

# ETHIOPIAN JOURNAL OF PEDIATRICS AND CHILD HEALTH

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*Atnafu Mekonnen , MD*

## Instruction to Authors

## Acknowledgments

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**OUTCOM OF CHILDREN WITH ACUTE POST STREPTOCOCCAL  
GLOMERULONEPHRITIS IN TIKUR ANBESSA SPECIALIZED TEACHING  
HOSPITAL Addis Ababa, Ethiopia.**

**Lamesginew Mossie MD\*. Damte Shimelis MD\*.**

**Abstract**

**Back Ground:** *post streptococcal glomerulonephritis is one of the commonest causes of glomerular disease in developing countries. It is also one of the commonest causes of morbidity and in few cases mortality if proper identification and supportive treatment is not delivered.*

**Objective:** *the objective of this study is to look into the outcome and identify the predictors of outcomes of patients with post streptococcal glomerulonephritis in a tertiary care hospital.*

**Materials and methods:** *Retrospective analysis of admissions of post streptococcal glomerulonephritis was conducted at Tikur Anbessa Specialized Teaching Hospital in Addis Ababa over eight year's period from 2003 to 2010. Data was collected from patient records. The record of each patient was examined for the following information: age, sex, and address sociodemographic characteristics, predictors of outcome and complications of APSGN.*

**Results:** *there were 68 children with APSGN enrolled during the study period. 40 (58.8%) were males and 28 (41.2%) were females. The common age group of presentation was between 6 and 10years (30/68, 44.1%) followed by 3 and 5years (21/68, 30.9%). The age range was between 2.5-14years with a mean age of 7.5years. Two patients had unusual age of presentation one at 2years and 6 months and the other at 2yrs and 11months. 44 (64.7%) had sore throat or skin infection before presentation while 24(35.3%) did not give any history of infection before presentation.*

*Fifty two (76.5%) patients were from Addis Ababa and 14 patients presented from Oromia region around Addis Ababa while 2 patients came from remote areas*

*Thirty two (47.1%) patients had follow up at the renal clinic for a duration, of 6 months - 1 year while the remaining were followed for less than 6 months and were released from follow up when they were stabilized.*

**Conclusion:** *There was no significant association between age, sex, renal dysfunction and severity of hypertension to the outcome of patients and .there was no complication observed during the follow up period.*

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## Introduction

Acute post streptococcal glomerulonephritis (APSGN) is a disease characterized by the sudden appearance of edema, hematuria, proteinuria, hypertension and acute renal dysfunction. APSGN results from infection of the throat or the skin by nephritogenic streptococci. (1, 2)

Post streptococcal glomerulonephritis is most common in children aged 5–12 years and uncommon before the age of 3 years. The typical patient develops an acute nephritic syndrome 1–2 weeks after an antecedent streptococcal pharyngitis or 3–6 weeks after a streptococcal pyoderma. (3)

Scarlet fever was first associated with the occurrence of acute glomerulonephritis in the late 1800s and early 1900s, and shortly thereafter acute glomerulonephritis was commonly associated with a previous streptococcal infection. Most cases of acute glomerulonephritis seen today are associated with a group A streptococcal infection and are not usually associated with scarlet fever. (4)

APSGN usually occurs as sporadic cases, but epidemic outbreaks have taken place in communities with densely populated dwellings that have poor hygienic conditions with a high incidence of malnutrition, anemia and intestinal parasites. A strong seasonal variation is noted; sporadic APSGN following upper respiratory infection, pharyngitis, and tonsillitis is more common in winter and spring in temperate areas, whereas skin infections are commonly found to precede APSGN in the more tropical and subtropical areas, with a peak incidence during summer and autumn. (5)

Unlike rheumatic fever, the outbreaks of acute glomerulonephritis have continued to decline and may be due to changes in the streptococci or the host. Regions of the world which still exhibit a high incidence of post streptococcal acute glomerulonephritis include Africa, the Caribbean, South America, New Zealand, and Kuwait.(6)

Acute post streptococcal glomerulonephritis occurs primarily in children and young adults, with males affected twice as often as females, and individuals over 40 can also be subjected to the disease. The epidemiology of acute post streptococcal glomerulonephritis is related to its presence in southern and temperate climates, where pyoderma-associated glomerulonephritis demonstrated peak occurrence in the summer, while rheumatic fever peaked in the autumn and winter months of the year. In northern climates, acute glomerulonephritis is associated with throat infection. However, frequently the same organism infecting the skin in impetigo will also infect the throat. In general, skin infection precedes that of the throat. Past epidemics in the United States have been community associated, with the most notable outbreaks in the Red Lake Indian Reservation in Minnesota in 1953 and 1966. Other factors such as crowding, poor hygiene, and poverty are also associated with outbreaks of acute glomerulonephritis. (3)

Group A beta-hemolytic *Streptococcus* (GAS) is the most common infectious agent responsible for acute glomerulonephritis in children. Over 470,000 cases of APSGN occur annually, leading to approximately 5000 deaths; 97% of these cases occur in less developed countries (8). A decline in the incidence of acute post streptococcal glomerulonephritis in developed and developing countries have been reported over the last 2-3 decades. As many as 50% of cases may be subclinical; thus, the true incidence of the disease is unknown. Nevertheless, acute post streptococcal glomerulonephritis continues to have a wide distribution as indicated by reports of the disease from all over the world. Because a high percentage of persons affected with acute post streptococcal glomerulonephritis have mild disease and are asymptomatic (estimates of the ratio of asymptomatic to symptomatic patients vary from 2:1-3:1), the actual incidence of the disease is not known. (4)

Post-streptococcal complications are known to be common among Ethiopian children. Little is known, however, about the epidemiology of beta haemolytic streptococci in Ethiopia. The monthly carrier rate of group A beta-haemolytic streptococci in Ethiopia varied from 7.5-39%, average being 17 %. (7)

Though recent studies were not conducted in our set up, it is not hard to imagine that acute glomerulonephritis continues to be a significant cause of morbidity, as can clearly be seen in our day to day clinical practices.

The objective of this study aims to look in to the natural history and some of the predictors of outcome of patients with APSGN at Tikur Anbessa Specialized Teaching Hospital department of Pediatrics and Child health.

Tikur Anbessa Hospital is a tertiary referral teaching hospital with a bed capacity of about 500. Department of Pediatrics and Child Health has a bed capacity of 150. It trains both under and post graduate students and gives service to all referred pediatric patients. Children with different renal and urologic problems are given care in the department and followed at the renal clinic.

### **Materials and Methods**

Records of all children <15 years of age with the clinical diagnosis of APSGN and who were on regular follow up at the renal clinic in the study period were reviewed. The presence of three or more of the following manifestations such as a sudden onset of hematuria, hypertension (systolic and diastolic blood pressure above the 95<sup>th</sup> percentile for age, height and gender), acute renal dysfunction manifested by a serum creatinine above the age adjusted range; facial edema, oliguria and fast recovery within the hospitalization period with

supportive therapy were the inclusion criteria in this study.

Children with evidence of pre-existing renal disease, whose proteinuria and hematuria and acute renal dysfunction were considered secondary to other causes than APSGN with a protracted course in the hospital like lupus nephritis, IgA nephropathy, or Henoch-Schonlein purpura and renal dysfunction secondary to other systemic diseases were excluded.

There were 68 patients under follow up with the same diagnosis in the study period and data was collected from chart review of patients using questionnaire that comprises the following variables: age at diagnosis and current age, sex, complaint at presentation like hematuria, body swelling, and history of sore throat and/or skin infection. Laboratory results like renal function test, ASO titre, urine analysis results were collected and analysed.

The collected data were checked for completeness by principal investigator and entered to SPSS 16.0 and analysed.

The study was approved by Addis Ababa University, College of Health Sciences Institutional Review Board. A written legal permission regarding the study was obtained from the department of Pediatrics and Child health Research and Publication committee prior to the study.

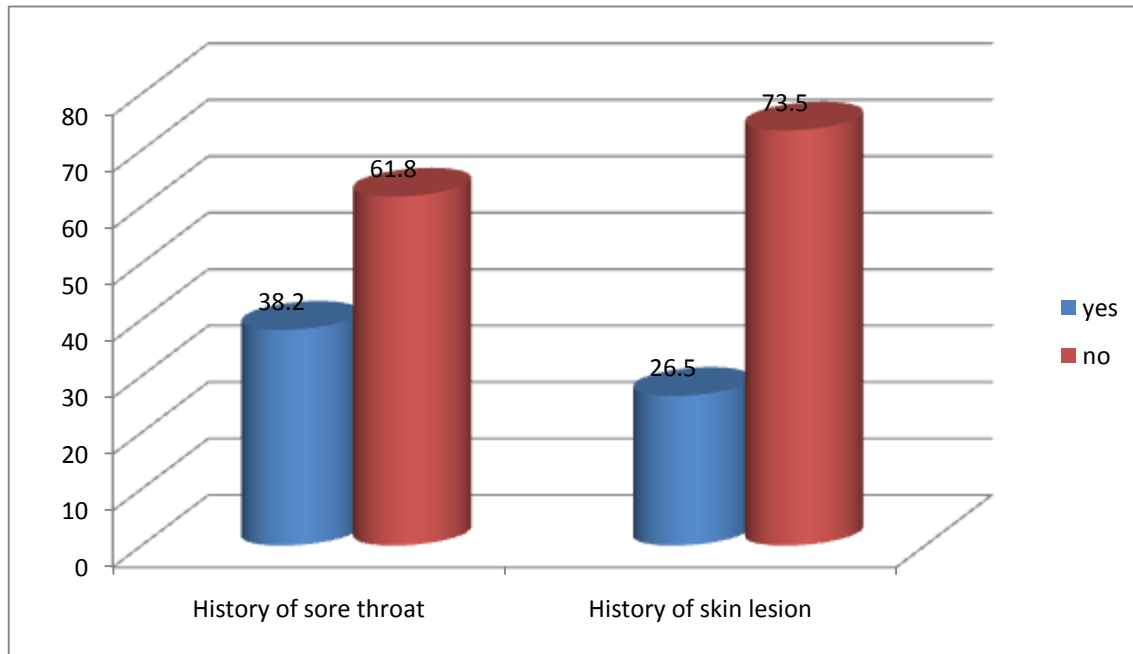
### **RESULTS**

During the study period records of 68 children with APSGN were enrolled in accordance to the inclusion criteria. The common age group of presentation was between 6 and 10years 30/68 (44.1%) followed by 3 and 5 years 21/68(30.9%). The age range was between 2.5-14years with a mean age of 7.5years. Two patients presented at 2years and 6 months and 2years and 11months respectively. Forty patients (58.8%) were males and 28 patients (41.2%) were females. Fifty two (76.5%) patients

were from Addis Ababa and 14 patients presented from Oromia region around Addis such as Woliso, Sululta, Alemgena, etc. the other 2 patients came from remote areas from Addis (Table1).

Thirty two (47.1%) patients had follow up from 6 months up to 1 year and the common reason identified for short duration of follow up was that patients were discharged from renal clinic once they were stabilized (Table1).

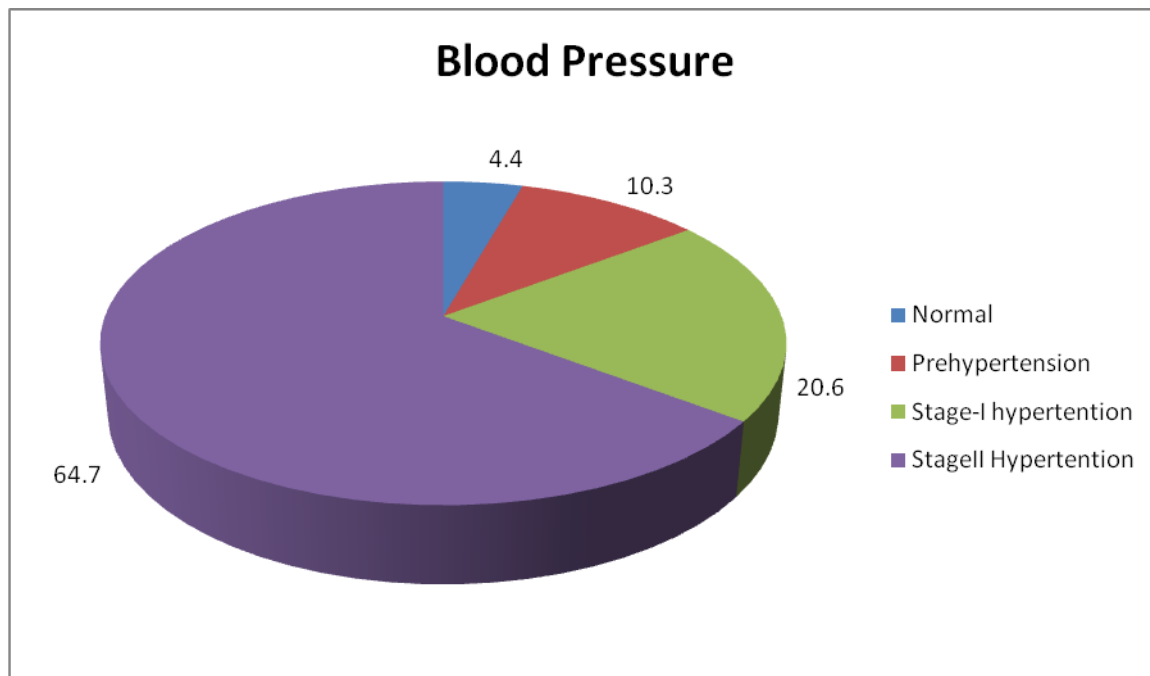
The most common chief complaints at presentation were body swelling 53/68 (77.9%) and hematuria 5/68 (7.4%). Twenty six( 38.2%) and 18(26.5%) children respectively presented with history of sore throat and skin lesion prior to presentation to hospital (Fig.1).Of those who gave history of any of the infections, only 22.7% of patients were treated with antibiotics in their nearby health institutions (Table2).



**Fig 1. History of infection prior to presentation (percentage) of children with APSGN at Tikur Anbessa Specialized Teaching Hospital; January 2003 to December 2010.**

Fifty eight (85.3%) patients had systolic and/or diastolic hypertension in reference to their age, gender and height during presentation to hospital. Of these, 44 patients (64.7%) had severe hypertension (Fig2).

All patients were treated with furosemide either oral or parenteral. But only 14 patients (20.6%) mandated additional antihypertensive drugs such as Nifedipine, Hydralazine or Methyldopa (Table 4).



**Fig.2.Children with PSAGN and their blood pressure recordings at Tikur Anbessa Specialized Teaching Hospital January 2003 to December 2010.**

All children had facial puffiness and/ or peripheral edema. Sixty (88.2%) patients had no edema on their 2<sup>nd</sup> week chart records and the remaining improved between 2 weeks and 6weeks. Fourteen patients had respiratory signs such as flaring of alae nasi, intercostal and/or subcostal retraction and creptation on auscultation of the chest (Table2).

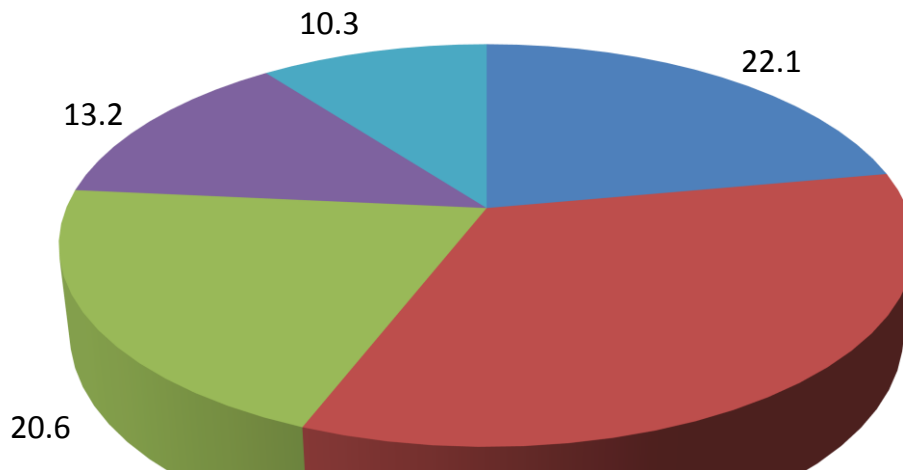
All patients had microscopic hematuria but only 52.9% had RBC casts in their urinalysis. Hematuria was cleared between 6 weeks and 1year in 57.4% of patients and early before 6wks in 41.2% of patients. Only 1 patient was found to have persisted microscopic hematuria more than a year.

Of all patients, 59 (86.8%) had nephritic range proteinuria and the rest had nephrotic range at presentation (Table3)

The serum creatinine level results were categorized based on severity of derangement for acute kidney injury and the upper limit was taken 0.7mg/dl for the study age group (14). The mean serum creatinine was 1.5mg/dl (range 0.5-9.7mg/dl).Fifty three patients (77.9%) had deranged renal function test with serum creatinine ranging from 0.8 to 9.7mg/dL (Fig.3). ASO titer was done only for 39 patients of which 15(38.5%) were positive (Table 3).



## Renal Function Test



**Fig.3.Serum creatinine level of children with APSGN at TASTH, January 2003 to December 2010.**

Fifty four patients (79.4%) stayed admitted in hospital for 1 week or less and 6 patients (8.8%) were managed as outpatient (Table4). Five patients were admitted with severe manifestations such as seizure and/or encephalopathy for which phenytoin was prescribed apart from antibiotics and anti hypertensives and 3 patients were diagnosed to have congestive heart failure at admission. But after management of their acute illness, none of them were found to have cardiac lesion clinically and/or using echocardiography. All patients were treated with antibiotics, the common drugs being Crystalline Penicillin and Amoxicillin.

All children recovered from the disease and no child had recurrence of proteinuria or abnormal blood pressure once corrected. All patients had normal serum creatinine during subsequent follow up. All children were followed for a minimum of 6 months on a monthly basis before they were declared free. Children with hematuria and or proteinuria were followed until their problem gets subsided.

Statistical test was done for any association but there was no significant association between age, sex, serum creatinine level and

severity of hypertension. In this study there was also no association between prior antibiotic treatment and severity of manifestation.

### **Discussion**

The burden of PSAGN is known to be high in developing countries the prevalence being common in children <15 years and more common in males than females. This study included children below 15 years and the result showed male predominance which accounted 58.8% of children(M:F=1.4:1).This is comparable to the study done in French children by Odile et al which showed 54% male predominance (8). In the study done at Tikur Anbessa Hospital by W.Tewodros and L.Muhe, etal the male: female ratio of streptococcal infection was1.9:1 which was also comparable to this study (7). The common age at presentation was between 6 and 10 years (range 2.5-14years) followed by 3 and 5years (30.9%) with mean age of 7.5years. In French children, the mean age was 6.7 years. In a 16 year period study in Sydney, Australia the mean age was 8.1years (range 2.6-14.1years).This also indicates a

similarity to the age of children affected with PSGN (8, 10).

In contrast to the study done in French children (8), in which fever was the commonest reason for consultation 30/50 (60%), the most common complaint in our review was body swelling (77.9%) and fever was the main complaint in only 3 patients (4.4%) This might be due to overlooking of fever in our situation. In this study 44/68 (64.7 %) of children had had sore throat or skin lesion before presentation and only 10 (22.7%) were treated with antibiotics.

History of infection was high in our study as compared to the study done in Scotland in which 'Sore throat/inflamed throat' was identified as a prodrome in 39 (49 %) of their cases. This might be because our study included history of both throat and skin infections in contrast to the study in Scotland by which the authors only reported physical sign of acute throat infection at the time of presentation(9).

Fifty eight (85.3%) of our patients had arterial hypertension in reference to their age, gender and height. Of these, 44 patients had severe hypertension. All patients were treated with furosemide either oral or parenteral. But 20.6% of patients mandated additional antihypertensive drugs such as Nifedipine, Hydralazine or Methyldopa. Furosemide is prescribed in our setup not only for blood pressure control but also for treatment of edema. But in French Polynesia children, any type of hypertension was found in 64% of children and a diuretic therapy (furosemide) had been prescribed for 33/50 children (66%) and a second anti-hypertensive treatment (nicardipine) had been given to 17/50 (34%) of children (8).

The mean serum creatinine in our case series was 1.5 mg/dl (range 0.5-9.7mg/dl). Fifty three patients (77.9%) had deranged renal function test with serum creatinine ranging from 0.8 to 9.7mg/dL. This is comparable to the study done in Sydney, which showed 81.1% of the studied children had renal

impairment (median peak creatinine, 1.08mg/dl, and range 0.44–10 mg/dl (10).This indicates that renal dysfunction is one of the commonest initial manifestation of patients with APSGN. In addition to renal failure 8 patients developed seizure and/or encephalopathy or heart failure; and the complications might be because of late presentation of patients. There was no significant association between age, sex, renal dysfunction and severity of hypertension. (Table 5). Severe hypertension, encephalopathy and congestive heart failure are common complications despite benign feature of APSGN.

