ascending pharyngeal artery.

When parapharyngeal space is invaded by parotid tumours the surgery becomes very risky, because it maybe impossible to control due to damage of the jugular vein or carotid artery.

Conclusions

Although there was no evidence of malignancy in our specimen, and the patient suffered no major morbidity, she is fortunate in this regard. Neglecting even a benign parotid mass carries an increasing risk of facial nerve injury when surgery is finally undertaken. The bony and muscular deformity associated with such tumours is disfiguring. Although more than 95% of all pleomorphic adenomas remain benign, it is important to bear in mind that the clinical course of such growths can be far from benign. Although it can be clinically fairly certain that a tumour is benign we advocate the early excision of parotid masses in all patients who will tolerate surgery.

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All images from the authors.

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Wessex connections with South Sudan

Even before independence, there have been links with Sudan, the Salisbury Diocese link going back decades. A medical link was made in 2007 between St Mary's Hospital on the Isle of Wight and the main hospital in Juba, the capital of South Sudan. As a result of initiatives by Dr Eluzai Hakim at St Mary's, further hospital links developed, which included

- The Poole Africa Link with Wau
- The Winchester link with Yei
- Discussions between Dorchester Hospital and Rumbek
- Vision 20:20 supported by ophthalmologists in Poole

Other links, some of which have been longstanding, included

- Brickworks and Yei
- Salisbury Sudan Medical Link
- Healthcare South Sudan with Kajo-Keji
- CRESS-UK and Kajo-Keji
- Medical training link that involved the Royal College of Physicians
- South Sudan Medical Journal

What has happened to these links?

Visits to South Sudan were made and partnerships strengthened, but civil unrest and attacks on aid workers eventually made it too dangerous for Wessex partners to visit South Sudan. COVID has now prevented travel. Fundraising continues and training at the KajoKeji Health Training Institute is being undertaken, with support now being given through remote learning.

What are the health needs in South Sudan?

The UN Office for the Co-ordination of Humanitarian Relief's June, 2021, report says

- The people are facing their highest levels of food insecurity since independence 10 years ago
- The impact of a lean season this year is expected to be the worst on record
- Conflict, displacement, flooding, loss of livelihoods, COVID-19 and an inability to reach health care and schools have created urgent humanitarian and protection need, especially for women and children.
- Attacks against communities, humanitarian workers and assets are on the rise.

In 2021

- 8.3 million people in need of humanitarian assistance
- 7.2 million people will face sever acute food insecurity between April and July
- 3.9 million people remain displaced inside and outside the country
- 1.4 million children under 5 years are expected to be acutely malnourished

Only 30% of the $1.68 billion funding required has been made available.

What next?

The health and wellbeing of ordinary people in South Sudan have suffered from decades if high level political power struggles. Until there is a political solution this will not change and there are no signs at the moment of this happening. As a consequence, the welfare of ordinary people will rely on humanitarian aid and, therefore, the willingness of wealthy countries to continue to provide this. Wessex partnerships with South Sudan colleagues will continue to be important.

If you would like to enquire about becoming involved in work to support South Sudan, then click on any of the partnership links above to find out more.

More information

- UN OCHA Report on South Sudan, June 2021
- Information from MSF on current health needs

Item from the 23 July 2021 newsletter of the Wessex & South West Global Health, UK. To receive the newsletter email john.acres@winchester.ac.uk

Medical Training Initiative (MTI) interviews for South Sudanese candidates

The Global Team at the Royal College of Physicians in London would like to host a half-day of virtual interviews for MTI applicants from South Sudan on 20th September, 10:00 – 13:00 South Sudan time (09:00-12:00 GMT). The timings mean that Team will be able to interview 4 candidates only. As this is a fairly small number of candidates, they can open applications for up for 1 week.

The virtual application form will be open from Friday 27 August 2021 – any applications received before this date may be missed by the shortlisting team.

The reason the Global Team cannot interview more doctors at the moment is because there are already a lot of MTI applicants from other parts of the world on the college database.

Please study the eligibility criteria below, and if you have any further enquiries, call the Department using the telephone contact at the bottom of this notice.

