Original articles
Cystic echinococcosis in children: A 5 year retrospective analysis at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia.…………………………………………...1
Tinsae Alemayehu, Workeabeba Abebe

Clinical presentation, cause, and short-term outcome of children with status Epilepticus in Tikur Anbessa Specialized Hospital Addis Ababa, Ethiopia: A 5-year retrospective cross-sectional study ……………………………………………………………8
Mahlet Abayneh, Tigist Bacha

Birth Injury and associated factors in Jimma University Specialized Hospital, Southwest Ethiopia …………………………………………………………………………………..19
Workneh Tesfaye, Netsanet Workneh, Eshetu Girma

Prevalence of disclosure of HIV positive status and its predictors among children and adolescents with HIV infection attending the paediatric infectious disease clinic at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia ……………………………………….32
Tigist Argaw, Etsegenet Gedlu

Follow up-outcomes of HIV-exposed infants born at health centers in Amhara and Tigray regions of Ethiopia………………………………………………………………………………..43
Solomie Jebessa Deribessa, Bud Crandall, Elke Koninings, Dagnew Muluneh

Case Report
Tuberous Xanthoma :A Rare Presentation of Familial Hypercholesterolemia……………………………56
Bereket Fantahun, Tesfaye Deme

Instruction to Authors………………………………………………………………………………………61
The Ethiopian Journal of Pediatrics and Child Health aims to contribute towards the improvement of child health in developing countries, particularly in Ethiopia. The journal publishes original articles, reviews, case reports pertaining to health problems of children.

Editorial board
- Damte Shimelis, MD Editor-in-chief
- Etsegenet Gedlu, MD, Member
- Nigussie Deyessa, MD, MPH, PhD Member
- Birkneh Tilahun, MD Member
- Tsinuel Girma, MD, PhD Member
- Mulugeta Betre, MD, MPH, DLit et Phil Fellow
- Tigist Bacha, MD, MPH. Member
- Rebecca Zewdie, Secretary
Table of contents

Cystic echinococcosis in children: A 5 year retrospective analysis at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia.................................................................1
*Tinsae Alemayehu, Workeabeba Abebe*

Clinical presentation, cause, and short-term outcome of children with status Epilepticus in Tikur Anbessa Specialized Hospital Addis Ababa, Ethiopia:
A 5-year retrospective cross-sectional study ...............................................................8
*Mahlet Abayneh, Tigist Bacha*

Birth injury and associated factors in Jimma University Specialized Hospital, Southwest Ethiopia .................................................................19
*Workneh Tesfaye, Netsanet Workneh, Eshetu Girma*

Prevalence of disclosure of HIV positive status and its predictors among children and adolescents with HIV infection attending the paediatric infectious disease clinic at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia .................................32
*Tigist Argaw, Etsegenet Gedlu*

Follow up-outcomes of HIV-exposed infants born at health centers in Amhara and Tigray regions of Ethiopia.................................................................43
*Solomie Jebessa Deribessa, Bud Crandall, Elke Koninings , Dagnew Muluneh*

Case Report
Tuberous Xanthoma :A Rare Presentation of Familial Hypercholesterolemia..............................56
*Bereket Fantahun, Tesfaye Deme*

Instruction to Authors.................................................................................................61
ORIGINAL ARTICLE

CYSTIC ECHINOCOCCOSIS IN CHILDREN: A 5 YEAR RETROSPECTIVE ANALYSIS AT TIKUR ANBESSA SPECIALIZED TEACHING HOSPITAL, ADDIS ABABA, ETHIOPIA

Tinsae Alemayehu*1, Workeabeba Abebe1

ABSTRACT

Background: Cystic echinococcosis (hydatid cyst) is one of the neglected tropical diseases diagnosed in Ethiopian children. The aim of our study was to describe characteristics of pediatric hydatid cyst admissions to Tikur Anbessa Specialized Teaching Hospital.

Methods: We reviewed records of 17 pediatric admissions with a diagnosis of hydatid cyst over a 5 year period (September 2010 – September 2015). We analyzed the socio-demographic characteristics, clinical presentations, and diagnostic features of the children and also studied their treatment outcomes and associated complications.

Results: The average age of the children was 7 years and 2 months. The most common location identified for the cysts were the lungs (13 patients). The most common chief complaints were cough and chest pain. The average size of cysts was 6.35 cm in diameter. The most common complications were super-infected cysts. All recovered with a combination of Albendazole and surgical treatment.

Conclusions: Cysts were commonly diagnosed in the lungs and male children outnumber females. Early presentation and diagnosis of CE prevents associated complications. This study also raises awareness of this neglected illness as a cause of chronic respiratory or abdominal complaints in Ethiopian children.