### **Limitation of the study**

The limitations to this study are those generally associated with retrospective studies, such as incomplete medical records.. There was no adequate information regarding socioeconomic status of parents and no phone numbers or full addresses to get patients for necessary information. Investigations such as C3 level, Anti-DNAse B titer determination are lacking in Ethiopia for confirming the diagnosis for patients with clinical evidences of APSGN.

### **Conclusion and Recommendation**

Since Ethiopia is one of the developing countries and there is high risk of skin and respiratory infections, it is common to get large number of patients with streptococcal infections leading to non supportive complications such as APSGN and Rheumatic fever. Despite good outcome of the disease, it is better to follow patients for prolonged period. Accurate recording and chart keeping is the important part of patient management and should be encouraged. Prospective studies are recommended on this common problem.

**Table 1. Demographic data of children with PSAGN at Tikur Anbessa Specialized teaching Hospital, Addis Ababa .January 2003 to December 2010.**

<b>Demography</b>	<b>N<sub>o</sub></b>	<b>%</b>
<b>Age (years)</b>		
<3	2	2.9
3-5	21	30.9
6-10	30	44.1
11-15	15	22.1
Total	68	100
<b>Sex</b>		
Male	40	58.8
Female	28	41.2
Total	68	100
<b>Address</b>		
Addis Ababa	52	76.5
Oromia around Addis	14	20.6
Other places	2	2.9
Total	68	100
<b>Duration of follow up</b>		
6 month	20	29.4
6 mo-1 year	32	47.1
>1year	16	23.5

**Table 2 clinical presentation of children with PSAGN at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa. January 2003 to December 2010.**

<b>Variables</b>	<b>No</b>	<b>%</b>
<b>Use of antibiotics</b>		
Yes	10	22.7(14.7)
No	34(58)	72.3(85.3)
<b>Reason for presentation</b>		
Body swelling	53	77.9
Hematuria	5	7.4
Decreased urine output	2	2.9
Shortness of breath	2	2.9
Body swelling and hematuria	1	1.5
Fever	3	4.4
Seizure	1	1.5
Abdominal pain	1	1.5
Total	68	100
<b>Respiratory sign</b>		
Yes	14	20.6
No	54	79.4
Total	68	100
<b>Signs of CHF</b>		
Yes	3	4.4
No	65	95.6
Total	68	100
<b>Seizure/Encephalopathy</b>		
Yes	5	7.4
No	63	92.6
Total	68	100
<b>Persistence of edema(weeks)</b>		
<2	60	88.2
2-6	8	11.8
Total	68	100

**Table 3 Laboratory findings of children with PSAGN at Tikur Anbessa Specialized teaching Hospital, Addis Ababa. January 2003 to December 2010.**

<b>Variables</b>	<b>No</b>	<b>%</b>
<b>Microscopic Hematuria</b>	68	100
<b>RBC casts</b>		
Yes	36	52.9
No	32	47.1
Total	68	100
<b>Proteinuria</b>		
Proteinuria of all kind	59	86.8
Nephrotic range	9	13.2
Total	68	100
<b>Persistence of hematuria</b>		
<6weeks	28	41.2
6weeks-1year	39	57.4
>1year	1	1.5
Total	68	100
<b>ASO titer</b>		
Positive	15	22.1
Negative	24	35.3
Not done/not documented	29	42.6
Total	68	100

**Table 4. Management of children with PSAGN at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa. January 2003 to December 2010**

Variables	No	%
<b>Duration of hospitalization</b>		
≤1 week	36	52.9
>1 week	26	38.2
Not admitted	6	8.8
Total	68	100
<b>Medical Managements given</b>		
Oral antibiotics	39	57.4
Parenteral antibiotics	29	42.6
Total	68	100
<b>Diuretics /Antihypertensive</b>		
Oral Furosemide	6	8.8
IV Furosemide	48	70.6
Furosemide and other antihypertensive drugs	14	20.6
Total	68	100

**Table 5: Effect of Age, Sex and Renal Function test derangement on severity of Hypertension of Children with APSGN at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa. January 2003 to December 2010.**

	Blood pressure				Total	P-value
	Normal	Pre-HTN	Stage 1HTN	Stage 2 HTN		
<b>Age (years)</b>						
<3	0	1(1.5%)	0	1(1.5%)	2(2.9%)	0.573
3-5	2(2.9%)	1(1.5%)	5(7.4%)	13(19.1%)	21(30.9%)	
6-10	0	4(5.9%)	6(8.8%)	20(29.4%)	30(44.1%)	
11-15	1(1.5%)	1(1.5%)	3(4.4%)	10(14.7%)	15(22.1%)	
Total	3(4.4%)	7(10.3%)	14(20.6%)	44(64.7%)	68(100%)	
<b>Sex</b>						0.547
Male	2(2.9%)	5(7.4%)	6(8.8%)	27(39.7%)	40(58.8%)	
Female	1(1.5%)	2(2.9%)	8(11.8%)	17(25%)	28(41.2%)	
Total	3(4.4%)	7(10.3%)	14(20.6%)	44(64.7%)	68(100%)	
<b>Serum Cr.</b>						0.689
<0.8	0	1(1.5%)	1(1.5%)	13(19.1%)	15(22.1%)	
0.8-1.0	1(1.5%)	2(2.9%)	5(7.4%)	15(22.1%)	23(33.8%)	
1.1-1.4	2(2.9%)	2(2.9%)	3(4.4%)	7(10.3%)	14(20.6%)	
1.5-2.0	0	1(1.5%)	3(4.4%)	5(7.4%)	9(13.2%)	
>2.0	0	1(1.5%)	2(2.9%)	4(5.9%)	7(10.3%)	
Total	3(4.4%)	7(10.3%)	14(20.6%)	44(64.7%)	68(100%)	

## References

1. Avner ED, Davis ID: Acute Poststreptococcal Glomerulonephritis. In: Behrman RE, Kliegman RM, Jenson HB. Nelson Textbook of Pediatrics. 17. Philadelphia: Elsevier Science; 2004:1740-1741.
2. **Melania S and Karen K**. An outbreak of acute post-streptococcal glomerulonephritis in remote Far North Queensland: Aust. J. Rural Health (2006) **14**, 160–163.
3. Clark G, White RHR, Glasgow EF, et al: Poststreptococcal glomerulonephritis in children: Clinic pathological correlations and long-term prognosis. *Pediatr Nephrol*: 1988; 2:381-388
4. **Madeleine W**. Pathogenesis of Group A Streptococcal Infections: *Clinical Microbiology Reviews*, July 2000, Vol. 13(3) : 489-490
5. **Michael A., Demetrius E & Michael L.** : Acute post-streptococcal glomerulonephritis in a 14-month-old boy: why is this uncommon? *Pediatr. Nephrol* (2007) 22:448–450
6. Wallings, H.; Acute Poststreptococcal glomerulo-nephritis in general practice: the contribution of infection to its onset and course. *Epidemiol. Infect.* (1996), 116, 193-201
7. **Tewodros W, Muhe L**. A one-year study of streptococcal infections and their complications among Ethiopian children. *Epidemiol. Infect.* (1992). 109;211-225
8. **Odile B , Jérôme P & Hélène G** et al: Acute post-streptococcal glomerulonephritis in children of French Polynesia: a 3-year retrospective study. *Pediatr. Nephrol* (2010) 25:275–280
9. **J. L. Taylor and J. G. R. Howie**, Antibiotics, sore throats and acute nephritis. *Journal of the Royal College of General Practitioners*, 1983, 33: 783-786.
10. **Christopher C , Peter W and Andrew R** . Post-streptococcal glomerulonephritis in Sydney: A 16-year retrospective review. *Journal of Pediatrics and Child Health* **43** (2007) :446–450
11. Afework M, Green-Abate C, Tafari N. Clinical profile of glomerular diseases in Ethiopian Children. *Ethiop Med J* 1980 **V** 18-19,
12. Meadow, S. R.. Poststreptococcal nephritis-a rare disease? *Arch.Dis Child* 1975;50, 379-381.
13. **Kazuhide S, Yukihiro K and Hitoshi S**: Girl with garland-pattern poststreptococcal acute glomerulonephritis presenting with renal failure and nephrotic syndrome. *Patient Report. Pediatrics International* (2007) 49, 115–117
14. **Muhammad Si**, Acute Kidney Injury. *Current Diagnosis and Treatment, Nephrology and Hypertension*, 2009:104.



# POLYCYTHEMIA IN YEKATIT 12 HOSPITAL NEONATAL INTENSIVE CARE

UNIT, Addis Ababa, Ethiopia,

*Mulualem Gessesse MD*

## ABSTRACT

**Background:** *Polycythemia is defined as an elevated hemoglobin concentration or hematocrit that is greater than two standard deviations above the normal value for gestational and postnatal age (1). The primary concern with polycythemia is related to hyper viscosity and its associated complications Blood viscosity increases exponentially as the Hct level rises above 42%. This associated hyperviscosity is thought to contribute to the symptom complex observed in approximately one half of infants with polycythemia.*

**Objective and Patients:** *The objective of this study was to describe prominent features of associated with neonatal polycythemia in newborns admitted to the neonatology unit of Yekatit 12 Hospital for the period of July 2006 up to December 2009.*

**Results:** *There were 1741 neonatal admissions to Yekatit 12 hospital from July 2006 up to December 2009 and out of these there were 115 cases of Polycythemia which makes the prevalence of Polycythemia 6.5% in the neonatal unit.. Even though most were delivered by SVD the risk of polycythemia was high in C/S group. Majority of the cases presented at the age of less than 24hours with a normal Apgar score.. Seventy eight (73 %) of the cases had a Hematocrit of >70% and 37 (27%) of the cases were symptomatic. The common presenting symptoms were respiratory distress, cyanosis and poor feeding. Forty two (36.5%) had complications including hyperbilirubinemia, necrotising enterocolitis and seizure. One hundred and nine (94.5%) were discharged home with successful treatment with either fluid or partial exchange transfusion; however, there were 5 deaths: 3 females and 2 males; three of them were preterm while two were term but small for gestational age (SGA). Among these deaths three were low birth weights (LBW) while two were very low birth weights (VLBW). (The incidence of polycythemia in the last 6 months of the study period was zero).*

**Conclusion:** *Polycythemia is fairly a common problem in neonatal period and to avoid serious complications early diagnosis and appropriate interventions are recommended, moreover this study could be used as a base line data for future study of polycythemia in neonates in Ethiopian settings.*

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## **INTRODUCTION**

Polycythemia is defined as an elevated hemoglobin concentration or hematocrit that is greater than two standard deviations above the normal value for gestational and postnatal age. Accordingly, a term infant is considered to be polycythemic if the hematocrit from a peripheral venous sample is greater than 65 percent or the hemoglobin is greater than 22 g/Dl. In clinical circumstances, the definition typically is based upon the hematocrit, rather than the hemoglobin concentration.

The incidence of polycythemia is said to be 1.5 - 4% of all live births. The incidence is higher among both small for gestational age (SGA) and large for gestational age (LGA) infants. The incidence of polycythemia is 15% among term SGA infants as compared to 2% in term appropriate for gestational age (AGA) infants. Neonates born to diabetic mothers and mothers living at high altitudes also have a higher incidence of polycythemia. Polycythemia is unlikely to occur in neonates born at a gestational age less than 34 weeks. (3 -5)

The objective of this study is to identify the factors associated with neonatal polycythemia in newborns admitted to the neonatology department of Yekatit 12 Hospital for the period of July 2006 up to December 2009. We believe this will create awareness on the degree of the problem and will help institute measures to solve the causes and alleviate the problem of neonatal polycythemia.

## **MATERIALS AND METHODS**

Yekatit 12 hospital is one of the referral hospitals managed by the Addis Ababa Health Bureau. The Neonatology unit was

established in July 2006. The unit has 30 inpatient beds with 10 incubators in the NICU, The health workers in the unit includes a neonatologist, a general practitioner and 14 nurses. Paediatric residents from the Medical faculty of Addis Ababa University department of Paediatrics and Child Health are attached to the unit on rotation basis.

This study was a cross sectional review of records using the data collection tools prepared for the purpose . and data was collected from inpatient charts and the High risk clinic registration book. The place and mode of delivery of the cases with the age of onset of the polycythemia and sex differences were analyzed. The association of polycythemia with birth weight, gestational age, Apgar score, number of newborns, maternal parity and the presence of maternal diseases were evaluated. The level of hematocrit at presentation, the presence of and type of symptoms and the type of management instituted, and the length of hospital stay was assessed. Finally the out come of cases with the causes of deaths was analyzed using the SPSS version 17.

## **RESULTS**

There were 1741 neonatal admissions to Yekatit 12 hospital from July 2006 up to December 2009 and out of these there were 115 cases of Polycythemia which makes the incidence of Polycythemia 6.5% in the neonatal unit. Out of these 51% were male neonates while female neonates were 49%. One hundred seven (87.8%) of the cases were from Yekatit 12 Hospital, while two were from other public hospitals, one from a health center and one from a private hospital. The place of delivery for three newborns was not available. Ninety nine (86%) of the polycythemic neonates were singletons, 13(11.3 %) were twin while it

was unknown in two infants. Seventy two (62.6 %) of the mothers were primipara while 41 (35.6 %) were multipara; the parity of one mother was not documented. The majority of the mothers were healthy, but 16 had a variety of diseases: 12 were hypertensive, 3 were diabetic, 5 had HIV/AIDS, 2 had Vaginosis, and 2 others had syphilis and bleeding disorder respectively.

Table 1 shows the incidence of polycythemia by mode of delivery among

live deliveries in Yekatit 12 hospital. There were a total of 11,160 live births in Yekatit 12 hospital during the study period and among these 107 were cases of Polycythemia which makes the incidence of polycythemia to be 0.95% in the delivery room of the Yekatit 12 hospital. Eighty four (73%) of the cases were delivered by spontaneous vaginal delivery (SVD), 21 were delivered by Caesarean section(C/S) while two were assisted deliveries.

**Table 1. Distribution of Polycythemia by mode of delivery for newborns delivered at Yekatit 12 Hospital, July 2006-June 2009**

<b>Mode of delivery</b>	<b>Number of deliveries</b>	<b>Number of polycythemia</b>	<b>%</b>
SVD	7505	84	1.11
C/S	1375	21	1.52
Assisted delivery	2280	2	0.08
Total	11160	107	0.95

The proportion of polycythemic neonates by the time of presentation is shown in table 2. Eighty four (73%) of the newborns presented at the age of less than 24 hours while 18 presented between 24 and 72 hours.

As shown in table 2 the majority of cases (73%) of polycythemic neonates presented at the age of less 24 hours of life.

**Table 2: Distribution of polycythemia cases by time of presentation, Yekatit 12 Hospitals 2006-2009.**

<b>Age at presentation</b>	<b>Number of cases</b>	<b>%</b>
<24 hours	84	73
24 - 72 hours	18	15.7
3 - 5 days	13	11.3
Total	115	100

The characteristics of the polycythemic newborns are shown in table 3. Ninety five (%) of the cases had a normal Apgar score whereas 9 were moderately depressed with an Apgar of 4 - 6 and three were severely depressed with an Apgar of 0 - 3. The Apgar score of seven cases was not documented.

Seventy (60 %) of the cases had a normal birth weight of 2500 – 3999 grams, while 38 had a low birth weight (1500 - 2499gms). Ninety three (80.7%) of the cases were term neonates, 12 were preterm, 8 were post term and in one case it was unknown.

**Table3. Characteristics of the polycythemic newborns Yekatit 12 hospital, July2006-June 2009.**

Characteristics	Number of cases	%
<b>1. APGAR Score</b>		
➤ Normal (7-10)	96	83.5
➤ Moderately depressed(4-6)	9	7.8
➤ Severely depressed(0-3)	3	2.6
➤ Unknown	7	6.1
<b>2. Birth Weight</b>		
➤ Normal(2500-3999gm)	71	6.7
➤ LBW(1500-2499gm)	38	33.1
➤ VLBW(1000-1499)	5	4.3
➤ Unknown	1	0.9
<b>3. Gestational Age</b>		
➤ Term(37-42weeks)	94	81.7
➤ Preterm(<37weeks)	12	10.4
➤ Post term(>42weeks)	8	7
➤ Unknown	1	0.9

The hematocrit level and clinical classification of the polycythemic neonates is shown in table 4. Forty- eight (41.7%) neonates had a hematocrit level of 71 - 75%. Thirty seven (32.2%) cases had a hematocrit value of 65-70%; twenty (17.4 %) had a hematocrit of 76-80% and ten (8.7%) >80%. As is shown in the table, 37 (32.2 %) of the newborns were symptomatic whereas 78

(67.8%) were asymptomatic at presentation. Taking these two variables (hematocrit level and the presence of symptoms) together with the postnatal age and the need for treatment, 35 (30.4%) were classified as Hypervolemic symptomatic, 69 (60%) were Hypervolemic asymptomatic; 8 (%) were Normovolemic asymptomatic and 3 (%) were Normovolemic symptomatic.

**Table4: Hematocrit level and Clinical classification of Polycythemia cases at Yekatit 12 Hospital Addis Ababa July 2006 - June 2009.**

<b>I. Hematocrit Level</b>	Number of Cases	%
➤ 65 - 70%	37	32.2
➤ 71 -75%	48	41.7
➤ 76 -80%	20	17.4
➤ >80%	10	8.7
<b>II. Clinical classification based on symptoms:</b>		
➤ Symptomatic	37	32.2
➤ Asymptomatic	78	67.8
<b>III. Clinical classification based on blood volume:</b>		
➤ Normovolemic Asymptomatic	8	7
➤ Normovolemic symptomatic	3	2.6
➤ Hypervolemic Asymptomatic	69	60
➤ Hypervolemic Symptomatic	35	30.4

The distribution of the clinical features in the 37 symptomatic polycythemic newborns is shown in table 5. The most commonly seen clinical features were respiratory distress (30(%)) followed by cyanosis (27(%)) and poor feeding (7(%)). Apnoea,

Seizure, Oliguria, and Prolonged capillary filling time were seen in three neonates respectively, while Lethargy, Hypotonia, Tachycardia and Priapism were seen in two. One neonate had Tremor. Almost all newborns had more than one presenting feature.

**Table 5: Distributions of the presenting features among the thirty seven symptomatic polycythemic newborns, Yekatit 12 Hospital, July 2006- June 2009**

<b>CLINICAL FEATURES</b>	<b>NUMBER OF CASES</b>	<b>%</b>
Respiratory distress	30	80.1
Cyanosis	27	73
Poor feeding	7	18.9
Apnoea	3	8.1
Seizure	3	8.1
Oliguria	3	8.1
Prolonged cardiac filling time	3	8.1
Lethargy	2	5.4
Hypotonia	2	5.4
Tachycardia	2	5.4
Priapism	2	5.4
Tremor	1	2.8

Ninety eight (85.2%) of the polycythemic newborns were managed with partial exchange transfusion , 14 (%)were managed conservatively with intravenous fluids, feeding and observation and the remaining two neonates who were candidate for partial exchange died before treatment could be given. Twenty nine cases stayed in the ward for less than 24 hours, 65 cases stayed for less than72 hours. Only 20 cases stayed for more than 7 days.

Seventy two (62.6 %) of the polycythemic newborns showed no complications whereas 43 (37.4 %) had one or more complications. Complications of polycythemia are shown in table 6. The most frequent complication was Hyperbilirubinemia (71.4%) followed by necrotising enterocolitis (34.9) and seizure (6/43). Four each had renal failure and DIC, two had persistent pulmonary hypertension and one had persistent hypoglycaemia.