All candidates need to meet the following criteria:

- Hold a **primary medical qualification** - recognised by the GMC and verified by the Educational Commission for Foreign Medical Graduates (ECFMG).
- Have a **postgraduate qualification.**
- Have **3 years post-qualification experience,** including 1 year's internship and at least 1 year in the speciality in which you intend to train while in the UK.
- Been engaged in medical practice for 3 out of the last 5 years including the 12 months prior to GMC registration being granted. There should be no gaps in employment during the 12 months. You must remain in medical practice throughout the application process. **Please note that the GMC does not consider clinical observerships as clinical practice.**
- Skills and competencies - you must possess the skills, competencies and understanding of medicine at least equivalent to a UK graduate at the end of their CMT.
- Have passed the International English Language Testing System (IELTS) with overall scores of 7.5 and 7.0 in all categories **OR** the Occupational English Test (OET). The tests are valid for two years and your scores must have been obtained in the same sitting.

For MTI enquiries please call 020 3075 1631. Monday – Thursday 11.00 – 15.00 GMT. Friday – 10.00 – 14.00 GMT.

Dr Eluzai Abe Hakim, MB.Ch.B, FRCP Edin, FRCP

International Adviser to the Royal College of Physicians London on South Sudan

Royal College of Physicians

Setting higher standards

Royal College of Physicians
Medical Training Initiative Interviews
South Sudan – September 2021

The Royal College of Physicians (RCP) Medical Training Initiative enables medical graduates from all over the world to train in the UK for up to 24 months

How the initiative works

- The RCP assesses applicants at panel interviews
- Successful candidates are matched to suitable NHS training posts (matching can take up to 1 year)
- The RCP facilitates GMC registration and the supporting Tier 5 Medical Training Initiative visa
- Medical graduates can train in a variety of posts at various levels for up to 24 months

Eligibility criteria

- Hold a primary and postgraduate medical qualification (e.g. MRCP(UK) Part 1, MMed)
- Have been in clinical practice for three out of the last five years including the most recent 12 months
- Have achieved the required Academic IELTS score - minimum of 7.5 overall and 7.0 in each category OR the Occupational English Test (Medicine) – minimum Grade B in each category

Posts are usually available in acute medicine, general internal medicine, geriatric medicine (elderly care), respiratory medicine and gastroenterology. Applications for other specialties are welcome, though posts may not be available immediately.

Your application will only be considered for shortlisting if you meet the eligibility criteria above

Interview date and time

Monday 20 September 2021, 10:00-13:00 Central Africa Time

Interviews will be taking place virtually on Microsoft Teams. If you are invited to interview, a link will be sent to you by email. Each interview will last 40 minutes.

To apply visit please complete the virtual application form which will be open from **Friday 27 August:** click here to access the virtual application form

The deadline for submission of completed applications is **Friday 3 September 2021 at 10:00 Central Africa Time**

If you have any questions, please email mti@rcp.ac.uk

www.rcplondon.ac.uk | **Medical Training Initiative** | September 2021

MSF report on South Sudan's first decade of independence

A recent news item from MSF announces the publication of a new 70-page report 'South Sudan: The consequences of violence since independence'. Among the health-related consequences noted are:

Deaths from preventable diseases

Violence across the country has disrupted people's access to healthcare, including routine vaccination, while increasing the risk of disease transmission and food insecurity. There have been repeated failures to ensure dignified living conditions for people in refugee camps and Internally Displaced Persons (IDP) sites. Instead, people fleeing conflict and violence have, over and again, been forced to live in deplorable conditions – with basic requirements for living space, water and sanitation unmet, far below the minimum emergency thresholds for survival.

At its worst, MSF has recorded three to five children a day dying from preventable diseases – such as malaria – in different refugee camps and protection of civilian sites. Meanwhile, people forced to live in the open, in the bush and swamps, have repeatedly been exposed to disease and extreme hunger.

In some areas, conflict has brought a resurgence of kala azar, the world's second-largest parasitic disease. There has also been measles, hepatitis C and cholera outbreaks, among others.

Mental health

Millions of people in South Sudan have been repeatedly exposed to traumatic events. MSF has witnessed increases in suicide attempts and has worked with patients coping with post-traumatic stress disorder.

Health care

The impact of protracted conflict and repeated humanitarian crises in South Sudan is worsened by a weak, chronically underfunded healthcare system, destroyed in many areas and largely neglected in others. In 2020, of approximately 2,300 health facilities, more than 1,300 were non-functional. Fewer than half (44 percent) of the total population and just 32 percent of internally displaced people live within five kilometres of a functional health facility.

Read the full report at https://msf.org.uk/sites/default/files/MSF-SS-Report-Web-SinglePages-DEF.pdf

Kwashiorkor – 'revisiting the evidence'

Kwashiorkor malnutrition affects hundreds of thousands of children and kills tens of thousands each year. Although recognized as a unique form of malnutrition since the 1930s, its etiology is still unclear.

