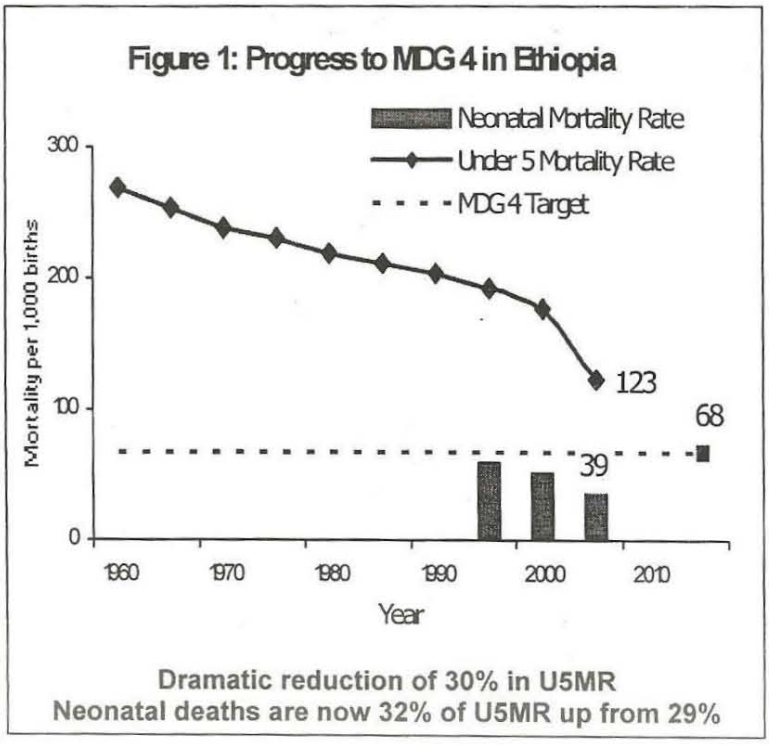
SAVING NEWBORN LIVES: ETHIOPIA

- There are 120,000 neonatal deaths in Ethiopia each year. 85,000 deaths are preventable with the existing care if this reached the poor
- There is dramatic reduction in the under 5 mortality, but less progress in NMR, despite known solutions to save lives
- Saving Newborn Lives/Save the Children US is working with the Ethiopian Ministry of Health and partners to help find sustainable ways to scale up in the Ethiopian context, especially through Health Extension Workers

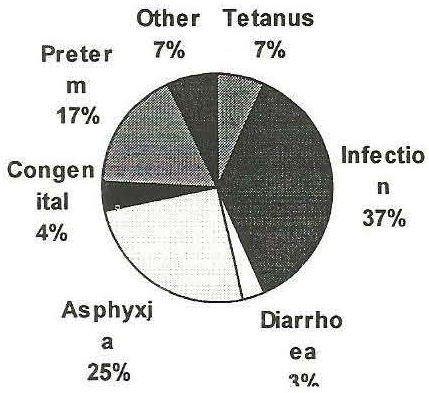
Each year, about 120,000 babies die in the first four weeks of life the neonatal period in Ethiopia. Although the neonatal period is only 28 days, it accounts for 32% of all deaths in children younger than 5 years of age. The risk of death is greatest in the first 24 hours of life, when half of neonatal deaths occur, and some three-quarters of all neonatal deaths occur within the first week of life, the early neonatal period. The 2005 Ethiopia Demographic and Health Survey (EDHS) shows a dramatic 30% reduction in under 5 mortality, and approximately 23% reduction in neonatal mortality rate (NMR) to 39 per 1000 live births, moving closer towards the fourth Millennium Development Goal (MDG) target of reducing under 5 mortality by two thirds by 2015 (Figure 1).

Ethiopia is among the ten countries globally with the highest number of neonatal deaths annually. Moreover within Ethiopia there are substantial disparities in levels of child mortality and coverage of care between different socio-economic strata. The neonatal mortality rate in rural areas of Ethiopia is 41 per thousand live births whereas in urban areas it is 35 per thousand live births (1).