Key words: Hydatid cyst, Echinococcus granulosus, Lung cyst

INTRODUCTION

Echinococcus granulosus is a cestode infection responsible for cystic echinococcosis (CE). Cystic echinococcosis is one of the major neglected tropical diseases in Ethiopia. Children dwelling around dogs and other domestic animals are at risk of acquiring the illness. Humans get infected by ingesting eggs passed in the feces of dogs1. Though usually asymptomatic, it can lead to symptomatic cysts leading to compression of structures. Hydatid cysts can involve the liver, lungs and rarely in other parts of the body. The lung is the most common anatomic location for pediatric CE while adults mostly have hepatic cysts. Some studies attribute this due to the high elasticity and compressibility of pulmonary tissue and thus a faster growth of hydatid cysts in lungs than liver2-5.

Cystic echinococcosis can complicate by super-infections, metastases, rupture with anaphylaxis and recurrence. Diagnosis of the
larvae in the intermediate hosts, especially in humans, is mainly by imaging and immuno-
logic techniques\(^{(5)}\). For smaller cysts (less than 5 cm), a 1 – 6 month regimen of benzimidazoles can suffice. A combination of PAIR (percutaneous aspiration followed by instillation of a scolicidal agent and re-aspiration) or surgery; along with benzim-
idazoles is the recommended treatment for larger cysts \(^{(6)}\).

Since untreated hydatidosis can have disas-
trous complications, it is necessary to under-
stand the pattern of the illness in Ethiopian children. Hence, this study was performed with the aim of presenting our 5 years clinical experience in the diagnosis and manage-
ment of cystic echinococcosis in children.

**METHODS**

In this retrospective study, we studied all children diagnosed and treated for cystic echinococcosis in TikurAnbessa specialized hospital from September, 2010 to September, 2015. There were 17 patients in total (10 males and 7 females) enrolled in the study. Medical record books and discharge summaries of patients admitted in the pediatric wards over the specified period of time were reviewed. Information concerning socio-
demographic data, epidemiologic risk fac-
tors, clinical presentation, results from inves-
tigative modalities (including size & location of cysts and associated complications) and outcomes of medical and surgical treatment were recorded accordingly. Descriptive statistics were used to analyze results.

**RESULTS**

**Demographic data**

In this study, we reviewed the records of all children diagnosed with hydatid cyst from September 2010 up to September 2015. Totally 17 children, out of which 10 males and 7 females, with hydatid cysts were referred to this centre in a period of 5 years. The average age of patients was 7 years and 2 months, which in males was 6 years and 8 months and in females was 7 years and 10 months. Half of the children were from the Oromo ethnic group. The religion of the children’s families was Muslim 4 (23.5%), Orthodox Christians 3 (17.7%) and religion was undocumented in 10 (58.8%). Out of 17 patients 4 were from Addis Ababa, 4 from Oromia region, 3 from Amhara, 2 from Southern nations nationalities and peoples region (SNNPR) and 1 from Ethio-Somali region. Residences of the rest were undocumented.

**Clinical presentation and risk factors**

The most common anatomic location observed in the patients was isolated lung involvement in 11/17(64.6%) of children while in 2/17 children the location was the liver. 10/17 children were males and 7/17 were females. Multi-organ involvement was seen in 2 cases (cysts were found in the lung and the liver. The gender distribution and location of the cysts in the lobes of the lungs is as shown in table 1.
The chief complaints of 7 patients with lung cysts were cough while 5 complained of chest pain. A right upper quadrant abdominal pain was seen in 3 of the 5 children having abdominal cysts (liver, mesenteric or splenic). The mean duration of symptoms at time of presentation of all children was 7 months and 6 days. Major complaints are shown in Table 2. A history of animal contact was observed in 4 children. 3 of them had contact with dogs but 1 child had contact with cats and another with cattle.

**Table 1:** gender distribution and location of lung cysts in children who were treated at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia

<table>
<thead>
<tr>
<th>Location of cysts in the lungs</th>
<th>Males (%)</th>
<th>Females (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right middle &amp; lower lobes</td>
<td>1 (11.1%)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Right hilum</td>
<td>1 (11.1%)</td>
<td>1 (25%)</td>
<td>2</td>
</tr>
<tr>
<td>Left upper lobe</td>
<td>1 (11.1%)</td>
<td>1 (25%)</td>
<td>2</td>
</tr>
<tr>
<td>Left lower lobe</td>
<td>1 (11.1%)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Left upper &amp; lower lobes</td>
<td>1 (11.1%)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Both right and left lungs</td>
<td>1 (11.1%)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Undocumented location in lungs</td>
<td>0</td>
<td>1 (25%)</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>4</td>
<td>13</td>
</tr>
</tbody>
</table>