A series of webinars was held in 2020 and 2021 to discuss the following topics: 1) the basic characterisation and treatment of kwashiorkor, 2) observable signs of kwashiorkor and 3) metabolic and biochemical characterisation of kwashiorkor.

The full recordings of the webinar series can be found at https://fic.tufts.edu/research-item/revisiting-the-evidence-on-kwashiorkor-malnutrition/

Although a causal association remains to be fully demonstrated, there is general agreement that there is an association between kwashiorkor and low serum albumin; nevertheless, many children with low serum albumin concentration do not develop oedema and some adults with ascites and oedema have normal albumin concentrations.

Most of the reports on kwashiorkor rely on cross-sectional observations that attempt to explain a snapshot of a highly dynamic process. Therefore, capturing this dynamic process, either by observing determinants of kwashiorkor before it occurs or by subjecting children with kwashiorkor to a metabolic nudge and monitoring their response, may provide deeper insights into the pathophysiology, or perhaps aetiology, of kwashiorkor. In conclusion, there is still much more we do not know about kwashiorkor and more research, especially targeting mechanistic pathways, is necessary to elucidate the aetiology of this disease.

Read on: Ennonline

Dr Pastore Alphonse Kwajok

Dr Pastore Alphonse Kwajok was among the first dentists from South Sudan. He graduated from the Faculty of Dentistry at Tanta University in Egypt in 1984. After graduating, he worked at Khartoum and Omdurman Teaching Hospitals from 1984 -1989 and at the Juba Teaching Hospital from 1990-1997.

Dr Pastore was born on January 1, 1953, in Kwörijik, Lurit (suburb of Juba), South Sudan. He started elementary school in Liria, Central Equatoria State, and completed at Rifia Shendi. He progressed to Intermediate School at El Damer Al Amiriya and completed at Juba One Intermediate School. Later, he was a student at Malakal Senior Secondary School, after which he entered Tanta University in Egypt.

Due to deteriorating security, Dr Pastore and his family left Sudan for Egypt in 1999 where he worked for the International Organization for Migration as an Interpreter and Cultural Orientation Officer. In January 2001, he and his family were resettled in Des Moines, Iowa, where he worked for Fresenius Medical as a dialysis technician until his death. Dr Pastore was married in 1995 to Ustaza Erika Matia Loro Bureng.

DR PASTORE ALPHONSE KWAJOK

January 1, 1960 - May 22, 2021

Dr Pastore was diagnosed with liver cancer in 2020 and fought a long and hard battle with the disease. He succumbed to the illness at Mercy Hospital in Des Moines, Iowa, on May 22, 2021, in the presence of his family. He leaves behind his wife, Erika Bureng, children George and Stephania, and his nephew, Yohana. He is also survived by his brothers, Dr James Kwajok, Batista Kwajok, and Ezu Kwajok, and sisters, Ann Kwajok, Liliana Kwajok, and Amphibia Kwajok.

Dr Pastore was a very outgoing person, a community organizer and first president of the Equatoria South Sudanese Community in Iowa

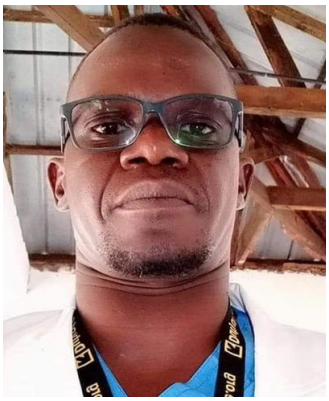
Dr Pastore was a very outgoing person, a community organizer, the first president of the Equatoria South Sudanese Community in Iowa, and a loving and devoted father and husband. Family, relatives, and friends will greatly miss him.

May his soul rest in eternal peace.

Humanitarian and healthcare workers killed in South Sudan

In recent months, several humanitarian and healthcare workers have been threatened, beaten, arrested, detained, tortured and even killed in several parts of South Sudan. The South Sudan Doctors' Union has condemned these acts and called on the government to protect healthcare workers, investigate these incidences and bring the perpetrators to book. SSMJ remembers some of the health workers killed or found dead in their duty stations below.

Dr Louis Edward Saleh



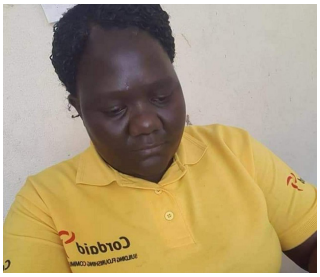
Dr Louis, who was working at Ganyiel PHCC in Unity State under the International Rescue Committee (IRC), was killed in cold blood within the health facility on 21 May 2021.The 41-year-old doctor started his career in 2013 at Juba Teaching Hospital and worked in Bor before moving to Ganyiel Payam where he unfortunately met his death.