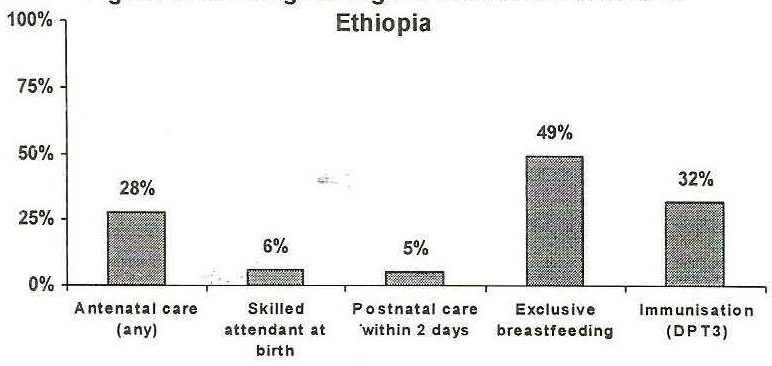
Globally, the main direct causes of neonatal deaths are estimated to be preterm birth (28%), severe infections (26%), and asphyxia (23%). Low birth weight is also an important indirect cause of death. Global epidemiological data suggest that between 60% and 80% of newborn deaths are in small babies (2) Infections, including neonatal tetanus, account for 44% of neonatal deaths in Ethiopia (Figure 2). Asphyxia and preterm birth directly cause 25% and 17% of neonatal deaths, respectively. Another factor that contributes to high neonatal mortality is low birth weight. Some 15% of Ethiopian newborns are born with low birth weight..

Figure 2. Estimated causes of newborn death in Ethiopia



Despite this burden of neonatal mortality, solutions do exist to reduce the 120,000 newborn deaths each year. If essential low-tech cost-effective interventions reached 90% of women and newborns in Ethiopia, up to 85,000 newborn lives could be saved annually. The unacceptably high neonatal mortality rate in the country is attributable to various factors. While in most of Africa the antenatal care (ANC) coverage is at 60% or over, in Ethiopia ANC coverage is 28%, only 1% higher than the last DHS 5 years ago. The vast majority of deliveries (94%) take place at home. Skilled attendance at birth is 10% according to the Federal Ministry of Health (FMOH), but 6% according to EDHS 2005. The 2005 DHS suggests there has been no increase in coverage of skilled attendance in the last 5 years. (Figure 3).Around 15% of women use a traditional birth attendant.

Figure 3: Coverage along the continuum of care in Ethiopia



Antenatal care and early postnatal care is a key opportunity to encourage healthy behaviours, especially in the home and community. Early recognition and care seeking for newborn danger signs is one of the well identified sets of behaviors that would significantly reduce neonatal

mortality (3). In Ethiopia, caretakers' lack awareness of danger signs (4) and mothers' delayed care-seeking for children, particularly for newborns, at health facilities is low (1).

In developing countries, World Health Organization (WHO) recommends parenteral antibiotic therapy[1] in a health facility for treatment of serious neonatal infections (5-7). In low resource settings like Ethiopia, where the majority of births occur at home and families rarely seek care outside the home for neonatal illness, treatment with antibiotics at a hospital is currently not a feasible strategy to reach severely ill neonates. Therefore, alternative community-based management strategies are needed.

In an attempt to improve access to primary health care, the FMOH recently implemented a Health Extension Program (HEP). With its focus on the rural areas where the majority of the population resides, the HEP is considered as one of the most important institutional frameworks for achieving the MDGs. A central strategy of the HEP is the collaboration between Health Extension Workers (HEW) and volunteer community health promoters (CHP). Curative service at health posts is restricted to treatment of malaria, oral rehydration therapy (ORT) for diarrhea, de-worming, and first aid. As curative service is limited at the health post, the health center constitutes the first point of referral (8).

[1] Eg, benzylpenicillin or ampicillin plus an aminoglycoside such as gentamicin.

Given high neonatal mortality rates in Ethiopia, lack of caretaker awareness of danger signs in newborns, limited curative service at health posts, and barrier to accessing treatment at health centers, the current HEP framework does not adequately address the needs of neonates suffering from infections. Under National IMNCI guidelines, HEW are allowed to assess and classify sick neonates (9). But neonates who require antibiotic treatment are referred to a higher level of care, a hospital. Most of these sick neonates will not reach the referral site due to barriers of distance, time, and cost required for travel. As a result, nearly 95% of neonates die at home without receiving proper treatment (10). Considerable evidence from Asia has demonstrated that NMR can be significantly reduced from infection management at home and in the community.