**Table 6: Distributions of complications seen in the polycythemic newborns with complication. Yekatit 12 Hospital, July 2006 - June 2009.**

<b>Complications</b>	<b>Number of cases</b>	<b>%</b>
Hyperbilirubinemia	30	71.4
Necrotizing enterocolitis	15	34.9
Seizure	6	14
Renal failure	4	9.3
Disseminated intravascular coagulopathy (DIC)	4	9.3
Persistent pulmonary hypertension	2	4.6
Persistent Hypoglycaemia	1	2.3

One hundred and ten (95.7 %) cases were discharge cured; however, there were 5( 4.3%) deaths. Three of the deaths were females and two were males; three were preterm while two were term but small for gestational age (SGA). Among these deaths three were low birth weights (LBW) while two were very low birth weights (VLBW). All cases had respiratory distress with cyanosis and poor and prolonged capillary filling on presentation, four were completely cyanotic; four had oliguria; three had symptoms and signs of Necrotizing Enterocolitis (NEC); two had signs of bleeding disorder and two had central type apnoea. The hematocrit levels of died cases was 83%, 81%, 75%, 72% and 68% respectively. Two of the neonates died before 24 hours, (18 and 22hrs) one died on the 5<sup>th</sup> day, the 4<sup>th</sup> and 5<sup>th</sup> neonates died on the 9<sup>th</sup> and 12<sup>th</sup> day respectively. Two of these neonates died before treatment could be initiated, but partial exchange has been done at least twice for the rest of them. The clinical cause of death could not be ascertained in the two neonates who died before 24 hours, however the rest died of multi-organ failure.

Among the successfully managed and discharged neonates only nine did not return to the high risk clinic for follow up . Of the one hundred who were seen at the high risk clinic on follow-up 94 ( 94 %) didn't have any complaints or show any complications seven days after discharge. Four had prolonged hyperbilirubinemia and two had seizures which were managed accordingly.

## **DISCUSSION**

Polycythemia, defined as a central venous hematocrit (Hct) of greater than 65%, is a relatively common disorder. Neonatal polycythemia is said to be present when the hematocrit greatly exceeds normal values for gestational and postnatal age. The incidence of polycythemia is variable from country to country, but is said to be 1.5-4% of all live births (1, 2). Wiswell *et al* (3) found an incidence of 1.46% in their analysis of 3,768 infants born at Brooke Army Medical Center, San Antonio, TX, from January 1, 1981 through December 31, 1984. Moreover they have also reported lower incidence rates of 1.14% and 0.80% in screened populations numbering 7,133 and 23,125 neonates

respectively(4, 5). In our study the incidence of polycythemia was 6.5% among the total admissions, but 0.95% among the live births of Yekatit 12 hospital. The incidence among the live births is lower than other studies. This could partly be explained by the fact that the incidence of polycythemia has been decreasing progressively since the establishment of the neonatology department in the hospital and the implementation of using the standardly accepted timing in clamping the cord as a routine practice ( not part of the study )Studies have shown that delayed ( to what time ??) I suggest you remove this as it is contradicting the current teaching of the delay cord clamping ( a very old studies cited )

Among the 107 deliveries in Yekatit 12 hospital with polycythemia 84 (%) were delivered by spontaneous vaginal deliveries, 21 (%) were delivered by Caesarian section and two were assisted deliveries. As it is shown in the table the incidence of polycythemia is higher in those delivered by C/S. This could be due to the fact that this procedure is undertaken, most of the times, on emergency basis for maternal and/or fetal conditions. According to a study by Yifru and Ahmed fetal distress was the commonest indication for operative deliveries (32.5%) as well as the commonest cause of low Apgar scores at the 1<sup>st</sup> minute (61.4%). (8)

As it is shown in table 2, eighty three cases were admitted at the gae of less than 24 hours. However there were still 13 cases who were admitted later than 3 days after delivery. This was mainly due to the delay in the diagnosis of the cases due to lack of awareness on the part of the family or health professionals.

As the characteristics are not known for all live births in our hospital or the other referring hospitals, the risk of polycythemia in each group could not be

calculated. Although most of the cases were of normal birth weight 43 (%) neonates had less than normal birth weight, 5 of them being in the very low birth weight category. In Wiswell *et al* (3) study the birth weight ranged from 1,640 to 5,500g in the 55 neonates with polycythemia with an average birth weight of 3128g. Ramamurthy and his colleague found the birth weight to range from 1,900 to 5,160 gm in the 74 neonates they studied, with only12% of them having a birth weight less than 2500gm (9). However, it is a well known fact that the incidence is higher among both small for gestational age (SGA) and large for gestational age (LGA) infants, presumably because chronic intrauterine hypoxemia stimulates the secretion of erythropoietin which in turn increases red cell production. The incidence of polycythemia is 15% among term SGA infants as compared to 2% in term appropriate for gestational age (AGA) infants (10). In our study, even though the proportion of the different gestational age groups is not known, the finding that 33 of 114 cases were small for gestational age (SGA) could indirectly supports this conclusion. However, contrary to the general belief that polycythemia is unlikely to occur in neonates born at a gestational age less than 34 weeks (11), we have found two cases with a birth weight of 1300 and 1250 gms and a gestational age of 29 and 30 weeks respectively. Similar findings have been observed by Wiswell *et al* (3).

Most reports state that 50% or more of polycythemic infants are asymptomatic. In our study we also found the proportion of symptomatic polycythemia cases to be 32.4% (37/114). However, Wiswell *et al* found that the majority of their polycythemic infants were symptomatic and have other features of



the disorder (3). Respiratory distress (81%) was the most common symptoms followed by cyanosis (72.9%) and poor feeding (18.9%) in the 37 symptomatic neonates. Apnoea, seizure oliguria and prolonged capillary filling time were each seen in 8.1% of the neonates. In the study by Ramamurthy and colleague (9) plethora and lethargy were the most commonly observed symptoms, affecting, respectively, 63% and 50% of all neonates. Whereas, in Wiswell *et al* (3) study the most common signs and symptoms were “feeding problems” (21.8%), plethora (20.0%), lethargy (14.5%), cyanosis (14.5%), respiratory distress (9.1 %).

Moreover, 42 of the polycythemic patients either presented with or developed one or more complications. The most commonly observed complications were hyperbilirubinemia (71.4%), Necrotizing enterocolitis (35.7%), seizure (14.2%) renal failure and DIC (9.5% respectively), persistent pulmonary hypertension (4.7%) and persistent hypoglycemia (2.3%). Wiswell *et al* (3) found hyperbilirubinemia in 21.8% and 33.5% in their two part study involving 55 and 932 neonates with polycythemia, while hypoglycemia was found in 40% and 13% of the same groups. In contrast to

our study they found the incidence of NEC, seizure, renal failure, DIC, and persistent pulmonary hypertension to be 1.4%, 0.5%, 0.4%, 0.2% and 0.1% respectively in the 932 neonates with polycythemia. The difference in these patterns could be attributed to the level of neonatal service in their setup where cases are diagnosed early and managed appropriately before the development of complications.

The case fatality rate of polycythemia was 4.3% in this study. All the deaths were in the high risk groups of small for gestational ages and low and very low birth weights. Besides, all of them presented with symptoms and signs of complications such as severe cyanosis with respiratory distress, NEC or renal failure.

Conclusion: Polycythemia is fairly a common problem in neonatal period and to avoid serious complications early diagnosis and appropriate interventions are recommended, moreover this study could be used as a base line for future study of polycythemia in Ethiopian settings

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## REFERENCES

1. Jeevasankar M, Agarwal R, Paul VK, et al. Polycythemia in the newborn. *Indian J Pediatr.* January 2008; 75(1):68-73.
- 2.
3. Mimouni FB, Merlob P, Dollberg S, Mandel D. Neonatal polycythaemia: critical review and a consensus statement of the Israeli Neonatology Association. *Acta Paediatr.* Oct 2011;100(10):1290-6. [Medline].
4. Wirth FH, Goldberg KE, Lubchenco LO: Neonatal hyperviscosity I. Incidence. *Pediatrics*, 1979; 63: 833-6.
5. Stevens K, Wirth FH. Incidence of neonatal hyperviscosity at sea level. *Pediatrics* 1980; 97:118
6. Thomas, E., Wiswell, J., Devn Cornish and Ralph S. Northam. Neonatal Polycythemia: Frequency of Clinical Manifestations and Other Associated Findings *Pediatrics* 1986; 78; 26-30
7. Wiswell TE, Pettett PG, Rawlings JS: Neonatal polycythemia in Hawaii. *HI Med J* 1984; 43:398-403
8. Rawlings JS, Pettett PG, Wiswell TE, et al: Estimated blood volumes in polycythemic neonates as a function of birth weight. *J Pediatr* 1982; 101:594-599
9. Po Shohat M, Reisner SH, Mimouni F, Merlob P. Neonatal polycythemia II. Definition related to time of sampling. *Pediatrics* 1984; 73:11-3
10. Oh W. Neonatal polycythemia and hyperviscosity. *Pediatr Clin North Am* 1986; 33:523-32
11. Yifru B, Ahmed A. Emergency obstetric performance with emphasis on operative delivery outcome: Does it reflect the quality of care? *Ethiopian Journal of Health Development* 2004; Vol. 18, No. 2.
12. Rajam S. and Yves W. Neonatal Polycythemia: I. Criteria for Diagnosis and Treatment *Pediatrics* 1981;68;168-174
13. Bada HS, Korones SB, Pourcyrous M, Wong SP, Wilson WM3rd, Kolni HW, Ford DL. Asymptomatic syndrome of polycythemic hyperviscosity: effect of partial exchange transfusion. *J. Pediatr* 1992; 120: 579-85
14. Mackintosh TF, Walkar CH. Blood viscosity in the newborn. *Arch Dis Child* 1973; 48: 547-53

**EFFECTIVE MAINSTREAMING OF THE CONVENTION OF THE RIGHTS OF THE CHILD AND THE RIGHTS-BASED PROGRAMMING APPROACH: “WALKING TO THE WALK” IMPERATIVES OF PEDIATRICS AND CHILD HEALTH CARE FOUNDATIONS IN ETHIOPIA AND ELSEWHERE**

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**ABSTRACT**

***Aim:*** The piece of work puts imperative emphasis on effective mainstreaming of the Convention of the Rights of the Child (CRC) and Rights-based Programming Approaches (RBPA) in all dimensions of Pediatrics and Child Health Care practices as the cardinal professional morale guide.

***Method:*** This is a descriptive qualitatively review. Pertinent electronic and/or hard copy materials of the College of Health Sciences of the Addis Ababa University, University of Gondar College of Health Science, Hawassa University’s College of Health Sciences, and Jimma University’s College Public Health and Medicine and, the Federal Ministry of Health were the primary data sources. Curricula of these four major public Health Sciences Colleges and the Health Ministry’s Programme documents, specifically, focusing on Pediatrics and Child Health Care in Ethiopia were systematically analyzed in light of the global dynamics. Extent of concrete attention and hence incorporation of the CRC and RBPA fundamentals into the respective regular standards of academic and programmatic practices in particular comprised the overarching criterion, focus, and indicator of the systematic appraisal.

***Observations and reflections:*** In light of the contemporary state of knowledge and standards of practices pertaining to CRC and RBPA, it became evident that the various levels of Pediatrics and Child Health practitioners have not been putting sufficient enough academic and programmatic efforts on these dimensions, specifically, within the pre- and in-service Pediatrics and Child Health Training Curricula packages in Ethiopia thus far. Practically the same typical feature was found prevailing in respect to the pertinent strategic guidance document of the Ministry of Health, namely the National Strategy for Child Survival in Ethiopia (2005/06-2014/15). It could have been assumed that, by now, mainstreaming of CRC and RBPA will have become coherent and hence straightforward standards of Pediatrics and Child Health practices, all across, in light of the on-going active support which is being provided by the key United Nation agencies and other sizable number of Development Partners.

***Conclusions:*** CRC and RBPA competency Pediatrics and Child Health practices should constitute among the foundational “walking the walk” requirements at all times. In this respect, comprehensive, interconnected, and systematically thorough enough intervention package may be warranted.

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## Introduction

Presumably, the history of traditional “Pediatrics” and Child Health Care practice goes back to the “pre-historic” period (i.e., as far back as the history of humanity and initiation of the earliest “primitive” socialization *per se*). Following the anecdotal thread, all of the series of earlier periods of civilization, namely the then powerful Far Eastern, Mesopotamian, Roman, Greek, Ethiopian, Egyptian and so forth philosophical perspectives and practices are believed to have put their respective “Pediatrics” and Child Health care footprints but little were found documented to date. In contrast, the evolution of the contemporary “modern” and scientifically founded “Pediatrics” and Child Health Care practice dates back not that far and long, though. Intricately tied to the era of “Western Renaissance” of dynamic scholarly/scientific discoveries, innovations, technological advancements, expansion of manufacturing, modernization of governance and sectoral service systems, etc., Pediatrics and Child Health care proper boasts of little more than 200 years of historical milestones (1-3). The term “Pediatrics” driven from the Greek word “*paed*” or “*paid*” meaning “child” and “*iatros*” standing for “doctor” or “healer”, literally means “healing of children”. However, according to the Policy Statement of the American Academy of Pediatrics, the profession’s commitment, among others, is: “the attainment of optimal physical, mental and social health and wellbeing for all infants, children, adolescents, and young adults” (3).

Evidently and collectively, the progressively adapted contemporary Code of Medical and Health Professional Ethics and the World Health Organization’s (WHO) Helsinki

Declaration of Health/Medical Research Ethics do serve mandatory morale guides across nations. Similarly, Hippocrates period which continues to shape the contemporary morale value of health and clinical professional practice, through the still distinctively prominent “Oath of Hippocrates”, has been widely recognized the solid foundation (4-7). On the other hand, despite the existence of the Universal Human Rights Declaration of the United Nations since 1948 and then emanating from all the other human rights initiatives, the Convention of the Rights of the Child (CRC) and the Rights-based Programming Approach (RBPA) are comparatively recent developments along the Pediatrics and Child Health Care milestones (8-14). And still, these two tools are supposed to make up integral parts of any initiative we can possibly think of, including training and programmatic spheres.

Foundationally guiding the respective Pre- and In-Service Pediatrics and Child Health Training Programs should make up one of the cardinal pathways. Similarly, all of the Pediatrics and Child Health Care related program documents are expected to particularly pay sufficient degree of emphasis to CRC and RBPA (15-28). The solemn declarations such as “Health for All ...” and “Universal Coverage and Universal Fairness” may only be possible to get attained through and with concrete implementation the CRC and RBPA by all, at all levels, and at all times (29, 30). The objective of the systematic analysis is in order to be able to, specifically, flagship CRC and RBPA mainstreaming “*walking the walk*” imperative across all the spectra of Pediatrics and Child Health Care standards of practices in particular.

## Method and Materials

This is a descriptive qualitative study limited to systematic critical analysis of pertinent documented evidences of the specifically targeted health stream, i.e., Pediatrics and Child Health within the Ethiopia as particularly prevailing at the time of the review. Whilst the systematic review has made an exclusive focus on and about the Ethiopia case scenario, however, the information may potentially feed into the other settings as well. In view of technological facilities coupled with the time factor considerations, the enrolment did employ the e-mail and telephone guided communication through the corresponding focal leads within the respective institutions. The five universities with fairly well established medical schools were purposively enrolled into the review. Accordingly, given their comparative historical as well as practical prominence at least within Ethiopia, the College of Health Sciences of the Addis Ababa University, University of Gondar's College of Health Sciences, Jimma University's College of Public Health Medical Sciences, and Hawassa University's College of Health Sciences and Mekele University's College of Health Sciences together with the Federal Ministry of Health were the primary specific targets of the review. However, the pertinent document of the Mekelle University's College of Health Sciences was not accessed solely due to the absence on official abroad mission of the lead In-Charge of the Department of Pediatrics and Child Health within the specified time. Medical Degree Curricula, namely "Undergraduate Curricula for the Degree of Doctor of Medicine prepared by the Medical and Health Science National Council August 2008" of these four major public Health Sciences Colleges and the pertinent Programme document, namely the "National Strategy for Child Survival in Ethiopia" of the Federal Ministry of Health of Ethiopia were systematically appraised

with a particular focus on the Pediatrics and Child Health stream.

With the intuition that the specific theme is of vital professional significance as well as timely, the Author initiated the solicitation and then performed systematic analysis duly capitalizing upon the generously facilitative supports extended, particularly, by Professor Bogale Worku the Executive Director of the Ethiopian Pediatrics Society and the In-Charges of the respective target institutions during the time. The Editorial Board of the Ethiopian Journal of Pediatrics and Child Health appreciated and open-heartedly welcomed the consolidation of this review paper for possible publication in the forthcoming Issue of the Journal. In order to expedite the process, serial e-mail-based correspondences were exchanged. A relatively short time frame was put mainly to be able to make it readily available and accessible, specifically, at and during the anticipated maximum audience interaction of Pediatricians-Child Health professionals at the forthcoming Ethiopian Pediatrics Society's Annual (14<sup>th</sup>) Scientific Conference. The publication in the Ethiopian Journal of Pediatrics and Child Health with the eventual dissemination in the course of the Conference is believed to stimulating maximal attention toward concerted professional action within the shortest time frame possible.

The concrete task of evidence review of the pertinent documents of the systematic analysis may well be claimed as fairly pragmatic, quick, qualitative, simple and straightforward enough. It, specifically, looked into the extent of concrete attention and hence incorporation of the CRC and RBPA fundamentals into the respective regular standards of academic and programmatic practices comprised the overarching criterion, focus, and indicator of the systematic appraisal.

As to the scientific soundness of the choice and application of the methodology per se, arguably, there has been ever more growing interest on qualitative techniques and hence analysis in health search over the last three to four decades. In fact, at present, there even is a rigorous scientific discourse around qualitative and social epidemiology as well as around the dynamicity of the Taxonomy of Epidemiology as discipline itself (31, 32). Systematic qualitative analysis is presumed to increasingly forming integral consideration of and thereby informing the Ethiopian Journal of Pediatrics and Child Health inclusive. Accordingly, this review and analysis falls under and hence follows this specific pathway.

### Pragmatic Observations and Reflections

Like with the Methods and Materials, the observations and reflections will have to get rationalized and guided by the pragmatic lens of reasoning. At the outset, the plan was to critically review any of the possible “Pediatrics” and “Child Health” related curricula of the varied health professional cadres in Ethiopia coupled with the pertinent programmatic documents of the Ministry of health. However, it eventually got exclusively confined to the “Pediatrics and Child Health” domains of the major medical schools, mainly, due to logistics, resources, and time constraints. Four of the five medical schools enrolled could share their full curricula electronically for the proposed review within a reasonable time range (panel 1).

**Panel One: Study Denominations and Documents of the Critical Review, Ethiopia, 2012.**

Document Source Sites	Exact Document Title	Remarks
Addis Ababa	Department of Pediatrics and Child Health Curriculum for Postgraduate Program Certificate of Specialty in Pediatrics and Child Health (November, 2008) and Undergraduate Medical Curriculum Prepared by Medical and Health Science Council and Faculty of Medicine, Addis Ababa University (September 2008) together with the Year II and Year III detailed schedules based on the curricular extracts; and Child Health Curriculum of the School of Public Health.	Regularity (on how frequent) of curriculum revision and amendments were not clearly specified except stating like: “the Curriculum Committee of the School of Medicine is responsible to up-date the curricula regularly ... the medical council shall evaluate the medical school every five years and forward its recommendations ...”; and hence, thorough revision must have been due.
Gondar	Undergraduate Medical Curriculum Final Prepared by Medical and Health Sciences National Council; August 2008.	
Hawassa	Undergraduate Medical Curriculum Final Prepared by the Medical and Health Sciences National Council; August 2008.	
Jimma	Jimma University Faculty of Medical Sciences, School of Medicine. Revised Degree of the Degree of Doctor of Medicine (MD) Prepared by the School of Medicine in Line with (the) Medical and Health Sciences National Council Recommendation; August 2008.	
Mekele*	Neither the electronic nor the hard copy of the	Receipt of the concrete

	Curriculum was, actually, received; based on the practical experiences with all the other Medical Schools , it however, is highly likely that it is in line with the “Medical and Health Sciences National Council Recommendations” (blended from AAU, Gondar and Jimma, in particular).	Curriculum version could not materialize due to force de majors.
Ministry of Health’s Programme specific	FDRE National Strategy for Child Survival in Ethiopia**, Family Health Department, Federal Ministry of Health, Addis Ababa, Ethiopia, July 2005.	There was no clear stipulation in the specific document on the regularity of possible updates addendum considerations.