Dr Dominic Pitia

Dr Dominic Pitia, who worked for Care International as the Emergency Health Manager in Akobo, was found dead in his room in Jonglei State on 27 July 2021. Dr Pitia was a graduate of the College of Medicine, University of Juba and had previously studied at Usratuna and Comboni Secondary School, Juba. In a press release, CARE International stated that both the organization and local authorities are conducting investigations into the cause of death.

Mr Mabior Manyok Ader

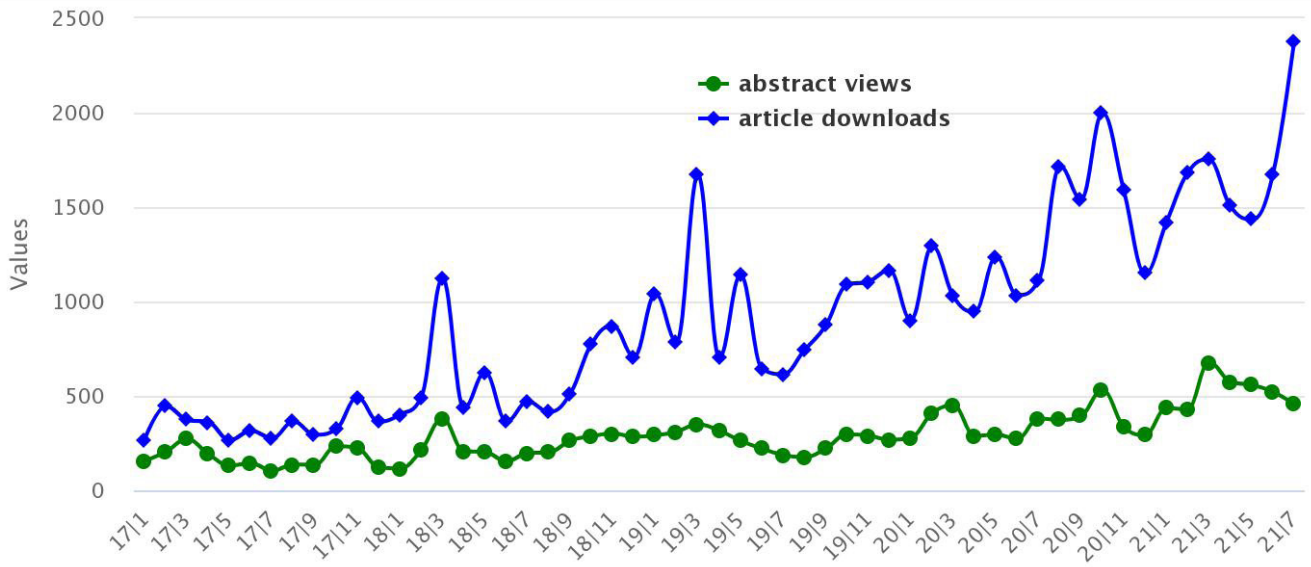
Mabior Manyok Ader, a clinical officer working at Pajut PHCC, was found dead in his room in Duk, Jonglei State, on 27 July 2021. Mabior was working for the Médecins du Monde (Médicos del Mundo), a French medical organization that provides emergency and long-term medical care to people in several parts of South Sudan.