A meta-analysis of community-based trials of case management of pneumonia in Africa and Asia showed a neonatal mortality rate (NMR) reduction of 27% (11). The antibiotic regime used in the trials was mainly oral co-trimoxazole, although two studies included injectable penicillin. A study in rural India (12) reported a 62% reduction in the NMR with a home-based package for neonatal sepsis that included gentamicin injections by community health workers, although this reduction may be related to a number of simultaneously introduced interventions in addition to the gentamicin. There

is also evidence from India, Bangladesh, and Nepal that community health workers can effectively manage neonatal infections at home (11-13).

Saving Newborn Lives has been actively promoting newborn health and survival in Ethiopia since 2002. Establishing partnerships and advocating for the inclusion of newborn health issues in policy and program documents were important roles played by Save the Children USA (SC-US) under the first phase of Saving Newborn Lives (SNL-1). Successful partnerships with FMOH, UNICEF and professional bodies such as Ethiopian Pediatric Society (EPS) and Ethiopian Nurse Midwives Association led to major shifts in policy. Participation in national task forces and working groups, sponsoring and hosting conferences and workshops, lobbying and briefing about SNL-1 at relevant forums and distribution of reference materials on essential newborn care to universities, regional health bureaus and other partners were the major activities to increase partnership and the visibility of newborn issues in Ethiopia and to ensure the inclusion of newborn health issues in policy documents. As a result, the newborn issues are included in the National Child Survival and Reproductive Health strategy documents, in the HSDP III document and in the REDUCE advocacy tool.

SC-US played an important role in the national maternal and neonatal tetanus education campaign during 2003-05. SC-US conducted important formative research about barriers to clean birth practices and tetanus coverage and used this information to design, produce and distribute behavioral change communication (BCC) materials as part of a social mobilization campaign to improve coverage in key parts of the country. Tetanus toxoid coverage in the campaign zones resulted in reaching a total of 2.8 million women of reproductive age receiving at least 2 doses.

SC-US tested the training materials for Home Based Life Saving Skills (HBLSS) in conjunction with American College of Nurse Midwives (ACNM). Results of the field test demonstrated a strong capacity for family guides and traditional birth attendants to remember important messages and skills to recognize problems, apply first aid steps, and refer women and neonates with complications. TAKE ACTION cards and messages during delivery and in conversations with expectant mothers improved birth attendant practices and referrals.

Under the umbrella of the second phase of Saving Newborn Lives (SNL-II), several groups in Ethiopia are eager to address newborn health and are seeking the best way in which to implement such programs within the FMOH infrastructure to continue to reduce the neonatal mortality rate. A community-based treatment of neonatal infections integrated into the current IMNCI strategy will be implemented and tested in two zones in Oromia and SNNP regions. Save the Children/SNL and John Snow, Inc. (JSI) will jointly implement this project in col-

laboration with other partners including the FMOH, EPS, universities, WHO and UNICEF. Given the combination of Save the Children's rich experiences from its and partner programs under SNL - I and JSI's ongoing work in IMNCI and Community Health Promotion in the FMOH context, the project management team is well positioned to take a leadership role in this first-of-its-kind intervention in Ethiopia.

The project will work within the framework of the HEP and its focus on mobilization of and collaboration with community volunteers to promote improved household practices and demand for services. Specifically the project will address the improvement of safe delivery and essential newborn care practices in the home, identification and referral of sick neonates for the treatment of infections by the HEW, strengthening HEW skills to encourage and support CHPs efforts to improve neonatal care in households, and building capacity of Woreda and health center staff to ensure supervision of HEWs as well as the provision of essential drugs and supplies to health posts. As health posts are situated in rural communities, caretakers and newborns that have traditionally had little access to health services will be the beneficiaries of this intervention.

Community-based delivery of antibiotics within the national IMNCI framework, specifically through the HEP, has the potential to fill the current knowledge gap regarding the effectiveness, feasibility, and acceptance of home-based treatment of neonatal infections and bring about a significant reduction of the high neonatal mortality rate in Ethiopia and bring rapid progress toward MDG 4.