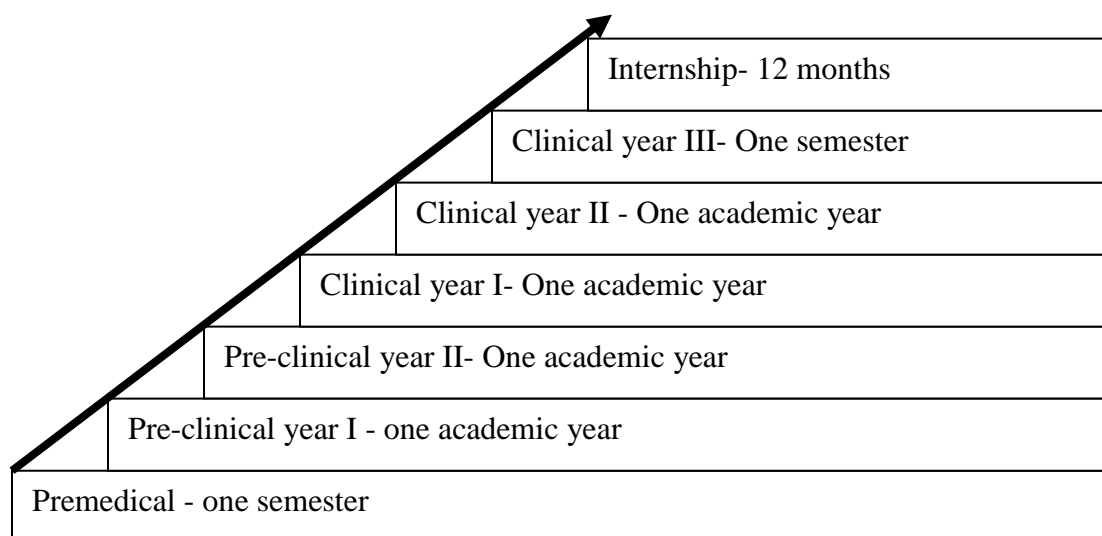
\*: As already commented within the appropriate sections, Mekeles’ actual curricula version was not obtained at the time of this review.

\*\* : According to the FMoH of Ethiopia, “The National Child Survival Strategy is one module of the three-part strategy. It should be read in conjunction with the National Reproductive Health Strategy and the National Nutrition Strategy. Together, these three complementary strategies address the preventive, promotive and clinical care needs of the highly vulnerable maternal, newborn and child health groups”.

It was evident that in substantive content terms, in particular, all of the readily made available for review curricula of the four medical schools are fairly generically identical. In so far, however, the CRC and RBPA were not found visible enough in both the undergraduate for the degree for the doctor of medicine (MD) and postgraduate certificate of specialty in Pediatrics and Child Health Training curricula in Ethiopia. It is worth noting that neither CRC nor RBPA was mentioned anywhere in the

clinical-oriented curricula reviewed (*Panel I*). And, if at all, the efforts, to date, must have, yet, been ad hoc and thus can never be expected to result in meaningful as well as sustainable impact. On the other hand, whilst still insufficient, particularly, the Child Health Curriculum of the School of Public Health within the College of Health Sciences of the Addis Ababa University has been offering CRC and RBP the passing-by recognition.

**Panel Two: Chronological Structure and Timeframe of the Generic Undergraduate Medical Degree Training Program in Ethiopia, Active 2008 through 2012.**



Like with the curriculum, with the systematically concerted technical guidance by the Medical and Health Science National Council, the number of training years, schedule and structure of the course of the

undergraduate training for the degree of Medical Doctor are typically harmonized and standardized in Ethiopia since August 2008 (*panel 2*).

**Panel Three: Selected Undergraduate Medical Degree Curriculum Specifications (“Modules”) with Potentials Entry Points for CRC and RBPA Essentials, Ethiopia\*, 2012.**

Training Programme Courses	Selected ‘Modules’ Specifications	Allotted Credits/ Weeks	Remarks
Under the Pre-Med	Civics Education	3	Whilst not the direct objective of the analysis, apparently, however, (perhaps unintentionally), as stipulated in the documents, the core public health courses did not appear paying due attention to Child-Adolescent, Family and Reproductive Health domains;
	Medical Anthropology and Sociology	3	
	Health Education	1	
Under the Pre-Clinical Y1	Environmental Health	2	
	CBTP Phase 1	3	
Under the Pre-Clinical Y2	ComH Epidemiology	3	
	Health Serv. Mx	3	
	Nutrition	2	
	CBTP Phase 2	3	
Under the Bridging Course	Physical Dx and Clinical Skills	P or F	
	Medical Ethics and Legal Medicine	2	
Under the Clinical Year 1	Internal Medicine 1	11	
	General Surgery 1	11	
	Obst. & Gyn. 1	11	
	Pediatrics	11	



	CBTP Phase 3	3	also, Health Education should have warranted to get mainstreamed within the “basic professional” course content
Under the Clinical Year 2	The major clinical attachments	44	
	Research Methods	1	
	CBRTP Phase 4	3	
Internship	Major Clinical Disciplines	40	
	TTP	8	
	Student Research Programme	3	
	Comprehensive Community/ Public Health Evaluation	P or F	

\*: By taking into account the very elaborate CBTP/TTP of Jimma Medical School’s case as potentially common point of reference, it is proposed that the specified here above Modules will make the tailor-made (instructional and evaluation) incorporation of the CRC and RBPA essentials.

In general, the undergraduate curriculum prepared by the Medical and Health Sciences National Council (of 2008) appeared paying insufficient attention to the public health and social dimensions of health the distinctive exception, in certain aspects, being Jimma (*Panel 3*). It is important to highlight that, to date, CBTP and TTP, have been classically typical of the Jimma domain. Specifically, as duly highlighted (*panel 3*), from the Federal Ministry of Health’s

programmatic perspective, the main source document which got critically reviewed was the “National Strategy for Child Survival in Ethiopia” issued and launched in July 2005. This is a ten-year tailored into two phases (2005/06-2009/10 and 2010/11-2015) strategy document. Evidently, the strategy is a richly collaborative endeavor. However, neither CRC nor RBPA even as a glossary or term were to be found within the document.

**Panel 4: Proposed Specific Courses or Modules of the Respective Curricula within Which CRC and RBPA Can Effectively Get Incorporated (Mainstreamed) Tailor-made, Ethiopia, 2012.**

Training Programme	Pertinent Specific Course or Module	Remarks
Undergraduate Curriculum for Degree in Medicine (MD)	Civic education	Essential
	Medical Anthropology and Sociology	Potentially applicable
	Medical Ethics and Legal Medicine	Essential
	Health Education	Potentially applicable
	Pediatrics and Child Health	Essential
	CBTP and TTP	As per the elaborate specifications within the Jimma domain and essential.
Curriculum for Postgraduate Program Certificate of Specialty in Pediatrics and Child Health	General Pediatrics (and Child Health)	Essential
	Research Methods (Projects)	Essential
	Health Education	Potentially applicable
	Teaching skills and activities	Essential



If not constituting separate module in/on their own right, it is rationalized that the duly tailor-made CRC and RBPA essentials can effectively get mainstreamed within the specified here above disciplines (*panel 4*), including within the competency and proficiency evaluation domains

## **Discussion**

This piece of work is shaped by the strong argument that effective mainstreaming of the CRC and RBPA in all spheres of Pediatrics and Child Health Professional Practices should make up the mainstay of standards of practices. This is a position being increasingly advocated for in the various platforms. Certainly, it may well be argued that the respective professional codes of ethics can guide the practice (4-7). And, it arguably is correct that, in light of the prevailing state of knowledge and technology at the given time, the founding “fathers” of Pediatrics and Child Health both globally and in Ethiopia alike have increasingly been exerting the deserved efforts in respect. The “Medical Ethics for Physicians Practicing in Ethiopia” which was published and disseminated as of December 1987 is one of the vivid examples (6). However, a professional code of ethics which does not take into concrete and systematic accounts of the CRC and RBPA provisions can never be considered complete and comprehensive enough. To the effect, this paper argues that all of the Professional Codes of Ethics need to get concretely informed by these two fundamental instruments (7-14) and, specifically more so, that of Pediatrics and Child Health.

Due to the mere fact that Medical and Health Science National Council could drive the development process, basically, the undergraduate medical curriculum of the five medical schools considered in the review were standardized and uniform and if

not it could only be just in packaging format (e.g. “Community Based Training Program” (CBTP)/“Team-based Training Program (TTP)” and “Students Research Programme” Vs “Community Health Attachment”, “Health Informatics” Vs “Information Technology”, etc.), structuring and the likes (16-20). Certainly, the coherent standardization and uniformity features of the undergraduate medical curricula are very commendable. But the Jimma University’s CBTP and TTP appeared consistently distinctive (19). Overall, however, within the National context, the School (then Faculty) of Medicine of the Addis Ababa University could have set the rightful historic precedence; of course, consequently followed by Gondar and Jimma, in particular (16, 17, 19). Apparently, both the Undergraduate and Postgraduate level training programmes of the respective Medical Schools in Ethiopia are believed to have a direct stake on the tailor-made incorporation (mainstreaming) of CRC and RBPA. In light of their distinctive roles, Pediatrics and Child Health domains will bear increased responsibility into the indefinite future.

Regularity, timeliness and up-to-datedness of the curriculum appraisal and amendments might be challenged. Equally, balancing of the contextualization (“nationalization”) with globalization demands may get looked into from the two major perspectives, namely from the dynamic preparedness and readiness to the increasing demands of the 21<sup>st</sup> Century professional standards and from the point of desired attraction of “Health and Medical Tourism”, including expanding training potentials to entrants from other countries. “To advance third-generation reforms, the Commission puts forward a vision: all health professionals in all countries should be educated to mobilize knowledge and to engage in critical

reasoning and ethical conduct so that they are competent to participate in patient and population-centered health systems as members of locally responsive and globally connected team ... realization of this vision will require a series of instructional and institutional reforms, which should be guided by two proposed outcomes: transformative learning and interdependence in education” (25).

It may well be speculated that to date, be it for technical and/or logistical reasons, however, the complementarily, continuum or links, and synergy between the “Pediatrics” and “Child Health” professional practice aspects and, mainly, within the academics settings, have often been remaining blurred and thereof lacking sufficient equilibrium. Unintentional marginalization of the “Child Health” domain may have been the common practice. A critical and sound balance between the “Pediatrics” and “Child Health” domains of the professional practices across the key players cannot be an overemphasis (8, 9, 23-28). CRC and RBPA should make up essential catalysts of the dynamic transformative process of education and programming in Pediatrics and Child Health alike. As an illustrative example, inter alia, under Article 24 of the CRC it is stated that “Children have the right to the highest attainable standard of health and access to medical facilities when they are sick” (9). Accordingly, the absolute indispensableness of ensuring the critical balance among child health promotion, prevention and protection, cure, and rehabilitation spectra of professional standards of practices cannot be an overemphasis. Such undoubtedly calls for uncompromising advocacy role fulfillment of the health profession, essentially, through and with the effective CRC and RBPA instrumentation in the everyday practices (8-14) the lead of which being the Physician.

The profound stake to Pediatrics and Child Health becomes increasingly clear.

It cannot be stated well than: “The UN Convention of the Rights of the Child provides a framework for improving children’s lives around the world. It covers both individual child health practice and public health and provides a unique and child-centered approached to child pediatrics problems ... **Pediatricians can make a difference to the status of children worldwide by adopting a rights-based approach**” (8). Whilst Undergraduate Medical Education is the rightful foundation, equally, the Postgraduate Pediatrics and Child Health specialization training programme is required to provide due emphasis to CRC and RBPA essentials (8-14).

Championing the practical mainstreaming/implementation of CRC and RBPA is vital necessity, including toward the rightful ascertainment of the myriad of quality of care of child’s social services and child’s broader social readiness competencies and thus should make up the day to day business of everyone (27-30). Moreover, who else could have been better vanguards of CRC and RBPA than the Ministry of Health, Health and Medical Education, and Health Professional Associations systems (7, 8-10, 13, 21-26). Effective mainstreaming of CRC and RBPA within both the front-line and referral level professional practices will result in increasingly universal as well as sustainable health care service demand, utilization and coverage (29, 30).

Apparently, at any given academic level, it may well be a commonly prevailing tendency for a clinician to paying more and legitimate attention to alleviating the suffering at hand than looking to the other

fundamentally broader dimensions of health. In spite of such, however, trans-generational scientific rationalization and practical wisdom unwaveringly demonstrate/illustrate that substantial portions of potential sufferings can well get significantly averted and hence minimized through and with concerted systematic public health measures (3, 7, 8, 22, 25, 27).

Given, at least in principle, that regularly periodic curriculum and programme documents appraisal and up-dates are common standards of practices, it will be worthwhile to make the necessary preparatory efforts to the respective effect in regular and timely tandem. Systematic incorporation and practice of the complementary “CRC” and “RBPA” essential tools should be viewed the foundational “Walking the Walk” imperative of Pediatrics and Child Health in particular (15-26, 29). Among others, increasingly greater systematic coordination with the Child and Adolescent Public Health Stream and hence institutionalization of joint implementation arrangement may be the realistically cost-effective alternative. This, equally, may apply to the wider “Child Health” domain of the Pediatrics and Child Health of both the undergraduate and postgraduate training programmes. The call for increasingly greater coordination and joint endeavoring appears just right and timely enough.

Similarly, Ethiopia, like many of the countries around the world, is expected to revise and up-date Its Child Health Strategy in view of the broader and comprehensive “Quality Child Survival, Development, Health and Wellbeing” framework beyond the 2015. The CRC and RBPA tools will be the best foundations for optimal “Walking the Walk” of Pediatrics and Child Health care across the country thereof. In fact, the same will hold true to many countries of the

world (22-26, 29). Absence of due link to the CRC and RBPA essentials within the “National Strategy for Child Survival in Ethiopia” of July 2005 was found equally bothersome (21). The concrete reason could not get ascertained by this study due to its nature. It is high time to be able to look into the consideration concerted enough.

The purposeful focus of the critical review on the five universities with the fairly well established medical schools and the Federal Ministry of Health alone might not be able to fully reflect the spectra in respect to the status of mainstreaming of CRC and RBPA across Ethiopia. Again, the study limited itself on solely reviewing documented evidences in the Ethiopian setting; comparison with other settings could have expanded our horizons but this study did not attempt simply because such was not within the scope of the current endeavour. Nevertheless, the critical review brings out justifiably solid enough information to be able to guide the future standards of practices irrespective of the domains and levels of Pediatrics and Child Health.

### **Conclusions and Recommendations**

To date there really has been insufficient effort in properly internalizing and thus institutionalizing the fundamental CRC and RBPA requirements by all the responsible bodies irrespective of the domains, levels and orientations we can possibly think of – academics, policy, program, research, service, etc. Whereas, CRC and RBPA were supposed to become the standing foundational requirements, the reality on the Ethiopian professional ground did not prove such. Henceforth, CRC and RBPA should make up the fundamental bolting, cementing-gluing, netting, and so forth essentials of Pediatrics and Child Health standards of practices across all spectra in particular. Effective mainstreaming of CRC and RBPA will ensure optimal “Walking the

Walk” of the proper (holistic and at full scale) Pediatrics and Child Health standards of practices in particular. Towards sustained cultivation of unwavering professional conviction, commitment, and culture so that CRC and RBPA become at the bedrocks of optimal Pediatrics and Child Health Care practice, therefore:

- All of Pediatrics and Child Health Care policy, strategy, programme, and service related discourses and documents, at the various levels, must always get shaped by the corresponding CRC and RBPA essentials.

- CRC and RBPA literacy of all layers of Pediatrics and Child Health as well as in the broader health profession should constitute among the mandatory competency requirements at all times. Both the pre-service and in-service Pediatrics and Child Health Care training environments at all levels need to steer the progressive dynamics to the effect. The curricula of all Pediatrics and Child Health Care academics and training initiatives should be required to mainstream the entirety of CRC and RBPA philosophy/principles and practice tools. To the effect, the Module Specifications for the potential tailor-made incorporation within the Curricula, in particular, are duly proposed. Increasingly greater systematic coordination and joint

venturing with the key actors appeared among the feasible as well as sustainable enough alternatives.

- Research enterprises must get re-oriented to the progressive enrichment of Pediatrics and Child Health CRC and RBPA implementation evidence-base trajectory across the continuum.
- Development partners and civil societies may tangibly contribute across all dimensions of Pediatrics and Child Health CRC and RBPA capacity enhancement dynamics.
- Professional Associations, namely the Ethiopian Pediatrics Society and similar entities must bear CRC and RBPA flagship high and sustained enough; are strategically positioned to progressively advocating for, advancing, and promoting “Walking the Walk of Pediatrics and Child Health Care Foundations” (CRC and RBPA) in particular.
- The Ethiopian Journal of Pediatrics and Child Health may spearhead in featuring matters of CRC and RBPA on stand-by scheme.

## References

1. **Margaret K H.** **What We Don't See.** 200 NEJM Years Anniversary Article. N. Engl. J. Med. 2012; (366):1328-34
2. Robert C. Brownlee, MD. Pediatrics History. **The American Board of Pediatrics: Its Origin and Early History.** Pediatrics, Nov 1994; 94:732-735.
3. American Academy of Pediatrics Policy Statement. **The Pediatrician's Role in Community Pediatrics.** Pediatrics April 2005; 115 (4):1092-1094.
4. **Frankie P.** **The Tracks We Leave: Ethics in Health care Management.** The Foundation of the American College of Health Care Executives. Health Administration Press. Chicago Fourth Edition, 2010.
5. **Standards of Medical Care in Ethiopia,** the 36<sup>th</sup> Annual Conference of the Ethiopian Medical Association. Africa Hall, Addis Ababa Ethiopia (Amharic in full) May, 1992 ETH C. (1999)
6. **Medical Ethics for Physicians Practicing in Ethiopia** December, 1987.
7. **Milton I. Roemer.** **Code of Ethics based on Medicine's Social Responsibility.** World Health Forum 1982; 3:357-375.
8. **Watersotn T and Goldhagen J.** **Why children's rights are central to international child health?** Arch. Dis Child 2006; 92:176-180 doi 10.1136 adc/:2006 098228 (downloaded from adc.bmj.com May 22, 2012).
9. United Nations. **The Convention of the Rights of the Child.** November 1989.
10. **Convention of the Rights of the Child Ethiopian pictorial version** (with four local languages: Amharic, Oromiffa, Somali, and Tigrigna), Communication Section, UNICEF Ethiopia (undated).
11. UNICEF. **The Human Rights Based Approach: Statement of Common Understanding.** The State of the World Children 2004; 91-93.
12. UNICEF Regional Office for South Asia. **A Rights-Based Programming Approach to Programming for Maternal Mortality Reduction in South Asian Context: A review of the literature.** UNICEF Regional Office for South Asia 2003; 1-54.
13. UNICEF Regional Office for South Asia. **Pocket Guide for a Rights-based Approach to Programming for Children: Application in South East Asia,** February 2001.

14. InterAction: American Council for Voluntary International Action. **Rights-based Approach to Development: What is Rights Based Approach to Development (RBA)?** (Undated).
15. **Addis Ababa University's Department of Pediatrics and Child Health Curriculum for Postgraduate Program Certificate of Specialty in Pediatrics and Child Health;** November 2008.
16. **Addis Ababa University's Faculty of Medicine's Undergraduate Medical Curriculum** Prepared by the Medical and Health Sciences Council and the Faculty of Medicine, Addis Ababa University, September, 2008; ...
17. **Gondar University's Undergraduate Medical Curriculum Final** Prepared by the Medical and Health Sciences National Council (ETH) August 2008; 1-264.
18. **Hawassa University's School of Medicine Undergraduate Medical Curriculum Final** Prepared by the Medical and Health Sciences National (ETH) Council August 2008; 1-137.
19. **Revised Curriculum for the Degree of Doctor of Medicine (MD)** Prepared by the School of Medicine in line with the Medical and Health Sciences National Council Recommendations. Jima University's Faculty of Medicine and Public Health Sciences (ETH), August 2008; 1-187.
20. **Mekele University's School of Medicine Undergraduate Medical Curriculum** (ETH), (contacted but, actually, was not accessed and reviewed right before submission for publication).
21. Federal Ministry of Health. **National Strategy for Child Survival in Ethiopia.** Family Health Department, Federal Ministry of Health. Addis Ababa, Ethiopia, July 2005.
22. The Editors. **Educating for Health Equity: Walking the Walk.** MEDICC Review, July 2012; 14(3):3.
23. **Gory C.** **Cuba's Latin American Medical School: Can Socially-Accountable Medical Education Make a Difference?** MEDICC Review, July 2012; 14(3):5-11.
24. **Ricardo A.** **The Vocation to Serve: Cornerstone of Health Care.** Viewpoint. MEDICC Review, July 2012; 14(3):52.
25. **Julio F, Lincoln C, Zulfiqur A. Jordan C, Nigel C, Timothy E, et al.** **Health Professionals for a new century: transforming education for strengthening health systems in an interdependent world.** Education of Health Professionals for 21<sup>st</sup> Century, The Lancet Commissions. The Lancet 2010; 376:1923-1958.