**Table 2:** symptoms at presentation of children with cystic echynococcosis in children who were treated at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>No of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough</td>
<td>3</td>
<td>23.1%</td>
</tr>
<tr>
<td>Chest pain</td>
<td>1</td>
<td>7.7%</td>
</tr>
<tr>
<td>Cough and chest pain</td>
<td>5</td>
<td>38.4%</td>
</tr>
<tr>
<td>Cough and fever</td>
<td>3</td>
<td>23.1%</td>
</tr>
<tr>
<td>Hemoptysis</td>
<td>1</td>
<td>7.7%</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>3</td>
<td>42.8%</td>
</tr>
<tr>
<td>Abdominal swelling</td>
<td>1</td>
<td>14.3%</td>
</tr>
<tr>
<td>Sweating</td>
<td>2</td>
<td>28.6%</td>
</tr>
<tr>
<td>Palpitation &amp; exercise intolerance</td>
<td>1</td>
<td>14.3%</td>
</tr>
</tbody>
</table>
**Diagnosis: Laboratory & imaging features**

Overall, the disease was diagnosed before surgery in 9 patients (52.94%). The pre-surgery diagnosis was pulmonary tuberculosis in 27.3% of cases of pulmonary cystic echinococcosis. Other pre-surgical diagnoses considered for the lung hydatid cysts were a mediastinal mass (1 patient), bronchogenic cyst (1), and pulmonary cyst (1).

Laboratory examinations showed anemia and an elevated erythrocyte sedimentation rate (ESR) in 5 patients each; leukocytosis in 3 and neutrophilia in a further 3 children. Eosinophilia was seen in none of the cases. Elevated liver enzymes were seen in all children with abdominal cysts.

Radiological examinations showed 23 cysts in total in 17 patients. 5 of the pulmonary cysts were found in the left lung; of which 2 were on the upper lobe, 2 in the lower lobe and 1 involving both lobes. In the right lung, there were 4 cysts (2 in the right hilum, 1 in the right lower lobe, and 1 involving both right middle and upper lobes). Bilateral cysts occurred in 1 patient. Chest x-ray descriptions of the lung hydatid cysts included parenchymal masses, loculated effusions and hilar densities. But chest X-rays could diagnose only 7.7% of all pulmonary hydatid cysts. Ultrasonography and CT scans proved more accurate forms of diagnosis of CE, with 80% and 100% accuracy respectively. Of the hydatid cysts identified by a chest ultrasound, 6 were noted to have an irregular, double wall. Daughter cysts were noted in 1 child. Chest CT showed a ruptured cyst in 1 child and confirmed an infected hydatid cyst in another. Abdominal ultrasounds performed on cysts diagnosed in the liver, spleen and mesentery showed double walled cysts in 2 patients with a further 2 having daughter cysts.

The number of cysts in patients was varying from the minimum of 1 to the maximum of 3 in each patient and the average was 1.35. The average number of cysts in males was 1.5 and in females was 1.14 in each person. Multiple cysts were detected in 4 children (23.5%). The biggest dimension of cyst was 11.8 cm in its maximum diameter and the smallest was 1.8 cm in its maximum span. The average maximum diameter of the cysts was 6.35 cm (Among males it was 6.36 cm and among females it was 6.69 cm). Pulmonary cysts were found to have a larger average size (6.06 cm) than liver cysts (5.15 cm).

**TREATMENT AND COMPLICATIONS**

Pre-surgery albendazole treatment was given for 88.2% of the patients; for a mean duration of 4 months and 1 day with no toxicities detected. Follow-up ultrasound was not done to assess changes in size of cyst but none disappeared. Following surgery, 64.7% of patients received albendazole treatment for a mean duration of 4 month and 7 days.

Surgery was done in 13 patients with no mortalities; with the remaining being lost to
follow-up before being assessed for surgical treatment. Pre-operative complications in relation to the hydatid cysts were seen in 10 children. All 5 children with isolated lung cysts were assessed to have super-infected cysts. The presentation of 3 children with isolated pulmonary cysts was that of recurrent respiratory tract infections. Recurrence was noted in one child who had been diagnosed with a right lung CE and given albendazole (duration: undocumented). A ruptured cyst was documented in one patient while 3 had metastases to other organs.

**DISCUSSION**

The clinical characteristics and prevalence of CE in Ethiopian children is virtually unstudied. In this study, we evaluated all pediatric CE cases admitted to TikurAnbessa specialized hospital from September, 2010 to September, 2015. Most children in our study were males. In contrast, a female predominance was seen in Khalif et al’s study. This was also shown in the study conducted by Assefa et al in Addis Ababa (7,8). We postulate the male predominance in our study to be related to behavioral risks among boys concerning herding livestock and increased contact with domestic animals like dogs and cattle.