Another important aspect of this intervention will be to establish a simple and timely notification system between CHPs and HEWs for the identification of pregnant women, births, and the identification and referral of sick neonates with the active participation of families. Building upon the strong collaboration that has been witnessed between HEWs and CHPs in communities, HEWs will train and support CHPs for promotion of antenatal care, birth preparation, safe delivery, essential newborn care, optimal breastfeeding, vitamin A for mothers, immunizations, recognition of danger signs in sick neonates, and prompt care seeking. Currently in Ethiopia, much of the evidence-based and cost-effective life saving interventions do not reach the majority of women, newborn and children and when available are not received in a timely manner. However, the policy environment for better coordination and collaboration in the provision of maternal, newborn and child health services and reduction of complications during pregnancy, childbirth and the postnatal period has improved. It is therefore important to keep this momentum for building and strengthening partnership among the stakeholders to coordinate and harmonize efforts to improve the survival of Ethiopia's newborns.

Action steps for paediatricians to improve newborn health in Ethiopia

- Advocate for more attention for increased attention and investment in newborn health issues as today's newborns are Ethiopia's next generation
- Commit to improving the quality of care for newborns in your own practice
- Consider getting a group of like-minded paediatricians together to discuss how to improve newborn care – the International Paediatric Association together with EPS are piloting a network of paediatricians concerned about newborn health.

Contact Dr Bogale Worku or Dr Amha Mekasha for more information

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DIABETIC KETOACIDOSIS DURING INFANCY: TWO CASE REPORTS

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INTRODUCTION

Diabetes mellitus is a syndrome of disturbed energy homeostasis caused by a deficiency of insulin or of its action and resulting in abnormal metabolism of carbohydrate, protein & fat. It is the most common endocrine metabolic disorder of childhood & adolescence with important consequences on physical & emotional development. Morbidity & mortality stem from metabolic derangements and from long term complications that affect small & large vessels.

With few exceptions, Diabetes in children is due to Type I Diabetes Mellitus (Insulin dependent DM) and it is characterized by severe insulinopenia and dependence on exogenous insulin to prevent ketosis and preserve life. Diabetic ketoacidosis (DKA) is responsible for the initial presentation of many (approximately 25%) diabetic children (1). The incidences of type 1 diabetes mellitus is rapidly increasing and show a trend toward earlier age onset. The incidence is highly variable among different ethnic groups. The overall age-adjusted incidence varies from 0.7/100,000 per year in Karachi to about 40/100,000 per year in Finland (2). Even though diabetes during infancy is not unusual the clinical presentation in these cases and the early age at onset necessitates a high index of suspicion to diagnose them and salvage their life.

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Case 1

This is an 11 and ½ months old male child from Addis Ababa who was brought by his parents with the major complaint of high grade fever and persistent vomiting of ingested material of 1 day duration. Otherwise she had no cough or grunting, no diarrhea, skin lesions, yellowish discoloration of the eye or any urine color change. She does not have any recent travel to a malarious area. No family history of diabetes mellitus.

On physical examination (P/E) the patient was sick looking with pulse rate (PR) of 136beats/min and respiratory rate (RR) of 48/min. Temperature was 38.7°C. No apparent sings of dehydration. The only impressive finding was on central nervous system examination which revealed irritability with constant cry. In this infant as there was no focus for the fever and as she was irritable with constant cry the first thing considered was meningitis. With this impression lumbar puncture (LP) was done and the diagnosis of DKA was suggested by an elevated cerebrospinal

fluid (CSF) glucose level which was 369 mg/dl. Then the random blood sugar (RBS) was determined and it was > 450 mg/dl.

Case 2

This is an 11 month old female child from Addis Ababa who was brought to a Hospital by her father with a two days history of high grade intermittent fever and repeated episodes of vomiting of non bilious, ingested material. She also had runny nose. Otherwise she had no cough or grunting, no diarrhea, skin lesions, yellowish discoloration of the eye or any urine color change. She lives

in non malarious area and she does not have any recent travel to a malarious area. For the above complaint she was taken to two other clinics where she was given Amoxicillin in the first clinic & ceftriaxone in the second one despite which her condition worsened and she became progressively weak and later non- communicating. She had no history of abnormal body movement, trauma to the head or prior history of toxin ingestion or drug intake apart from those mentioned above. No family history of Diabetes mellitus. She was fully immunized according to the EPI schedule.