26. Richard Harton. **A new epoch of medical education.** Comment. The Lancet. Published online, November 2010; DOI 10.1016/S0146-6736(10)62008-9: 1875-1877(accessed on May 12, 2012).
27. Anthony Lake. **Early Childhood Development: global action is long overdue.** The Lancet. Published online September 23, 2011 DOI: 10.1016/S0140-6736(11)614S0-5 (accessed on May 12, 2012).
28. UNICEF. **The State of the World Children 2011: Adolescence an Age of Opportunity.** UNICEF, New York, USA, 2011.
29. Any Haines, George Alleyne, Ilona Kickbusch, Carlos Dora. **From the Earth Summit to Rio+20: integration of health and sustainable development.** Lancet 2012; 379:2389-2397.
30. Dr. Margaret Chan, Director-General of the World Health Organization. "*Universal coverage is the ultimate expression of fairness*". (Second-term) Acceptance speech at the Sixty-fifth World Health Assembly, World Health Organization, Geneva, Switzerland, May 23, 2012.
31. **The Future of Epidemiology: The First Panum Lecture in Copenhagen 1999.** International Journal of Epidemiology October 1999; 25(5):S996-S1024.
32. Michael Agar. **Toward a Qualitative Epidemiology: a keynote Address at the Eighth Qualitative Health Research Conference.** Qual. Health Res 2003; 13:974 DOI: 10.1177/1049732303256886 (<http://qhr.sagepub.com/cgi/content/ref/13/7/974>).

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# A NEGLECTED OLD DISEASE IN A NEW FOCUS: EPIDEMIC OF VISCERAL LEISHMANIASIS

at Libo-kemkem Woreda, North West Ethiopia, Kassahun Mitiku MD, MPH, \*

## ABSTRACT

**Objective:** *to describe the clinical and epidemiological features, treatment measures and the case fatality rate of patients with visceral leishmaniasis (vl) in libo-kemkem woreda.*

**Methods:** *Retrospective descriptive analysis of demographic and epidemiologic data from patients with visceral Leishmaniasis diagnosed and treated in Addis Zemen health center and outreach sites at Libo-kemkem Woreda North West Ethiopia from may 2005 to January 2006.*

**Results:** *Two hundred twelve deaths which occurred before the epidemic of visceral Leishmaniasis proper got confirmed were believed to have died due to Kala-azar (KA). Those deaths which occurred before the epidemic was actually confirmed and the 1292 patients diagnosed and treated for KA were included in the study. The age of patients ranged from 5 months to 60 years whilst the mean age was 18 years. Of the 1292 patients who were diagnosed and treated at the health center, 25.3 % were female and 58% came from Bura kebele of Libo-kemkem Woreda. Associated infections were diagnosed in 10.9 % of the admitted patients. Patients were treated with Sodium Stibogluconate (SSG). The death rate was 3.8%. The documented main immediate causes of death are associated infections like tuberculosis with respiratory failure and sepsis.*

**Conclusions:** *We have to be aware that Kala azar is expanding its horizon and is becoming a serious public health problem, therefore it is necessary to empower health workers on early recognition and appropriate management of visceral Leishmaniasis and its complications. More importantly, appropriate laboratory kits and drugs must be available in selected areas to early diagnose and treat patients. Control measures must be intensified to curve the rising epidemic.*

\*WHO-EPI-Ethiopia country office

## Introduction

Visceral Leishmaniasis (VL), commonly known as Kala-azar is a human systemic disease caused by parasitic protozoan species of the genus **leishmania**. It is transmitted by the bite of the tiny and seemingly innocuous female phlebotomine sandfly (1- 3)

Depending on the species of the parasite and the immune response of the host, the clinical spectrum of Leishmaniasis **ranges from self- healing skin lesions** to a fatal systemic disease called visceral Leishmaniasis (VL) or Kala azar (KA) (1, 3).

Visceral Leishmaniasis may occur sporadically throughout an endemic region or may occur in epidemic foci. An increased number of cases and large numbers of deaths have been reported in some new focuses.

Visceral Leishmaniasis is endemic in the tropical and sub-tropical regions of Africa, Asia, the Mediterranean, Southern Europe, South and Central America. The distribution of VL in these areas however is not uniform; it is patchy and often associated with areas of drought, famine and densely populated villages with little or no sanitation. In endemic areas children below the age of 15 are commonly affected. In sporadic and

epidemic cases of VL people of all ages are susceptible with males at least twice as likely to contract the disease as females, except those who have conferred immunity due to past infection. Leishmaniasis is most prevalent in rural areas (5, 6).

Leishmaniasis is common in the north western part of Ethiopia bordering the Sudan and Eritrea (7). There are also reports in the south west part of the country mainly in Konso and the central part of the country North Shoa of Amhara (8, 9, 10).

Leishmaniasis has not been reported from Addis Zemen previously and is not included in the Integrated Disease Surveillance Response (IDSR) in Ethiopia (include the corresponding Ref.). However since September 2004 it has caused a lot of sickness and death in one of the Woredas of south Gonder called Libo-kemkem. As part of the epidemic control measure, and to learn its specific Epidemiological features in this particular area, we investigated the Epidemic. The particular aim of the investigation was to describe the epidemic namely: to know who were affected, which localities are hardly affected by the epidemic, when the Epidemic occurred, what other studies are required to know more about the disease in this area.

## **Methods**

### **The study area**

Libo-kemkem is in south Gonder zone and is one of the 113 Woredas of Amhara Region. It is divided into 29 rural and 4 urban Kebeles. The landscape is mountainous and plain low land. The lowland part of the Woreda is partly covered with Acacia trees and the soil is black which cracks deeply during the dry season. Small-scale irrigation is started in the plain low land part of the Woreda. The area is highly populated and a lot of stray dogs are found in every village. The main health provider in the Woreda is the government. During the study period there were one health center and 11 health posts for around 230,000 people. Malaria is the first cause of morbidity and mortality in the Woreda.

### **Confirmation of the Epidemic.**

The cause of the epidemic went unrecognized for more than eight months. As the main cause of febrile illness in the area is malaria, the illness was diagnosed as malaria. Repeated investigating teams went to identify the cause of the epidemic but failed to suspect Kala azar. The patients were being managed as malaria. As the illness was not responding to the latest anti-malarial drugs the community refused to take these medicines, they rather used to go

to the holy water. Finally, people experienced with the treatment of Kala azar (MSF- Greece) went to the area to see the “malaria” situation in the localities. At this moment, they considered Kala azar and investigated patients. The first thirteen specimens were taken to Abderafi and turned out to be positive with DAT. To confirm the etiology The Regional Health Bureau took five patients to Gonder university hospital, all of them confirmed to have *L. donovani* from their Splenic aspirate.

### **Treatment of patients**

The first thirteen patients were sent to Abderafi health center for treatment and at the same time a treatment center was established at the Addis Zemen health center. The south Gonder zone and the Regional Health Bureau deployed five health workers to assist the Woreda and MSF- Greece on the management of cases. The MSF-Greece trained all health workers involved on the management of KA. The Treatment center was established at Addis Zemen on 20 May 2005. As the cases were too many for the health center, outreach sites were established at three Kebeles near the patient’s homes until they completed the 30 day injection. CARE donated one big tent and patients were treated in the health center

under tents. Treatment included drugs and nutritional rehabilitation. As part of the treatment protocol patients were weighed at admission and the nutritional status was being assessed.

Treatment for visceral leishmaniasis was A 30-day course of 20 mg antimony per kg body weight which is available under different brand names (Pentostam, Glucantime, S.A.G)

### **Identifying additional cases**

At the beginning of the Epidemic (immediately after the 13 patients were tested and proved to be positive for DAT), the wereda health office with the assistance of WHO surveillance officer and MSF – Greece developed case definition, planned the care of patients and documentation. A form for data collection was developed and given to the wereda DPC focal person and head of the health center. More over the epidemic affected area was visited by the team to assess the geographical features of the area and examine patients at the site. Additionally, orientation was given on how to investigate the Epidemic especially on how to find additional cases and manage them.

### **Data collection and analysis**

The Woredas Health Office was collecting information on deaths even before the cause of the epidemic was identified. After the cause of the epidemic was known, data was collected by the health workers attending patients. These Health workers in addition to their training on how to manage Kala azar cases they were also trained on how to fill the registration form prepared by the wereda Health Office and WHO Surveillance Officer. The health workers collected the information based on the prepared registration form. The variables collected using the registration form were entered into a computer and analyzed using EPI INFO version 2002. The result of the descriptive analysis is presented using frequency table and graph. This analysis included both: the data collected by the wereda Health Office before the cause of the epidemic was known and the record of patient after the cause of the epidemic was known, from May 20, 2005 to January 15, 2006.

\* The author was a WHO surveillance officer who supported the outbreak investigation in the health facility and at the field level and has no conflict of interest of any kind

## Result

There were two hundred twelve deaths during the eight months before the diagnosis of Kala azar was confirmed, these deaths occurred despite treatment with the latest anti-malarial drug and retrospectively were believed to be due to Kala azar. The admission of Kala azar cases started on 25 May 2005 at Addis Zemen health centre. Since the diagnosis of Kala azar was confirmed, 1,928 people were tested with DAT and 1,292 (67%) of them were positive.

Of the DAT positive patients, twenty-five of them had splenic aspiration and parasitological examination; 23/25 positive LD. We have learnt that 67% of patients who fulfill the cases definition were found to be DAT positive and 16% borderline. Of DAT positive in 92% of them the parasite was identified from the splenic aspirate.

Among the DAT positive patients who were on Treatment 74.8 % are male. The mean age of patients was 18 years, the range being from 5 month to 78 years, but the majority of them being between 5 and 35 years (table 1). In the age group of five years and below there is no significant difference in sex of cases but as the age increases, the disparity of cases between the sexes increases. The

age distribution of deaths before the epidemic was confirmed and cases under treatment also have similar pattern except that there were relatively more deaths than cases in the under five years of age group (Table2).

The epidemic started from one of the Libo-kemkem Woreda and gradually the number of Kebeles affected increased. As of January 15, 2006, there were reports of cases from 20 of the 33 Kebeles including from one of the urban Kebeles. 743 (58%) of the cases were reported from one of the Kebeles called Bura. 1008 (78.6 %) of the cases were reported from the 4 Kebeles of the Woreda. There were 18 cases from neighboring Woreda (Fogera) who came for treatment at Addis Zemen treatment center.

Before the diagnosis of KA was confirmed, the death due to possible cause of KA was very high, after the diagnosis was confirmed and treatment center established death has decreased dramatically but the numbers of cases requiring treatment are increasing. By the time this report was prepared there was no sign of decrement in the reported incidence of Kala azar cases; rather it is increasing with time (Fig. 1).

The additional health problems recognized on the above patients were infection 10.9 %

(tuberculosis, sepsis etc), severe acute malnutrition 25.9 % and moderate acute malnutrition 11.1 %

The duration of the symptom of Kala azar patients at diagnosis were highly variable it ranges from a month to a year the mean duration is 50 days.

The main treatment modality was Sodium Stibogluconate (SSG) intramuscular and Nutritional rehabilitation. Since the health center has only 10 beds they were being cared in the tent. Sixty two percent of the patients before CARE gave the tent in October 2005 were treated at the outreach site. Except 18, all patients at the outreach sites have completed the treatment. After diagnosis was confirmed and as of January 15, 2006 there were 48 deaths the case fatality rate after initiation of treatment is 3.8 % (excluding those who disappeared against medical advice). Patients usually die after mean 12.1 days of hospital stay; the range is from three to 21 days of treatment. One of them died after discharge against medical advice.

There were 8 cases who gave a travel history to Kala azar endemic areas within the Region and few of them have a history of treatment for Kala azar; One of them went to Metema 5 months before the onset of the first possible KA case in Addis Zemen.

## Discussion

The deaths before the cause of the Epidemic was confirmed were compared with cases after Kala azar was confirmed. It was found that there was similar pattern between the two groups in terms of sex, age or residence and clinical symptoms. The deaths occurred despite treatment with Co'Artem, the latest anti- malarial drug in the country. The fact that the clinical picture, age and sex distribution pattern of those who died before treatment started and those who was confirmed to have KA and started on treatment is similar; increased the probability of the cause of deaths to be due to similar illness. These show the long lag time to recognize the cause of the epidemic and how ill prepared we were to handle the situation (12).

The diagnosis is suspected and established very late, this indicates that opportunities for early diagnosis have been lost. This must be a cause for concern since late diagnosis is a risk factor for death (2, 14). Though Leishmaniasis is reported in many parts of the country (10), it often is perceived as a problem of low priority. Likewise, Leishmaniasis is known to occur frequently in many foci, but often the strategy is to



react rather than to anticipate and prevent (11, 13).

Factors that possibly could have contributed to this perception of low priority include:

1. Lack of information about the current magnitude or nature of the potential problem, i.e. KA.
2. Budgets are inadequate and health offices are overstretched with many calls on their resources.
3. In this area, hospital facilities are absent and tools for screening and identification of patients are not available; and, overall, the population to health care facility distribution disparity within the Libo-Kemkem woreda was huge at the time.
4. Health workers in the affected communities were ill prepared on diagnosis and treatment of KA in particular.
5. There was no enough knowledge about the most effective points of intervention in the case of KA at least.

Duration of illness: The great variation in disease duration before admission is in line with published data. Leishmaniasis is generally an insidious disease, with non-specific initial symptoms, this in conjunction

with potential bias due to faulty memory and the low educational level of the populations makes this variable particularly difficult to interpret (14).

Inconformity with many of the literatures this investigation suggests that the male is more prone to this disease, this might be to nature of the work in the field and activity pattern for male. There may also be a hormonal factor linked to gender or exposure (5). This requires further study on type and residence of the vector and hormonal difference of male and that might contribute for the difference in the incidence of the disease.

One important characteristic of visceral Leishmaniasis is that the higher the incidence of the disease the greater the risk to the youngest Children (1,4,14). But in this series the under five children are not the highest affected children. This might be due to equal susceptibility of the community in new focus or the behavior of the vector (residing and biting in the forest where usually adults penetrate)

Nutritional evaluations revealed the disease has wide range of clinical variation, demonstrated by the presence of patients within the normal weight percentiles (63% of the patients), while 25.9 % of patients were severely malnourished. It should be

noted that a majority of the patients had suffered from the disease for less than 60 days; a period, which may well, not be sufficient for chronic nutritional problems to develop and which may explain the presence of well-nourished patients.

We were not able to determine the route by which VL entered the villages of Libo-kemkem. The only information we could demonstrate was the patient who has been to Metema and came back to Libo-kemkem Woreda 5 months before the first surviving case. Though there was no documented information of Kala azar in Libo-kemkem Woreda, as we didn't investigate the travel history of the deaths before the cause of the epidemic was known, it is difficult to conclude this case as the index case.

Climate, soil type and agricultural practice are factors that influence the disease pattern (15,16), the number of cases of Leishmaniasis is increasing, mainly because of man-made environmental changes and the absence of intervention to control the spread that may help to decrease human exposure to the sandfly vector, and the movements of susceptible populations into endemic areas also contribute to the increased incidence. Therefore we have to be aware that Kala azar is expanding its

horizon in areas where small scale irrigations are developing and is becoming a serious economic and public health problem. Excluding the deaths at home before the diagnosis was ascertained the reported cases fatality after the diagnosis was ascertained was 3.8% from admitted patients, which was similar to rates in other studies (14). It can, however, still be considered lower when compared with some other study lethality rates. The lower reported case fatality rates found in this study may be due to the fact that active case search might have pulled the cases that are of a lesser severity, thus admitting a patient that have lower risk of death.

### **Conclusion and recommendation**

As patients may die unattended in their home, strengthen active surveillance to pinpoint other affected villages, and improve the efforts to increase availability of diagnostic and treatment facilities.

We have to build the knowledge on epidemiology, ecological types, and designing a sound VL control strategy. As the study is a descriptive one, it should be enriched by studies that focus on the type and behavior of vector, mode of transmission, reservoir host and of the

species of the parasite in the locality, which in turn helps to design a control strategy.

We have to be aware that Kala azar is expanding its horizon, new woredas where has been no case report previously are reporting cases and the disease is becoming a serious public health problem, therefore it is necessary to empower health workers on early recognition and appropriate management of visceral Leishmaniasis and

its complications. More importantly, appropriate laboratory kits and drugs must be available in selected areas to early diagnose and treat patients. Until we know the behavior of the parasite and will be able to design a specific control strategy, the already known and readily available generic control measures must be intensified to curve the rising epidemic.

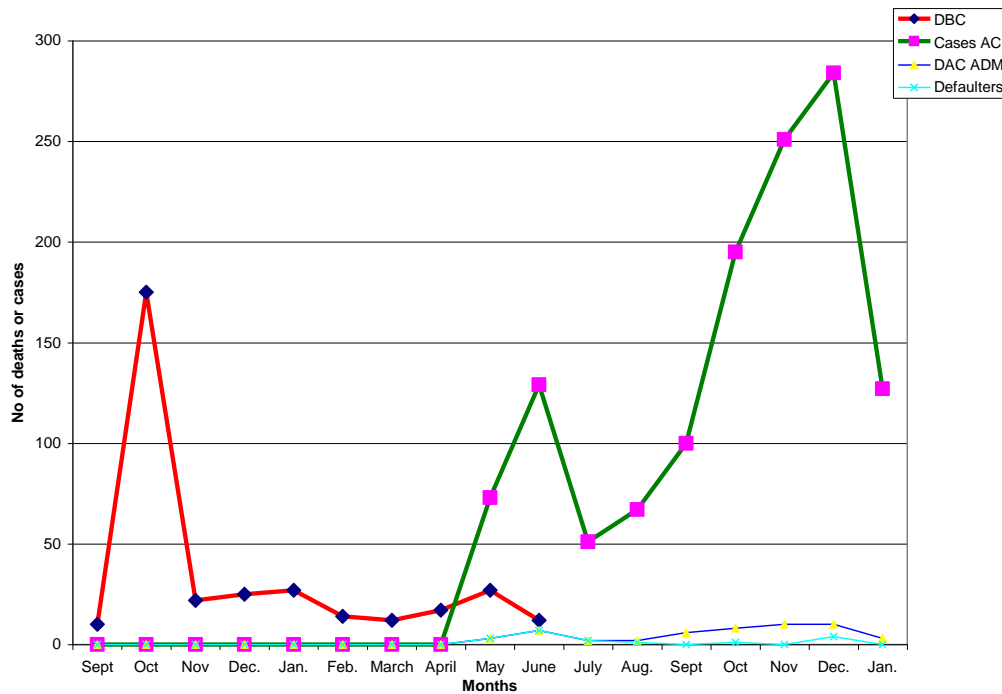
**Table 1: Distribution of Confirmed KA cases by age and sex Addis Zemen, North west Ethiopia, May 2005- January 2006**

Age group	Sex					
	Male	percent	Female	percent	Total	percent
<=5	119	54.8%	98	45.2%	217	16.9%
>=5-20	460	75.9%	146	24.1%	607	47.3%
>20 - 35	262	82.1%	57	17.9%	319	24.9%
>35 - 50	79	80.6%	19	19.4%	98	7.7%
>50 - 60	27	96.4%	1	3.6%	28	2.2%
>60	13	100.0%	0	0.0%	13	1.0%
Total	960	74.9%	321	25.1%	1282	100.0%

**Table 2: Age distribution of Kala azar cases on treatment and presumed KA deaths before the causes was known Addis Zemen, north west Ethiopia, September 2004- January 2006**

Age group	Patients on treatment		Deaths before confirmation	
	No	%	No	%
<=5	217	16.90%	50	27.50%
>5 – 20	607	47.30%	18	9.90%
>20 – 35	319	24.90%	69	37.90%
>35 – 50	98	7.60%	36	19.80%
>50 – 60	28	2.20%	4	2.20%
>60	13	1.00%	5	2.70%
<b>Total</b>	<b>1282</b>	<b>100.00%</b>	<b>182</b>	<b>100.00%</b>

**Fig 1: Trend of Kala azar deaths before its confirmation and deaths and cases after it was confirmed Addis Zemen, North west Ethiopia September 2004- January 2006**



Key

DBC= deaths before confirmation

DAC=deaths after confirmation

CASES AC = cases after confirmation

## References

1. World Health Organization Division Of Control of Tropical Diseases, Manual on visceral leishmaniasis control, Geneva 1996
2. Hailu A, Mudawi M. Royce C, (2005) Visceral Leishmaniasis: New Health Tools Are Needed. PLoS Med 2(7): e211
3. Boelaert M, Criel B, Leeuwenburg J, Damme van W, Le Ray D, et al. Visceral leishmaniasis control: A public health perspective. Trans R Soc Trop Med Hyg (2000) 94: 465–471
4. Behrman, Visceral Leishmaniasis, In Nelson text book of pediatrics 18<sup>th</sup> ED
5. World Health Organization, Control of the Leishmaniasis: report of a WHO Expert Committee. Geneva, 1990 (WHO Technical Report Series, No. 793).
6. Márcia J. A. Queiroz<sup>1</sup>, João G. B. Alves<sup>2</sup>, Jailson B. Correia Visceral Leishmaniasis: clinical and epidemiological features of children in an endemic area J Pediatr (Rio J). 2004; 80(2):141-6:
7. WHO. Dramatic upsurge in visceral Leishmaniasis cases in the horn of Africa, press release February 1998.
8. Ali, A, Ashford, R. W., (visceral leishmaniasis in Ethiopia. III. The magnitude and annual incidence of infection, as measured by serology in an endemic area. Ann. Trop. Med. Parasitol. 1994);88(1): 43-7
9. Ali, A., Ashford, R, (1994), visceral Leishmaniasis in Ethiopia. IV. Prevalence, incidence and relation of infection to disease in an endemic area. Ann. Trop. Med. Parasitol. 88(3): 289-93
10. Ayele T, Ali A . The distribution of visceral Leishmaniasis in Ethiopia. Am J Trop Med Hyg 1984 Jul; 33(4):548-52.
11. El-Masum M, Evans D, Minter D , El-Harith A. Visceral leishmaniasis in Bangladesh: The value of DAT as a diagnostic tool. Trans R Soc Trop Med Hyg (1995) ;89: 185–186.
12. Editorials, The world's most neglected diseases BMJ 2002;325:176-177 ( 27 July )
13. \_\_\_\_\_ Visceral Leishmaniasis: consequence of a neglected disease in a Bangladesh community Am. J. Trop. Med. Hyg., 69(6), 2003, pp . 624-62

14. Kafetzis D An Overview of Pediatric Leishmaniasis *Journal of Postgraduate Medicine*, Vol. 49, No. 1, Jan-March, 2003, pp. 31-38
15. Elnaiem D, Schorscher J, Bendall A, Obsomer V, Osman ME, et al. (2003) Risk mapping of visceral leishmaniasis: The role of local variation in rainfall and altitude on the presence and incidence of kala-azar in eastern Sudan. *Am J Trop Med Hyg* 68: 10–17
16. EL-Safi S, Bucheton B, Kheir M, Musa HA, EL-Obaid M, et al. Epidemiology of visceral leishmaniasis in Atbara River area, eastern Sudan: The outbreak of Barbar El Fugara village (1996–1997). *Microbes Infect* 4: 1439–1447.