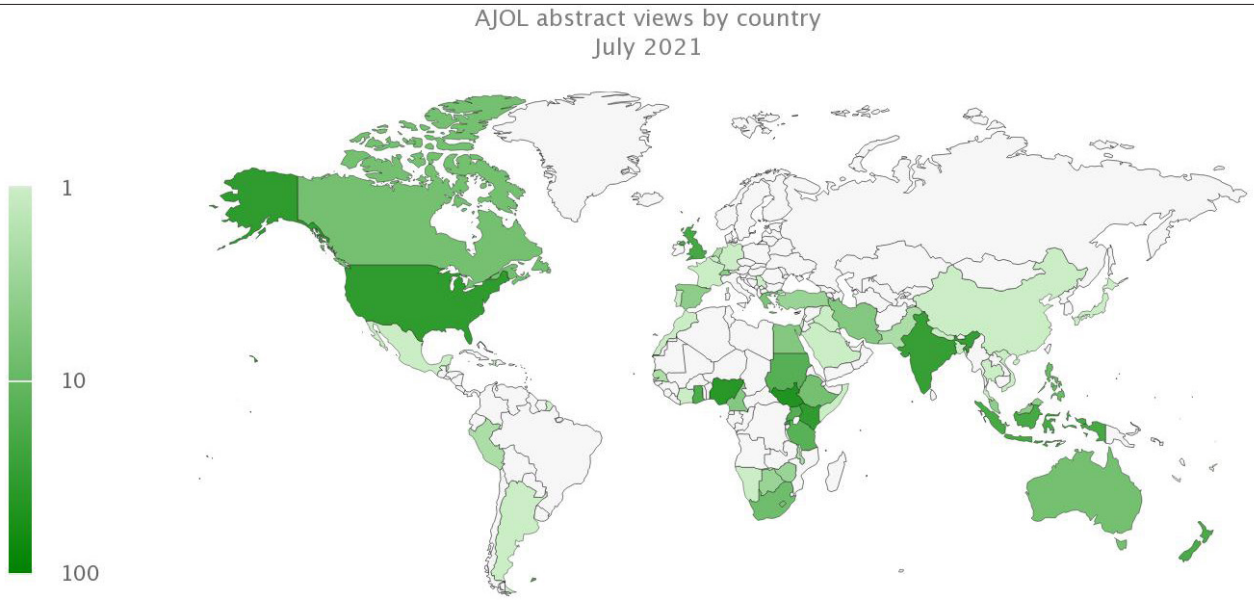


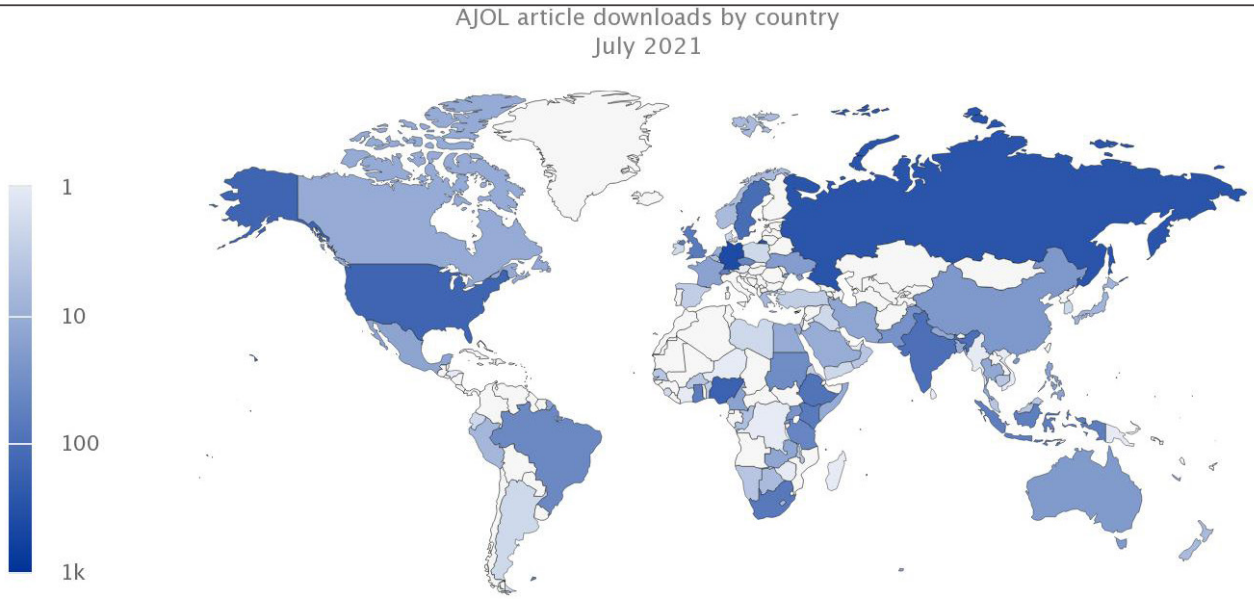
Ms Amono Anna Clara

Ms Amono Anna Clara, a specialist nurse in Reproductive Health working for Cordaid, an international emergency relief and development organization in South Sudan, succumbed to her injuries after she was shot in an ambush between Chukudum and Camp 15 in Budi County, Eastern Equatoria State on 12 May 2021. Amono was from Adilang Subcounty in the Agago district in Uganda and is survived by one child.

The graph and maps shown here are from SSMJ's interactive data on African Journals Online (AJOL) site. Similar data are available for every quarter since 2017. See More Here.







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.