On P/E she was acutely sick looking, with temperature of 36^0C PR= 136/min weak RR=54/min Weight = 7.8 kg

Sunken eyeballs and had whitish coat over the tongue. No bulging fontanel. Tympanic membrane and tonsils were normal. On chest examination she had intercostals retractions but clear to auscultation. She was tachycardic otherwise abdominal and genitourinary examinations were non- revealing except abdominal skin pinch which goes back slowly. On CNS examination she had spontaneous eye opening but not responding to painful stimuli. Pupils were bilaterally equal & reactive to light.

With the clinical impression of DKA to rule out meningitis the following investigations were done.

RBS was greater than 450 mg/dl.

Urinalysis revealed Glucose ++, Ketone ++, pus cells 2-3.

CSF analysis showed no cells, no gram stainable organism but the glucose was 388 mg/dl. Blood film for hem parasites was negative. The white blood cell count was 20,700/mm^3 with differential of lymphocyte 59% & neutrophils 41%.

Chest X-ray was normal.

Both cases were admitted to Tikur Anbessa hospital with the diagnosis of DKA and managed with fluids, electrolytes and insulin therapy and sent home after stabilization of their condition. Currently they are on Regular & Lente insulin on twice daily bases.

DISCUSSION

Diabetes Mellitus is reported to occur starting from the neonatal age group (2). It can occur as a transient or permanent phenomenon. But the onset of persistent Type I Diabetes Mellitus before the age of 6 months is most unusual. When Type I DM occurs during infancy there is an increased incidence of Diabetic ketoacidosis (DKA) at first presentation. DKA is a state of severe metabolic decompensation which is manifested by over production of ketone bodies & ketoacids resulting in metabolic acidosis, usually accompanied by hyperglycemia. In any child DKA should be considered if he/she presents with new onset of the following symptoms: abdominal pain, vomiting, dehydration, Kussmaul respiration or altered mental status.

The early manifestations may be relatively mild and consist of vomiting, polyuria & dehydration. In more prolonged and severe cases deep & fast breathing (Kussmaul respiration) are present. Abdominal pain or rigidity may be present and may mimic Appendicitis or pancreatitis. With disease progression cerebral obtundation and ultimately coma ensue. Laboratory findings include glucosuria, ketonuria, hyperglycemia, ketonemia & metabolic acidosis. Leukocytosis is common. Fever in a subject with DKA warrants evaluation and treatment for possible underlying infection. Blood, Urine & Throat cultures and Chest X- Ray films should be obtained. Lumbar puncture is

performed only if meningitis is suspected and even then should be done with caution because intracranial pressure is often increased.

The management of Type I DM may be divided into three phases depending on the initial presentation: that of ketoacidosis; the post acidotic or transition period for establishment of metabolic control; and the continuing phase of guidance of the diabetic child and his or her family. In DKA the immediate aims of therapy are expansion of the intravascular volume, correction of deficits in fluids, electrolytes, and acid-base status, and initiation of insulin therapy to correct intermediary metabolism. The major life threatening complication in children treated for DKA is cerebral edema.

Cerebral edema remains a leading cause of death in diabetic children, accounting for ≈ 31% of deaths associated with DKA (3).

Prompt recognition of the condition as it evolves, and prompt therapy with mannitol and hyperventilation can be life saving.

In infancy during the transition period and subsequently management is complicated by the difficulty in administering small doses of insulin, monitoring blood glucose, complementing insulin administration with feedings, and hypoglycemia. The potential for brain damage with unrecognized episodes of hypoglycemia is always a concern in infants. The most important factors in the management of hypoglycemia are an understanding by the patient and family of the symptoms and sign of the reaction, especially of the patient's individual pattern, and avoidance of known precipitating factors. Patients with diabetes presenting at 6-24 months might be associated with a different clinical pattern and higher rate of celiac disease than diabetes presenting later in life (4). Therefore during follow-up the infant should be evaluated for such occurrence.

The physician should be aware of the psychosocial issues involving the family of an infant with diabetes. Optimism and ongoing support should be provided to the family, so that the infant can grow up healthy.

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