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**EXCLUSIVE BREASTFEEDING AND REPLACEMENT FEEDING  
ON MORBIDITY AND MORTALITY IN HIV EXPOSED INFANTS AT ONE YEAR AGE  
IN TIKUR ANBESSA SPECIALIZED HOSPITAL.**

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**ABSTRACT**

**Background:** *Infant feeding in the context of HIV is complex because of the major influence that feeding practices and nutrition have on child survival. The dilemma has been to balance the risk of infants being exposed to HIV through breastfeeding with the risk of death from causes other than HIV if infants are not breastfed.*

**Objective:** *To compare the effects of exclusive breast feeding (EBF) and exclusive replacement feeding (ERF) on morbidity and mortality in HIV exposed infants at one years of age at Tikur Anbessa Specialized Hospital from 2007 to 2010.*

**Material and methods:** *A retrospective cross sectional study was conducted at Tikur Anbessa Hospital ,pediatric infectious disease clinic on all infants who were exposed to HIV and having a follow up from 2007 to 2010 and 116 infants qualify the inclusion criteria. The data was collected from exposed infant follow up chart and examined for the following variables: Infant feeding option, the prevalence of malnutrition, incidence of diarrheal disease, risk of HIV transmission. The data was cleaned and compiled and analyzed using SPSS version 17. The results was expressed in description, rate and tables and then interpreted, analyzed and association was made for different dependent and independent variables.*

**Result:** *A total of 116 HIV exposed infants were included in the study. The male to female ratio was 0.78 and the mean age of enrollment to the care was 1.8 months. The maternal PMTCT coverage was 32.7% and neonatal PMTCT coverage was 85.3%, neonatal PMTCT coverage was associated with decreased risk of HIV infection at one year. The prevalence of exclusive breast feeding (EBF) and exclusive replacement feeding (ERF) was 56% and 44% respectively. The mean diarrheal incidence was 3.54 per child per year and ERF was shown to have increased risk of diarrheal episode. Prevalence of marasmus and underweight at one year of age was found to be 10.3% and 27.6 % respectively. The risk of HIV infection at the age of one was 12.2%.and it was not associated with the method of feeding.*

**Conclusion and recommendation**

*As recommended by most of the studies in developing countries and WHO , our study has also shown high incidence of diarrhea in exclusively replacement feed infants and comparable cumulative HIV prevalence at one year in both options of infant feeding in the context of HIV exposure, thus It is imperative to conclude that exclusive replacement feeding is associated with high prevalence of diarrheal disease at one year . However it's the conviction if the authors that if AFASS is fulfilled the option could be given to the mother for exclusive replacement feeding.*

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## Introduction

According to Global Summary of the HIV/AIDS Epidemic December ,2010 (AIDS epidemic update) HIV/AIDS has created an enormous challenge to mankind since its recognition; about 32.8 million people were living with HIV, out of which about 2.5 million were children under 15 years of age. Of these children, 90% live in sub-Saharan Africa(1)

In Ethiopia the estimated number of people living with HIV (PLHIV) in 2009 was about 1.1 million Of which, 72,945 (6.6%) were children <15 years old and total AIDS Orphans are about 855,720. (Ref MOH REPORT 2009) Mother-to-child transmission is the primary mode of HIV acquisition in children accounting for about 90%of cases. Therefore, the most efficient and cost-effective way to tackle pediatric HIV globally is to reduce mother-to-child transmission (MTCT). (2)

Each year, HIV Infects an estimated 800 000 children, mainly because of transmission from mother to child during pregnancy, delivery, or breastfeeding. Most of these infections could be prevented through the use of antiretroviral drugs taken during pregnancy and delivery and the avoidance of breastfeeding. However, the use of breast milk substitutes also brings mortality risks that need to be balanced against the risk of HIV transmission. The balance of risks depends on local conditions and should be examined for each situation. For the mother who is HIV-negative or who does not know her status, breastfeeding continues to be recommended. For the mother who knows she is infected and for the health worker advising her, the risks associated with different infant feeding strategies need to be understood.(3)

It is well established that infants breast-fed by their HIV-infected mothers are at risk of

acquiring HIV infection through breast milk. However, in low resource settings where the HIV epidemic predominates, breast-feeding cannot simply be replaced by breast milk substitutes since alternatives to breast milk are unavailable, unaffordable, and unsafe. As a result, breast-feeding poses a dilemma for women who live in low-resource settings and who are infected with the human immunodeficiency virus (HIV). Breast -feeding can transmit HIV but is also the source of optimal nutrition and protection against other serious infectious diseases(4).

Infant feeding option in the context of HIV infection in our setting is still controversial and the out come of this infant is not well known. This study is conducted to evaluate the out come of HIV exposed infants in two different categories( EBF and ERF) at Tikur Anbessa Specialized Hospital department of pediatrics and child health .

## Methods and Material

### Study area

Addis Ababa, capital and largest city of Ethiopia. It is situated in central part of Ethiopia at an altitude of about 2440 m (about 8000 ft) above sea level. Tikur Anbessa Specialized Hospital is the largest government hospital of the city and the country as a whole. It is the main teaching hospital of AAU for undergraduate and post graduate medical students. In addition to teaching, the hospital gives both inpatient and outpatient services to children referred mainly from Addis Ababa and all over the country. The Pediatric infectious disease clinic at Tikur Anbessa Hospital has been giving care for HIV exposed infants since its establishment in 2007 for a total of 494 infants. So this study will be done at PIDC at Tikur Anbessa Hospital.

Retrospective cross sectional descriptive study by chart reviewing from year 2007 to 2010.. All HIV exposed infant who have follow up at PIDC of Tikur Anbessa



Hospital in the study period. The total of 116 exposed infants were included in the study from the total 374 who qualify the inclusion and exclusion criteria. Data was collected by trained data collector by standardized questionnaires. Each card was given a specific identity, the required information was recorded on the questionnaires. Data was cleaned, and analyzed using SPSS version 17. The results were expressed in description, rate and tables and statistical association was made. Ethical clearance was obtained from Department Research and Publication Committee (DRPC) and the Institutional mothers were dead during enrollment in to the care. Almost half 59 (50.9%) of mothers of exposed infants were on HAART. Thirty eight (32.7%) of mothers were on PMTCT. The neonatal PMTCT coverage was 99 (85.3%) and it is statistically associated with outcome of HIV prevalence at one year. ( $p < 0.05$ )

Infant DNA PCR tests were positive in 102 (87.9%) of the exposed infants and the rest 14 (12.1%) were negative for the HIV DNA PCR test. With regard to HIV antibody test 102 (87.1%) were negative and the remaining 15 (12.9%) were positive.

In the first six months 65 (56%) were on exclusive breast feeding and the rest 51 (44%) were on exclusive replacement feeding. Option of feeding after six months were categorized as continued replacement feeding, continued breast feeding with complementary feeding, and breast feeding discontinued with supplementary feeding, having frequency of 42.2%, 14.7%, and 43.1% respectively as shown table 2.

The mean diarrheal incidence per year were found to be 3.54 and it was statistically related with the option of feeding in the first six months indicating infants on ERF have

Review Board (IRB) of the college of health sciences, and all the information on the chart were confidential

## Results

A total of 116 HIV exposed infant were included in the study, of these 51 (44%) were male, 65 (56%) were female with male to female ratio of 0.78. The mean infant birth weight was 2646 gram, with a range of 1000-4000 gram. The mean age of enrollment in the care was 1.81 months. As shown in table 1, 113 (97.4%) mothers of the HIV exposed infants were alive and 3 (2.6%)

increased incidence of diarrhea. ( $p < 0.05$ ) and the mean annual clinical visit of 7.3 per child.

As shown in Figure 1, Anthropometric assessment at the age of six months, sixteen (13.8%) were marasmic, 25 (21.6%) were under weight and 76 (65.5%) were normal according to Welcome classification. The prevalence of stunting was 16 (13.8%) based on NCHC growth curve. Nine patients (7.9%) had head circumference below -2SD. And the one year anthropometric evaluation showed prevalence of marasmus to be 12 (10.3%), Sever stunting 17 (14.7%) and fourteen (12.1%) had head circumference less than -2SD. Option of feeding was not statistically associated with anthropometric findings. ( $p > 0.05$ )

The outcome regarding HIV infection status at one year were found to be positive in 14 (12.1%) and negative in 102 (87.9%), and there was no statistically significant association between the EBF and ERF group having HIV positive prevalence of 8 (12.3%) and 6 (11.7%) respectively. ( $p < 0.05$ )

**Table - 1 Distribution of variables in HIV exposed infants at Tikur Anbessa specialized hospital**

Variable		frequency	Percent
Sex	male	51	44%
	Female	65	56%
Maternal living status	alive	113	97.4%
	Dead	3	2.6%
Maternal HAART status	no	59	50.9%
	HAART<1 month	1	0.9%
	HAART>1 month	56	48.3%
Maternal PMTCT	no	78	67.3%
	PMTCT <1 month	10	8.6%
	PMTCT>1 month	28	24.1%
Infant PMTCT	no	17	14.7%
	Incomplete	2	1.7%
	Complete	97	83.6%
Infant DNA PCR	negative	102	87.9%
	Positive	14	12.1%
Feeding option	EBF	65	56%
	ERF	51	44%
Infant Hiv infection	Negative	102	87.9%
	Positive	14	12.1%
Infant weight at 1 year	<60%	12	10.3%
	60-80%	32	27.6%
	>80%	72	62.1%
	Total	116	100%

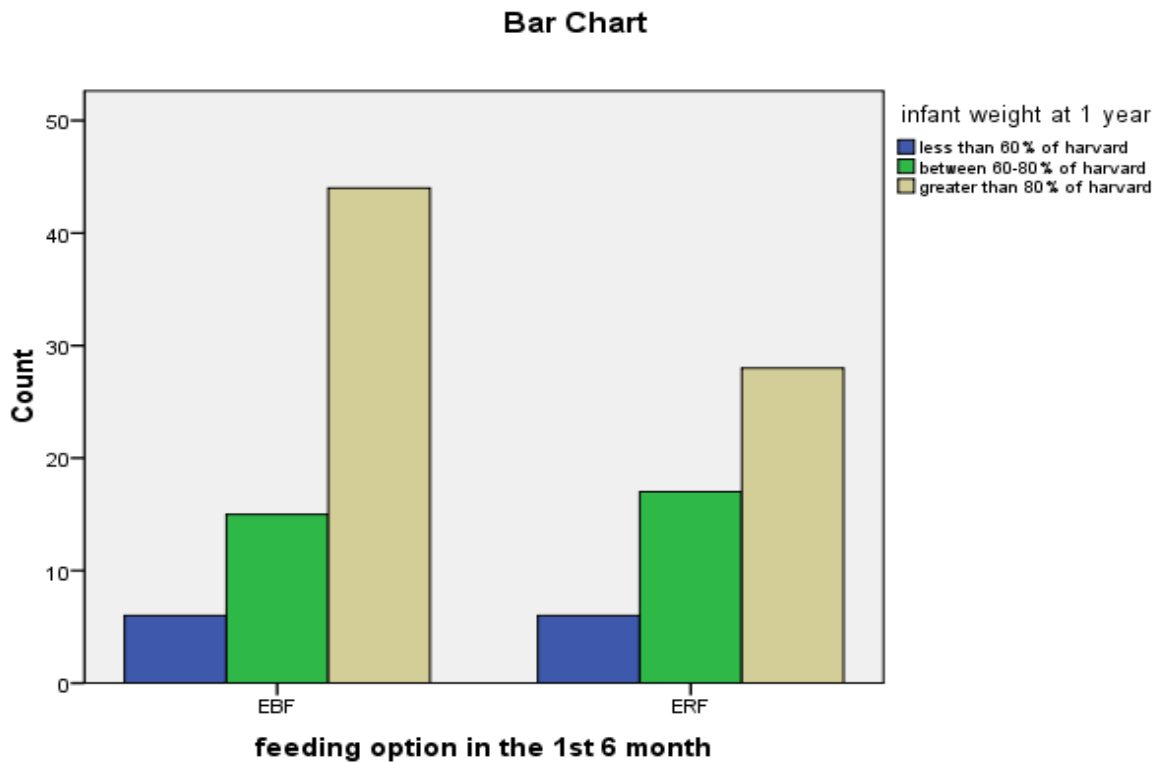
**Table -2 Infant Feeding option versus weight, diarrheal disease and HIV infection in HIV exposed infants in Tikur Anbessa specialized hospital**

variable	Infant feeding option		P- VALUE
	EBF	ERF	
Infant weight at 6 month			
< 60%	8(12.3%)	7(13.7%)	0.603
60-80%	12(18.4%)	13(25.4%)	
>80%	25(34.8%)	31(60.8%)	
Total	65(100%)	51(100%)	
Infant weight at one year			
< 60%	6(9.2%)	6(11.7%)	0.006
60-80%	15(23.1%)	17(33.3%)	
>80%	44(67.9%)	28(54.9%)	
Total	65(100%)	51(100%)	
Diarrheal Episode in one year			
<3	9(13.8%)	3(5.9%)	0.929
3-5	56(86.1%)	45(88.2%)	
>5	0(0%)	3(5.9%)	
Total	65(100%)	51(100%)	
HIV infection at one year			
Positive	8(12.3%)	6(11.8)	0.929
Negative	57(87.7%)	45(88.2)	
Total	56(100%)	51(100%)	

**Table 3 – Distribution of Infant PMTCT versus HIV status t 1 year in Tikur Anbessa specialized hospital**

Variable		HIV status at one year			p- value
		HIV negative	HIV positive	Total	
Infant PMTCT	No PMTCT	7(6.0%)	10(8.6%)	17(14.6%)	p-0.000
	PMTCT incomplete	2(1.7%)	0 (0%)	2 (1.7%)	
	PMTCT complete	93(80.2%)	4(3.4%)	97(83.7%)	
	TOTAL	102(88%)	14(12 %)	116(100%)	

**Figure 1 . Anthropometric patterns of HIV exposed infant at one years of age by the option of feeding in Tikur Anbessa specialized hospital**



## Discussion

This study was conducted to assess the morbidity and mortality outcome of HIV exposed infants pertaining to their method of feeding and does not include the detailed socio demographic characteristics of the mother and infant as it was retrospective cross sectional chart review. And it is difficult to make a conclusion in certainty the morbidity and mortality outcome of exposed infants due to ERF or EBF so the findings must be viewed in line of limitations of the study.

The prevalence EBF at 6 months in the study population was 56% which was higher as compared to most developing countries (average 39%) and also a study done in Conakry guinea which 15.5% and 13.3% in north Uganda with high prevalence mixed feeding (59.5%). This difference may be due to variation in study methods and exclusion of mixed feeding option in our study and high cultural and social implication of breast feeding [9,10]

In this study the effect of EBF and ERF on the outcome of HIV exposed infant at one year were assessed. It was found that the mean diarrheal episode was 3.54 per child per year in the study population and it was associated with option of feeding and exclusive breast feeding seems to protect infants against diarrhea it was also demonstrated by other study [4,5,8,9]

Regarding the prevalence of malnutrition at one year prevalence of marasmus & underweight was 10.3% and 27.6% which was higher compared to study done at Yekatit 12 hospital which was 2.1%

and 9.7% this may be due to nutritional center support at Yekatit 12 hospital was strong.

In contrary to other study method of feeding There was no significant association found with regard to growth and infant feeding option at six and one year of age, mothers exposed infant probably are choosing the option of feeding after their background capacity and counseling by the health professional on individual basis. (probably opted ERF if they really qualify AFASS criteria.) [2,5,8]

Low PMTCT uptake observed in our study (32.7%) is higher than the previously reported in Ethiopia (less than 10%) and Kenya (17%) and lower than Zimbabwe (59%). [2,10]

The cumulative HIV transmission at one year was 12.1% which was comparable in the study done at Yekatit 12 hospital (12.5%) but lower than northern Uganda with cumulative HIV transmission rate was 8% among children tested up to 18 months. [10,12]

## Conclusion and recommendation

As recommended by most of the studies in developing countries and WHO, our study has also shown high incidence of diarrhea in exclusively replacement feed infants and comparable cumulative HIV prevalence at one year in both options of infant feeding in the context of HIV exposure, thus it is imperative to conclude that exclusive replacement feeding is associated with high prevalence of diarrheal disease at one year. However it's the conviction if the authors that if AFASS is fulfilled the option could be given to the mother for exclusive replacement feeding.

## References

1. USAIDS report on global AIDS epidemic.2010.
2. F MOH, Guideline for paediatric HIV/AIDS care and treatment in Ethiopia: 2008.
3. Ross JS, Labbok M. Modeling the Effects of Different Infant Feeding Strategies on Infant Survival and Mother-to-Child Transmission of HIV (July 2004), Vol. 94, No. 7| American Journal of Public Health 1174-1180.
4. Chopra Mrollins N: infant feeding in the time of HIV :rapid assessment of infant feeding policy and programs in four African countries scaling up prevention of mother to child transmission, Arch Dis Child( 2008) 93:288-291.
5. WHO, Infant feeding option in the context of HIV: 1- 2.
6. Recommendations for use of antiretroviral drugs in pregnant HIV 1 infected woman for maternal health and interventions to reduce perinatal HIV transmission in United States, (may 24, 2010), pp.1. <http://aidsinfo.nih.gov/ContentFiles/PerinatalGL.pdf>
7. WHO,Antiretroviral drug for treating pregnant women and preventing HIV infection in infants, recommendation for public health approach.2010.1.
8. WHO,HIV and infant feeding, revised principle and recommendations, rapid advice.2009.21.
9. Diallo F,Bell L,Moutquin JM, Garant MP, The effects of exclusive versus non-exclusive breastfeeding on specific infant morbidities in Conakry (Guinea). The Pan African Medical Journal. 2009;2:2.
10. Ahoura L, Ayikoru H,Evaluation of a 5-year Programme to Prevent Mother-to-child Transmission of HIV Infection in Northern Uganda Journal of Tropical Pediatrics Volume 56, Issue1 Pp. 43-52.
11. Kullehe H,Tolawak K: Prevalence of HIV infection in infants exposed to HIV and received single dose nevirapin or zidovudine with single dose nevirapin at Yekatit 12 Hospital, Addis Ababa. Ethiop j ped child health. 2010;4(6)55-65.

**BLOOD GLUCOSE LEVELS IN PEDIATRIC EMERGENCY ADMISSIONS IN JIMMA  
UNIVERSITY SPECIALIZED HOSPITAL, SOUTHWEST ETHIOPIA**

**By: Mitsiwa Ruffo (MD)\* and Netsanet Workneh (MD)\***

**ABSTRACT**

**Background:** *Abnormal blood glucose level is one of the problems encountered in children with severe illness. Different studies showed that hypoglycemia is associated with poor prognosis in many severe childhood illnesses especially in sub-Saharan Africa where the prevalence of malaria, diarrhea and malnutrition remains high. To the best of our knowledge there has not been any published work on this subject in Ethiopia; as a result abnormal blood glucose level in pediatric emergency admissions has not received enough attention.*

**Objective:** *To determine the pattern of blood glucose levels in pediatric emergency admissions.*

**Methodology:** *The study was conducted at pediatrics Emergency unit of the Jimma University Specialized Hospital, Oromia region, Southwest Ethiopia from May 13, 2011 – June 12, 2011. The study design was a prospective cross-sectional and all nondiabetic children aged between 1 month to 14 years who were admitted to the emergency unit during the study period were included. Data was collected by trained medical person using structured questionnaire and by determining random blood glucose. After cleaning and coding, the data was analyzed using Statistical Package for Social Sciences (SPSS) windows version 16.0. Relevant test of statistical association was employed.*

**Result:** *Six percent of children admitted to Jimma University specialized hospital had an abnormal blood glucose level on admission. Hyperglycemia (4.8%) was more common than hypoglycaemia (1.2%). However, there was a strong association between hypoglycaemia and mortality. Hypoglycemic children with severe illness or malnutrition were having impaired mentation, and died despite an urgent determination of blood glucose and treatment.*

**Conclusion:** *Hypoglycemia is less common as compared to hyperglycemia in pediatric emergency admissions to Jimma University specialized hospital but it was associated with worst outcome of management.*

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## INTRODUCTION

Abnormal blood glucose level is the most common metabolic abnormality in childhood and is associated with neurological problems and death. Hypoglycemia is associated with poor prognosis in many severe childhood illnesses especially in sub-Saharan Africa where the prevalence of malaria, diarrhea and malnutrition remains high.(1-3) Intercurrent illnesses may trigger hyperglycemia as a result of the secretion of stress hormones and cytokines. In older infants and children, a whole blood glucose concentration of less than 40mg/dl (2.2mmol/l) or plasma glucose less than 45mg/dl (2.5mmol/l) and whole blood glucose >180mg/dl(10mmol/l) represent significant hypoglycemia and hyperglycemia respectively whether or not clinical manifestations are present and hypoglycemia in children with severe malnutrition is defined by WHO as RBS less than 54 mg/dl 4

Most of the time low blood glucose concentration is not associated with the development of the classic clinical manifestations of hypoglycemia. The absence of clinical symptoms does not indicate that glucose concentration is normal or has not fallen below optimal level for maintaining brain metabolism.5

The major long-term sequelae of severe, prolonged hypoglycemia are neurologic damage resulting in mental retardation, transient cognitive impairment, neurological deficit and recurrent seizure activity. Subtle effects on personality are also possible but have not been clearly defined.4, 6

hyperglycemia is defined as a transient elevation of blood sugar level associated with illness. Patients with stress hyperglycemia unlike diabetes mellitus usually do not have a lengthy history of polyuria, polydipsia, or weight loss. They do not manifest symptoms or signs of ketoacidosis or biochemical evidence of ketoacidosis is absent. During the acute phase of illness, hyperglycemia may be protective by providing energy to the brain and blood cells. Prolonged hyperglycemia, however, has been shown to increase morbidity and mortality. [7-10, 11]

The prevalence of hypoglycemia was found to be 6.4, 7, and 7.3 percent among emergency admissions in Nigerian, Mozambican, and Kenyan children respectively. Pershad, et al.12 According to the reports of Solomon, et al.3 Pershad, et al., 12 Osier, et al.13, and Elusiyan, et al. 14, among all emergency admissions the major contributors to hypoglycemia in the African studies in



decreasing order of importance were malaria, septicemia, pneumonia and protein energy malnutrition. 15-17

The prevalence and outcome of abnormal blood glucose is one of the clinical scenarios to be more clearly defined. This research is believed to provide a base line information on the prevalence of abnormal blood glucose level in pediatric emergency admissions, pattern of abnormal blood glucose level to underlying disease entity, and outcome of pediatric emergency admissions with abnormal blood glucose level in Jimma university specialized hospital.

## **OBJECTIVES**

### **General objective**

To determine pattern of blood glucose levels in pediatric emergency admissions aged 1 month to 14 year.

### **Specific objectives**

- To identify pattern of blood glucose levels among pediatric emergency admissions.
- To identify association of abnormal blood glucose levels and underlying medical condition.
- To identify clinical characteristics of abnormal blood glucose levels.
- To identify disease outcome of children with abnormal blood glucose.

## **METHODOLOGY**

**Study area and period:** The study was conducted at the pediatrics Emergency unit of the Jimma University specialized Hospital, Jimma zone, Oromia region, southwest Ethiopia which is located 350km from the capital city over a 1-month period (May 13, 2011–June 12, 2011).

**Study design:** The study design was a prospective cross-sectional

**Sampling technique:** The convenience sampling technique was used.

**Source population:** All pediatric admissions from 1month to 14 year of age who were admitted during the study period.

**Study population:** All nondiabetic Pediatric emergency admissions aged between 1 month and 14 year who were admitted during the study period.

**Variables:** Independent - Age, duration of the illness, time from last meal, mental status, seizure, diagnosis, and hospital stay. Dependent – Random blood glucose.

**Data collection Method:** Ethical clearance paper was obtained from ethical review board for human studies of Jimma University and permission was obtained from the authorities of the hospital. A structured questionnaire was administered to every recruited patient. The age of the

patients, sex, interval of last meal, duration of illness before admission, the presenting complaints, and pertinent physical findings (mental status and seizure) were obtained and recorded on the questionnaire. The data was collected by trained health personnel (Medical intern) who can speak Amharic and afan Oromo with strict supervision by the principal investigator. Prior to data collection, each material used as source of data for the study was arranged in sequence to avoid confusion and repetition during the data collection.

The procedure that the data collector followed to obtain the subject details was interviewing the parent/s of a child followed by doing physical examination and finally, blood glucose was obtained from capillary blood by pricking with lancet the lateral aspect of the finger tip after cleaning properly with alcohol swab. Sensocard glucometer was used for measuring blood glucose. SensoCard indicates blood glucose concentration by checking reaction between chemical reagents and the blood drop on the strip test. The whole measuring process is controlled by a microprocessor inside the sensoCard meter. The microprocessor also controls the internal calibration of the device and if any failure is detected in the operation, a relevant error message will be displayed. SensoCard is designed to be used

only with sensoCard test strip after entering the code of a strip, and checking if the 3-digit code on the vial of strips you are using matches the 3-digit code appearing on the meter's screen. In contrast to other methods of blood glucose measurements, sensoCard is calibrated to be used only with fresh capillary blood. No venous or plasma is suitable for accurate monitoring of glucose level.

**Data Quality control:** In order to check the validity and reliability of the questionnaire, it was pre –tested on ten patients before the actual study . The glucometer was also checked and set prior to the study. Factors that influence the measurement results (such as insufficient amount of blood, dirt or contaminants on finger, wiping off the blood that disperses first after pricking, and excessive rubbing) were clearly discussed with the data collector.

**Data analysis:** The data collected was checked for completeness and consistency and then it was cleaned, coded, and entered in to computer. Then it was analyzed using Statistical Package for Social Sciences (SPSS) version 16.0. The Significance level for each analysis was taken as  $p < 0.05$ .

**Exclusion criteria:** Diabetic children and neonates were not included in this study.

**Operational definition:** Hypoglycemia (blood glucose <40mg/dl or <54mg/dl for severely malnourished child). Hyperglycemia (blood glucose  $\geq$  180mg/dl).

## RESULTS

Among 165 patients aged 4 weeks to 14 years, the median age was 24 months (interquartile range (IQR) 7.5 to 72) and 113(68.5 per cent) were aged below five years. (Table 1). There were 100 (60.6 per cent) males and 65

(39.4 per cent) females giving a male: female ratio of 1.5:1. The median duration of illness and subsequent length of hospital stay were both 4 days (IQR 3 to 7). Blood glucose determination was assessed routinely with the glucose oxidase method. Two (1.2 per cent) of them were found to be hypoglycemic, 8(4.8%) of them were found to be hyperglycemic, and the remaining were normoglycemic (Table 2). The age and sex characteristics of the patients are as shown in (Table 3). All cases with abnormal blood glucose concentration were children below the age of five.

**Table 1 Age Distribution of pediatric emergency admissions in Jimma university specialized hospital**

Age(month)	Frequency	Percent
1-12	57	34.5
12-24	25	15.2
24-36	10	6.1
36-48	13	7.9
48-59	8	4.8
$\geq$ 59	52	31.5
Total	165	100.0

**Table 2 Blood glucose pattern of pediatric emergency admissions in Jimma university specialized hospital**

<b>Blood glucose(mg/dl)</b>	<b>Frequency</b>	<b>Percent</b>
0-40	2	1.2
40-80	10	6.1
80-120	89	53.9
120-160	52	31.5
160-180	4	2.4
≥180	8	4.8
Total	165	100

**Table 3 Demographic features of 165 pediatric emergency admissions in Jimma university specialized hospital**

<b>Features</b>	<b>Catego ry</b>	<b>Blood Glucose(mg/dl)</b>			<b>P value</b>
		<b>0- 40(n=2)</b>	<b>40- 180(n=155)</b>	<b>≥180(n= 8)</b>	
Age(Month)	1-12	1(1.8%)	52(91.2%)	4(7%)	.127
	12-24	0(0%)	24(96%)	1(4%)	
	24-36	0(0%)	9(90%)	1(10%)	
	36-48	0(0%)	12(92.3%)	1(7.7%)	
	48-59	1(1%)	6(75%)	1(12.5%)	
	≥59	0(0%)	52(100%)	0(0%)	
Sex distribution	Male	2(2%)	90(90%)	8(8%)	.124
	Female	0(0%)	65(100%)	0(0%)	

The duration of illness before admission and the time of presentation did not significantly influence the prevalence of abnormal blood glucose levels ( $\chi^2 = 4.79$ ;  $df = 5$ ;  $p = 0.441$ , and  $\chi^2 = 8.28$ ;  $df=5$ ;  $p=0.141$  respectively the prevalence of abnormal blood glucose

level was found to increase with impaired level of consciousness ( $\chi^2 = 22.91$ ;  $df = 5$ ;  $p < 0.001$ ) (Table 4). Patients with hypoglycaemia were more likely to die than those without ( $\chi^2 = 23.43$ ;  $df = 5$ ;  $p =0.009$ ) (see Table 5)

**Table 4 Admission characteristics of the 165 pediatric emergency admissions in Jimma university specialized hospital**

Features	Category	Blood Glucose(mg/dl)			P value
		0-40(n=2)	40-180(n=155)	$\geq 180$ (n=8)	
Duration of Illness before admission (days)	<7	0(0%)	105(67.7%)	5(62.5%)	.441
	$\geq 7$	2(100%)	50(32.3%)	3(37.5%)	
Interval of last meal(hrs)	<12	1(50%)	147(94.8%)	7(87.5%)	.141
	$\geq 12$	1(50%)	8(5.2%)	1(12.5%)	
Mental status	Alert	0(0%)	138(89%)	4(50%)	.001
	Impaired	2(100%)	17(11%)	4(50%)	

**Table 5 Outcome of management of pediatric emergency admissions in Jimma university specialized hospital**

Features	Category	Blood Glucose(mg/dl)			P value
		0-40(n=2)	40-180(n=155)	≥180(n=8)	
Length of hospital stay(days)	<1	1(50%)	3(1.9%)	0(0%)	0.022
	1-3	0(0%)	27(17.4%)	1(12.5%)	
	3-7	1(50%)	72(46.5%)	4(50%)	
	≥7	0(0%)	43(27.7%)	1(12.5%)	
	Unknown	0(0%)	10(6.5%)	2(25%)	
Outcome of admission	Alive	0(0%)	122(78.7%)	5(62.5%)	0.009
	Died	2(100%)	14(9%)	1(12.5%)	
	unknown	0(0%)	19(12.3%)	2(25%)	

The mortality in hyperglycemic children was higher than that in normoglycemic children, 1/8 (12.5%) versus 14/155 (9%) respectively (p = 0.009) (Table 5).

In this study sepsis, protein energy malnutrition, gastroenteritis, and malaria were the leading diagnoses associated with

abnormal blood glucose levels. Eight (4.8%) children were hyperglycemic on admission. The main primary diagnoses were protein energy malnutrition (PEM) and gastroenteritis each accounting 25% of cases. None of these children had insulin dependent diabetes mellitus (Table 6).

**Table 6 Distribution of blood glucose concentrations among various among various diagnoses in the 165 pediatric emergency admissions in Jimma University specialized hospital**

Primary diagnosis	All cases	Blood Glucose(mg/dl)		
		0-40(n=2)	40-180(n=155)	≥180(n=8)
Pneumonia	51(30.9%)	0(0%)	50(32.2%)	1(12.5%)
Malaria	8(4.8%)	0(0%)	7(4.5%)	1(12.5%)
Gastroenteritis	12(7.3%)	0(0%)	10(6.5%)	2(25%)
PEM	21(12.7%)	1(50%)	18(11.6%)	2(25%)
Sepsis	11(6.7%)	1(50%)	9(5.8%)	1(12.5%)
Meningitis	4(2.4%)	0(0%)	4(2.6%)	0(0%)
Others	58(58%)	0(0%)	57(36.8%)	1(12.5%)
Total	165(100%)	2(100%)	155(100%)	8(100%)

## DISCUSSION

Six percent of children admitted to Jimma University specialized hospital had an abnormal blood glucose level on admission. Hyperglycemia (4.8%) was more common than hypoglycemia (1.2%). However, there was a strong association between hypoglycemia and mortality.

In the present study, hypoglycaemia was found in 2(1.2 per cent) of the patients. This figure was less than the findings from other African countries. According to the reports of Solomon, et al.,<sup>3</sup> Pershad, *et al.*,<sup>9</sup> Osier, *et al.*<sup>18</sup>, and Elusiyan, et al. <sup>19</sup>, the prevalence of hypoglycemia among all

pediatric emergency admissions were 7, 6.54, 7.3, and 6.4 percent respectively. Many factors might be responsible for observed differences in prevalence such as short study period, small sample size, and few cases of malaria which accounted 4.8 percent of the diagnoses of this study; however malaria was the leading primary diagnosis associated with hypoglycemia in other mentioned studies.

Hypoglycaemia has been reported in bacterial sepsis; it was thought to be due to production of endotoxins which may stimulate insulin secretion. <sup>17, 20, 21</sup> In present study, the diagnoses associated with

hypoglycemia were sepsis and PEM. Eleven(6.7 percent) of cases were having a diagnosis of sepsis, and one out of eleven cases of sepsis was hypoglycemic which made the likelihood of hypoglycemia in sepsis 9 percent . Elusiyan, et al.19 in Nigerian children reported septicaemia as a second major diagnosis with 24 per cent of the hypoglycemic patients having a diagnosis of sepsis. In the present study, the diagnosis of septicaemia was based on clinical assessment, with only a few laboratory investigations.

In this study Protein energy malnutrition was the other diagnosis associated with hypoglycemia. Among 21(12.7%) cases with a diagnosis of PEM in this study, one was hypoglycemic; therefore the possibility of hypoglycemia in children with PEM was 4.8 percent. While Osier, et al.18 in Kenyan children reported PEM as a second primary diagnosis with 6.6% of the hypoglycemic children having PEM as their diagnosis. Among emergency admissions in Nigerian children PEM was the fourth diagnosis associated with hypoglycemia. The observed differences could be attributed to factors like small sample size, and short study period in the present study.

In the present study, there was a statistically significant association ( $p<0.001$ ) between the mental status of the patients and

presence of hypoglycemia. Other researchers 3, 12, 18, 19, 22 had similarly reported a significant association between coma and hypoglycemia on admission. Since altered mental status/coma is one of the clinical presentations of hypoglycemia, all patients with altered mental status should be sought for hypoglycemia.

The result of outcome of management in the present study, showed a worse outcome in the hypoglycemic group. The hypoglycemic group was more likely to stay on admission for shorter duration. This is because they were more likely to die. This association between presence of hypoglycaemia and worst outcome of management was found to be statistically significant ( $p=0.009$ ). This was also the findings of researchers in other studies.3, 16, 18,19, It appears however, that hypoglycaemia, is a function of the severity of illness in childhood, and more severely ill children will be more likely to die than less severely ill ones. It may be very difficult to assert or conclude that it is the presence of hypoglycaemia that causes the death. It may just be enough to say that whenever hypoglycaemia is present in any disease, that case is a severe one, and the risk of dying is higher.

During the acute phase of illness, hyperglycemia may be protective by providing energy to the brain and blood



cells.<sup>11</sup> In the present study, hyperglycemia was found in 8(4.8 per cent) of the patients. This finding was comparable to the findings in other studies. The reports of Osier, *et al.*<sup>13</sup>, and Bhisitkul, *et al.*<sup>23</sup>, assessed the prevalence of hyperglycemia among all emergency admissions, and the findings were 2.9, and 3.8 percent. The cause of hyperglycemia during illness is multifactorial, with the primary contributors being increased gluconeogenesis coupled with increased resistance to insulin-induced glucose utilization. Counterregulatory hormones (hormones opposing the actions of insulin) play an important role. These hormones include cortisol, catecholamines, glucagons, and growth hormone. Stress activates the hypothalamic-pituitary-adrenal axis, leading to the release of cortisol, which impairs insulin-mediated glucose uptake by skeletal muscle and increases gluconeogenesis. Catecholamines inhibit insulin binding and increase hepatic glucose production. Glucagon increases gluconeogenesis, and growth hormone inhibits insulin action by decreasing insulin receptors and impairing insulin activation.<sup>24,25</sup>

The main primary diagnoses found in hyperglycemic children in this study were PEM (25%), gastroenteritis (25%), sepsis (12.5%), pneumonia (12.5%), and malaria (12.5%). While Osier, *et al.*<sup>14</sup> in Kenyan

children reported malaria (49.4%), gastroenteritis (12.9%), lower respiratory tract infection (11.8%), and burns (7.5%) as the main primary diagnoses associated with hyperglycemia.

In the present study, the mortality in hyperglycemic children was higher than that in normoglycemic children, 1/8 (12.5%) versus 14/155 (9%) respectively ( $p = 0.009$ ); and this was in agreement with the findings in other studies.<sup>8,23</sup> In the present study, there was no observed statistically significant association between age and sex of the patients and blood glucose levels. This was also in agreement with the findings of other researches.<sup>12,16,19</sup> Also, no statistically significant difference was observed between the duration of illness before admission and the presence of abnormal blood glucose. There was however an increasing prevalence of hypoglycemia, the longer the duration of illness before admission.

Overall, in this study, hypoglycemia was less common than hyperglycemia but both were associated with worst outcome of management in children with PEM; sepsis was the other diagnosis which was associated with both hypoglycemia and hyperglycemia. Altered mental status was significantly associated with hypoglycemia.

## **CONCLUSION**

Hypoglycemia was less common as compared to hyperglycemia in pediatric emergency admissions to Jimma University specialized hospital but both were associated with poor outcome of management in cases with a diagnosis of protein energy malnutrition. Altered mental status was significantly associated with hypoglycemia. Sepsis was the diagnosis associated with both hypoglycemia and hyperglycemia in pediatric emergency admissions to Jimma University specialized hospital.

## **RECOMMENDATION**

We recommend all medical professionals working in pediatric emergency unit to consider blood glucose determination for all

pediatric emergency admissions to look for the presence of hypoglycemia or hyperglycemia. Glucometer with adequate supply of strips need to be always available in pediatric emergency unites. And serial measurement is important if the child has hypo or hyperglycemia and if the child is seriously sick. In all cases of pediatric emergency admissions with altered mental status hypoglycemia should be sought and managed aggressively if present. Emergency admissions with diagnosis of sepsis and protein energy malnutrition are at increased risk of having abnormal blood glucose; so cases with these diagnoses need more emphasis. And further study with larger samples size and longer duration of study is needed to prove the consistency of the findings of this research.

## REFERENCES

1. Jarjour IT, Ryan CM, Becker DJ. Regional cerebral blood flow during hypoglycaemia in children with IDDM. *Diabetologia* 1995; 38: 1090–95 [MedlineWeb of Science](#)
2. Pagliara AS, Kaul IE, Haymond M, Kipnis DM. Hypoglycaemia in infancy and childhood. *J Pediatr* 1973; 82: 365–79. [CrossRefMedlineWeb of Science](#)
3. Solomon T, Felix TM, Samuel M, et al. Hypoglycaemia in Paediatric admissions in Mozambique. *Lancet* 1994; 343: 149–50. [Medline](#)
4. Cornblath M, Schwantz R. Disorders of carbohydrate metabolism in infancy 2nd edition. WB Saunders, Philadelphia 1976, pp. 3–27 and 345–77.
5. Sperling MA. Hypoglycaemia. In: Behrman RE, Kliegman RM, Aron AM (eds), *Nelson Textbook of Pediatrics*, 18th edn. W.B. Saunders, Philadelphia, 2008; Chapter 92.
6. Bhisitkul DM, Morrow AL, Vinik AI, et al. Prevalence of stress hyperglycemia among patients attending a pediatric emergency department. *J Pediatr* 1994; 124:547–51.
7. Yang SY, Zhang S, Wang ML. Clinical significance of admission hyperglycemia and factors related to it in patients with acute severe head injury. *Surg Neurol* 1995; 44:373–7.
8. Preissig CM, Rigby MR: A disparity between physician attitudes and practice hyperglycemia in pediatric intensive care units in the United States: A survey on actual practice habits. *Crit care* 2010;14:R11
9. Pershad J, Monroe k, Atchison J. Childhood Hypoglycaemia in an urban emergency department: Epidemiology and a diagnostic approach to the problem. *Paediatr Emerg Care* 1998; 14: 268–71.
10. English M, Wale S, Binns G, Mwangi I, Sauerwein H, Marsh K. Hypoglycaemia on and after admission in Kenyan children with severe malaria. *Quart J Med* 1988; 91: 191–97.
11. Faustino E.V., Apkon M.: Persistent hyperglycemia in critically ill children. *J Pediatr* 2005; 146: 30-34.
12. White NJ, Warell DA, Chanthavanich P, et al. Severe hypoglycaemia and hyperinsulinaemia in falciparum malaria. *N Engl J Med* 1983; 309: 61-3. [MedlineWeb of Science](#)
13. Marsh K, Forster D, Waruiru C, et al. Indicators of life-threatening malaria in African children. *N Engl J Med* 1995; 332:1399–404. [PubMed: 7723795]

14. Zijlmans W, Kempen A, Ackermans M, Metz J, Kager P, and Sauerwein H. Glucose Kinetics during Fasting in Young Children with Severe and Non-severe Malaria in Suriname. *Am. J. Trop. Med. Hyg.*, 79(4), 2008, pp. 605-612
15. Taylor TE, Molyneux ME, Wirima JJ, Fletcher A, Morris K. Blood glucose levels in Malawian children before and during the administration of intravenous quinine for severe falciparum malaria. *N Engl J Med* 1988; 319: 1040–46. [MedlineWeb of Science](#)
16. Bennish ML, Azad AK, Rahman O, Phillips RE. Hypoglycaemia during diarrhea in childhood, Prevalence, Pathophysiology and Outcome. *N Engl J Med* 1990; 322:1357–63. [MedlineWeb of Science](#)
17. Wharton B. Hypoglycaemia in Children with Kwashiorkor. *Lancet* 1970; 1: 171–73. [MedlineWeb of Science](#)
18. Osier FH, Berkley JA, Ross A, Sanderson F, Mohammed S, Newton CR. Abnormal blood glucose concentrations on admission to a rural Kenyan district hospital: Prevalence and outcome. *Arch Dis Child* 2003; 88: 621–25.
19. J. B. E. Elusiyan, E. A. Adejuyigbe, and O. O. Adeodu. Hypoglycaemia in a Nigerian paediatric emergency ward. *J Trop Pediatr.* 2006 Apr; 52(2):96-102.
20. Jan IS; Tsai TH; Chen JM; Jerng JS; Hsu HF; Hung PL; Hsueh PR; Lee LN. Hypoglycemia associated with bacteremic pneumococcal infections. *Int J Infect Dis.* 2009; 13(5):570-6
21. Miller SI, Wallace RJ Jr, Musher DM, Septimus EJ, Kohl S, Baughn RE. Hypoglycaemia as a manifestation of sepsis. *Am J Med* 1980; 68: 649–54.
22. Hirshberg E, Lacroix J, Sward K, et al: Blood glucose control in critically ill adults and children: A survey on stated practice. *Chest* 2008; 133:1328–1335
23. Bhisitkul D.M., Vinik A.I., Morrow A.L., et al: Prediabetic markers in children with stress hyperglycemia. *Arch Pediatr Adolesc Med* 1996; 150: 936-941.
24. Ronan A, Azad AK, Rahman O, et al. Hyperglycemia during childhood diarrhea. *J Paediatr* 1997; 130:45–51.
25. Villalpando HS, Hernandez ZA, Vazquez O, et al. Hyperglycemia of the dehydrated infant. *Bol Med Hosp Infant Mex* 1980; 37:185–93.

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# Case Report

## An Extremely Low Birth Weight Female Baby surviving in a Hospital in Addis Ababa

By Atnafu Mekonnen (MD)\*

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### *Case summary*

This case report is about an extremely low birth weight baby who was born to 32yrs old Para-III lady at gestational age of 27<sup>+1</sup> week by date. The delivery was at Girum general Hospital. The mother had two previous pregnancies ended with intrauterine fetal death one at gestational age of 28 weeks and the other at gestational age of 32 weeks due to severe preeclampsia. This pregnancy was planned, wanted and supported.

The mother was having Antenatal Care (ANC) follow up for the current pregnancy and she was told to have hypertension a month back before the termination of the pregnancy for which she was taking medications. The ANC was at Myungsun Christian Hospital. Since it was not possible to control the hypertension, termination of the pregnancy was planed and the mother was given dexamethasone for 48 hrs before the termination.

As soon as termination of the pregnancy was decided, thorough discussion was made with both parents about the possible outcomes.

On14/9/2010, emergency C/S was done for severe preeclampsia. The outcome was an alive female baby weighing 645gm with Apgar score of 5&6 at first and fifth minute respectively. Immediately after stabilization, the new born was transferred to the hospital's Neonatal Intensive Care Unit (NICU).

Immediately after delivery the baby was in severe respiratory distress. It was possible to get surfactant and one dose was given (after termination was thought to be inevitable, parents were told to get surfactant and it was possible to bring it from abroad). With the diagnosis of preterm, extremely low birth weight, severe hyaline membrane disease and cesarean section delivery, she was put on mechanical ventilator, surfactant was given, umbilical catheter inserted, and ampicillin and gentamycin was started. She needed ventilation for two weeks. During he hospital stay she was treated for culture proven sepsis twice. She had apnea of prematurity till 35 weeks of post menstrual age and given aminophylline. During her stay in the hospital, the baby was transfused three times for severe anemia (due to anemia of prematurity). Oral vitamin D and iron was also started. She was oxygen dependent till 4 months of her chronological age. She stayed in the NICU for three months and discharged after arranging oxygen administration at home. The weight at discharge was 1565 gm. At discharge, brain ultrasound, and blood pressure measurement were done and found to be normal. After discharge ophthalmic evaluation was done and there was no evidence retinopathy of prematurity.

The following values indicate the growth and development patterns of the baby:

- *Girum General Hospital ,Addis Ababa Ethiopia*

**Weight:**

At birth- 645gm, At 3 month- 1565gm, At 6months- 3405gm, At 10months- 5600gm, At 15months- 6500gm, At 18months- 8000gm

**Development:**

At 6months- able to support head momentarily.

At 8 months- able to sit with support

At 10months- able to identify family face.

At 18months- able to walk with support and say mama and baba .

**Review of Literatures**

Delivery of Extremely preterm babies can be due to rupture of membranes or as a result of intended delivery for fetal distress and other obstetric complications. Data are showing that preterm deliveries are increasing both in absolute number and as a proportion of all births. For example in England in 2006 alone 0.3% of all births were extremely preterm. Similar trend is being reported in other Western European countries and the USA (1). Side by side the survival of very preterm babies is increasing progressively over the past decades due to the advance of medical care for such babies (2). The advent of modern perinatal and neonatal care has increased the survival rates of these babies to approach 3 in 4 live births. However such children have higher rates of adverse health outcomes and they deserve follow up over time (3). Practices like administration of maternal antenatal corticosteroids, improvements within organized neonatal and perinatal networks, administration of surfactant, maintaining normothermia and acid base balance, preventing hypoglycemia, increased use of non invasive continuous

At 19months-able to speak about 4words and stands without support momentarily.

In conclusion, this baby was born prematurely with extremely low birth weight and stayed in the NICU for 3months; she was treated for culture proven sepsis twice, and had bronchopulmonary dysplasia (she was oxygen dependent for more than 36weeks of the post menstrual age).

The purpose of this case report is to ignite questions in the minds of pediatricians and other professionals working in the field of neonatal care in our country so that we can work together in a better way to improve the outcome of extremely low birth weight babies. Could this baby be the first reported case in our country who has survived with such birth weight?

positive airway pressure than mechanical ventilator and improved neonatal nutritional practices have improved the survival of extremely preterm babies (1).

Whenever delivery of 22-26weeks gestation is expected, periviability counseling to the parents is strongly needed. The counseling process has to be understandable and comforting to the family. It is recommended that hospitals that provide high-risk obstetric and neonatal intensive care should have guide line for periviability counseling which should be informative, supportive and clear to the parents (4).

Extremely premature infants are at risk of developing both immediate and long term morbidities. Immediate neonatal morbidities such as necrotizing interocolitis, respiratory problems, patent ductus arteriosus and sepsis are some of the anticipated problems (1).

Animal study has shown that ventilation can cause pulmonary injury. As a result of the ventilation there is a stress response and release of inflammatory cytokines in small and medium sized airways (5).

The Swedish study found that extremely immature babies are smaller in weight, height and head circumference than matched control groups of children born at term when compared at the age of eleven years old. They exhibit catch-up growth in weight and height up to eleven years but they don't have catch-up growth in head circumference after the first six months of life (6). Similarly the EPICure study has also revealed that extremely premature babies who were born at 25 completed weeks of gestation had lower weight, height, and head circumference compared with full-term classmates when they reach early school age (7). Intracranial hemorrhage particularly cerebroventricular hemorrhage is more frequent in preterm babies than in term infants. Developmental delay, learning difficulties, and behavioral problems also occur more commonly in children who were born extremely premature (8). Rate of cerebral palsy also increases as gestational age decreases in very preterm babies. For those less than 26 weeks of gestational age it ranges from 16-28% and for those less than 32 weeks the range of occurrence is about 6-9%. In very preterm babies cognitive deficit may become more apparent with increasing age. Language and behavioral problem is another sphere of development where such babies are found to have lower than the controls. Visual and hearing disability is also gestation dependent. For example, 10% of those with gestational age less than or equal to 26 weeks were found to have severe visual disability as compared to 2% of those born at greater than or equal to 28 weeks of gestation (9, 10). The Dutch prospective study found out that 12.6% of young adults who were born very preterm and/or with a very low birth weight had moderate or severe problems in cognitive or neurosensory functioning (11).

But a longitudinal study done in Norway indicated that there is no difference in social

functioning and school performance among low birth weight young adults and normal birth weight young adult control groups (12).

Babies who are born with low birth weight are at risk to experience differences including higher blood pressure, lower insulin sensitivity and lower pulmonary function as compared to the normal birth weight babies when they become young adults (13, 14).

Prematurity has also an effect on the lung on long term basis and pulmonary problems are also common immediately after birth. In a prospective cohort study, it was associated with lower FEV1 and exercise capacity in those who are born at gestational age less than 32 weeks and/or birth weight less than 1500gm compared with healthy term control subjects when they become young adults (15, 16, 17). More chest deformity and increased respiratory morbidity is also seen in children born extremely premature as compared to class room controls at the age of eleven years (18).

Bronchopulmonary dysplasia (BPD) is the lung complication that can be anticipated in very preterm babies. Babies with BPD can have an excess of respiratory symptoms at school age and more abnormalities on pulmonary function testing than preterm survivors without BPD (9). Many of the survivors who are born at less than 28 weeks gestational age develop bronchopulmonary dysplasia and some can be oxygen dependent sometimes for years (8). Structural pulmonary abnormalities such as emphysema is also common in such individuals (19).

In chronic neonatal lung disease supplemental oxygen at home is recommended. In such condition oxygen administration at home has many benefits. It reduces or prevents pulmonary hypertension, reduces intermittent desaturations and airway resistance as well as promotes growth and neurodevelopment.

Supplemental oxygen at home is also preferable with regard to the quality of life and psychological impact for the infant and family as compared to hospital stay. Chronic neonatal lung disease is the main reason for administration of oxygen at home. For example, in June 2007, 60% of children who needed home oxygen in England and Wales were due to chronic neonatal lung disease (20). In one study out of those who need supplemental oxygen due to BPD after 36 weeks of post menstrual age, the median duration of oxygen need was up to 2.5 months of age (21).

Retinopathy is another complication seen in extremely premature babies. Ethnic wise screening for retinopathy of prematurity found out that black and Asian preterm babies have a higher risk of developing retinopathy of prematurity compared to the white preterm infants (22).

Mortality of preterm babies is predicted by gestational age and birth weight and there is a progressive decrease in mortality over time except in those less than 24 weeks of gestational age (9). Other factors such as being female sex, adequate administration of antenatal steroids and caesarean delivery are reported to favor increased survival in extreme preterm babies (1).

## **Lessons learned**

With regard to child health, Ethiopia is striving to attain the millennium development goal which is going to end in 2015. Without taking action to reduce neonatal mortality, it doesn't seem that it is possible for the nation to achieve the target for reducing the under five mortality rate. Prematurity is one of the major causes of neonatal death in the country. Hence to attain the millennium development goal with regard to child health, we need to improve the care for preterm babies. I believe that having well staffed and well equipped neonatal intensive care unit is one solution for such a problem. The survival of this baby with such birth weight can be a good testimony for my idea. The baby required mechanical ventilator, several times transfusion, twice treatment for culture proven sepsis, oxygen administration for several months, surfactant administration and intensive follow up and nursing care. All these have contributed to the survival of this baby. To improve the survival of the preterm babies we need to improve the existing neonatal intensive care units and establish new ones, provide continuous medical education for the staff working on the field and make available some drugs like surfactant.



## References

1. Natalie K Yeane, Edile M Murdoch, Christoph C Lees. The extremely premature neonate: anticipating and managing care. *BMJ* 2009; 338:b2325
2. Jennifer Zeitlin, Pierre-Yves Ancel, Dominique Delmas, Gérard Bréart, Emile Papiernik. Changes in care and outcome of very preterm babies in the Parisian region between 1998 and 2003. *Arch Dis Child Fetal Neonatal Ed* 2010;95:F188-F193.
3. Lex W. Doyle, MBBS, MSc, MD, FRACP, Peter J. Anderson, BA, GradDip(AppPsych), PhD. Adult out come of extremely preterm Infants. *PEDIATRICS* Vol. 126 No. 2 August 2010, pp. 342-351.
4. Joseph W. Kaempf, MD, Mark Tomlinson, MD, Cindy Arduza, NNP etal. Medical Staff Guidelines for Periviability Pregnancy Counseling and Medical Treatment of Extremely Premature Infants. *PEDIATRICS* Vol. 117 No. 1 January 2006, pp. 22-29.
5. HILLMAN, NOAH H.; KALLAPUR, SUHAS G.; PILLOW, J JANE etal. Airway Injury From Initiating Ventilation in Preterm Sheep. *Pediatric Research: January 2010 - Volume 67 Issue 1 - pp 60-65.*
6. Aijaz Farooqi, MD, Bruno Hägglöf, MD, PhD, Gunnar Sedin, MD, PhD, Leif Gothefors, MD, PhD, Fredrik Serenius, MD, PhD. Growth in 10- to 12-Year-Old Children Born at 23 to 25 Weeks' Gestation in the 1990s: A Swedish National Prospective Follow-up Study. *PEDIATRICS* Vol. 118 No. 5 November 2006, pp. e1452-e1465.
7. M A Bracewell, E M Hennessy, D Wolke, N Marlow. The EPICure study: growth and blood pressure at 6 years of age following extremely preterm birth. *Arch Dis Child Fetal Neonatal Ed* 2008;93:F108-F114.
8. Lex W. Doyle, Peter J. Anderson. Pulmonary and Neurological Follow-Up of Extremely Preterm Infants. *Neonatology* 2010;97:388-394.
9. David W A Milligan. Outcomes of children born very preterm in Europe. *Arch Dis Child Fetal Neonatal Ed* 2010;95:F234-F240
10. Dieter Wolke, PhD, Muthanna Samara, MSc, Melanie Bracewell, MD, Neil Marlow, MD, EPICure Study Group. Specific Language Difficulties and School Achievement in Children Born at 25 Weeks of Gestation or Less. *The Journal of Pediatrics* Volume 152, Issue 2 , Pages 256-262.e1, February 2008.
11. Elysée T. M. Hille, PhD, Nynke Weisglas-Kuperus, MD, PhD, J. B. van Goudoever, MD, PhD etal. Functional Outcomes and Participation in Young Adulthood for Very Preterm and Very Low Birth Weight Infants: The Dutch Project on Preterm and Small for Gestational Age Infants at 19 Years of Age. *PEDIATRICS* Vol. 120 No. 3 September 2007, pp. e587-e595
12. Morten Duus Odberg, Irene Bircow Elgen. Low birth weight young adults: quality of life, academic achievements and social functioning. *Acta Paediatrica* Volume 100, Issue 2, pages 284–288, February 2011.
13. Morten Duus Odberg, Kristian Sommerfelt, Trond Markestad, Irene Bircow Elgen. Growth and somatic health until adulthood of low birthweight children. *Arch Dis Child Fetal Neonatal Ed* 2010;95:F201-F205
14. Joost Rotteveel, MD, Mirjam M. van Weissenbruch, MD, PhD, Jos W. R. Twisk, PhD, Henriette A. Delemarre-Van de Waal, MD, PhD. Infant and Childhood Growth Patterns,

- Insulin Sensitivity, and Blood Pressure in Prematurely Born Young Adults. *PEDIATRICS* Vol. 122 No. 2 August 2008, pp. 313-321.
15. **Elianne J. L. E. Vrijlandt, Jorrit Gerritsen, H. Marike Boezen, René G. Grevink and Eric J. Duiverman.** Lung Function and Exercise Capacity in Young Adults Born Prematurely. *American Journal of Respiratory and Critical Care Medicine* Vol 173. pp. 890-896, (2006).
  16. Lucia Jane Smith, PhD, Peter Paul van Asperen, MD, Karen Olwyn McKay, PhD, Hiran Selvadurai, PhD, Dominic Adam Fitzgerald, PhD. Reduced Exercise Capacity in Children Born Very Preterm. *PEDIATRICS* Vol. 122 No. 2 August 2008, pp. e287-e293.
  17. Liam Welsh, Jane Kirkby, Sooky Lum et al. The EPICure study: maximal exercise and physical activity in school children born extremely preterm. *Thorax* 2010;65:165-172.
  18. Joseph Fawke<sup>1,\*</sup>, Sooky Lum<sup>2,\*</sup>, Jane Kirkby et al. Lung Function and Respiratory Symptoms at 11 Years in Children Born Extremely Preterm. *American Journal of Respiratory and Critical Care Medicine* Vol 182. pp. 237-245, (2010).
  19. P. M. Wong, A. N. Lees, J. Louw et al. Emphysema in young adult survivors of moderate-to-severe bronchopulmonary dysplasia. *ERJ August 1, 2008 vol. 32 no. 2 321-328*.
  20. I M Balfour-Lynn, D J Field, P Gringras et al. BTS guidelines for home oxygen in children. *Thorax* 2009;64:ii1-ii26.
  21. Enid M Hennessy, Melanie Bracewell, Nicholas Wood. Respiratory health in pre-school and school age children following extremely preterm birth. *Arch Dis Child* doi:10.1136/adc.2008.140830
  22. Anil KV Aralikatti, Arijit Mitra, Alastair K O Denniston et al. Is ethnicity a risk factor for severe retinopathy of prematurity? *Arch Dis Child Fetal Neonatal Ed* 2010;95:F174-F176

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