In contrast to adult reports from Ethiopia as well as African and Asian studies, the lungs are more affected in our hospital’s pediatric admissions. 76.4% of our cases had pulmonary cysts; either isolated or in conjunction with extra-pulmonary CE. This is also reflected in Iranian and South African pediatric admissions (9,10). This might be due to earlier symptom onset and early presentation of the space-occupying cysts in lung tissue which has less resistance to the more compact organs like the liver, which oppose cyst growth. The same explanation can be given to the larger size of pulmonary cysts in our patients as compared to hepatic cysts.

Multi-organ involvement was seen in 11.8% of cases in our study. This is in agreement with pediatric admissions’ report from Iran (15.2%) but much lower than corresponding figures in South Africa (38.1%). Hydatid cysts can rarely be found in organs like the kidney, heart, brain, peritoneum, lesser sac and extremities (9,10). In our study, we identified cysts located in the mesentery, spleen and the heart (inter-ventricular septum).

We found that the major presenting symptom of pulmonary cysts was cough followed by chest pain. Other symptoms were hemoptysis and fever in pulmonary CE and abdominal pain and swelling in extra-pulmonary CE. This is in accordance with findings in Aslanabadi’s study from Tabriz, Iran and Celebi’s study from Turkey (10,11). Among our children, 29.4% had secondarily infected hydatid cysts. This is a high incidence in comparison with reports from Iran (15.3%). Only 1 (5.88%) had a recurrence, much
lower than observed in Sjostrand and Ols-son’s report from China (20%) and Androni-kou et al’s figures from South Africa (61.9%)(9,10,12). Multiple cysts were identified in 23.5% of our patients which is higher than Tantawy’s description of Yemeni pediatric cases (6.7%). This might be due to a more delayed presentation to our hospital; which was on average 7 months and 6 days (12). Diagnosis of CE is significantly aided by imaging. Ultrasonography and computed topographyscans had a high level of accuracy in the diagnosis of our cases. This is echoed in a review from China (with almost all of the cysts in 56 patients being diagnosed by an ultrasound)(13). All of our patients recovered with a combination of Albendazole and surgical treatment.

Limitations: this is a retrospective chart review and incomplete documentation of information and missed patient records are the drawbacks of this study.

CONCLUSION

As exhibited in pediatric case summaries reported from elsewhere, we observed a predominance of lung hydatid cysts among our patients; with cough being the dominant presenting symptom. More males were diagnosed with cystic echinococcosis. Diagnosis using ultrasound and CT scan proved highly accurate. More than half of our cases involved complicated cysts and close to a quarter had multiple cysts. Delayed presentations may have contributed for both and as such, we hope that this study will raise awareness of this neglected illness as a cause of chronic respiratory or abdominal complaints in Ethiopian children.

ACKNOWLEDGMENTS

The authors thank Tikur Anbessa Specialized Hospital, Addis Ababa; and Dr.Endale Tefera, Associate professor and consultant pediatric cardiologist, Department of Pediatrics, School of medicine, Addis Ababa University for their kind support.

REFERENCES


ABSTRACT

Background: Status epileptics (SE) has an increased incidence and poor outcome in resource-limited countries where infectious disease like malaria, meningitis are in higher rates and where also health care system is limited. Researches in this setting are limited particularly in pediatrics. We aimed to see the clinical presentation, causes and short-term outcome of children with SE.

Methodology: A 5-year cross-section study was conducted from January 2005 to January 2010. Children with age above 1 one month and age less than 13 years were included. Data entered and analyzed with SPSS version 16.

Result: Eighty-nine patients were found during the study period. Generalized tonic-clonic seizure was the commonest type of seizure (74.8%). Only 28% arrive within 2 hours of onset of seizure. There was a previous history of seizure disorder in 34 (38.2%) of the cases. Temperature greater than 38°C was documented for 40 (44.9%) patients at presentation. From the febrile group at presentation 26/40 (65%) had an acute central nervous system (CNS) infection who were previously neurologically normal. Patients with acute CNS infection had pyogenic meningitis in 18 (69.2%), CNS Tuberculosis 5 (19%) and viral meningitis 3 (11.5%) cases. None of the patients received intravenous anti-epileptic drug except diazepam; 51 (57.3%) patients discharged improved with no squeal, 32 (36.0%) had a neurologic deficit (5 were having a neurologic abnormality at admission), there were 6 (6.7%) deaths. All deaths occur in acute symptomatic SE. HIV infection was found to be statically associated with poor outcome p-value < 0.05.

Conclusion and recommendation: Most of the patients with SE arrived late to hospital and mortality was found to be high in acute symptomatic SE. To improve patient care and outcome there should be health education and improve the care of symptomatic SE like providing intravenous anticonvulsant.

*1 Assistant professor in pediatric and child health, St Paul’s Hospital Millennium Medical College
*2 Assistant professor in pediatric and child health, consultant pediatric emergency and intensive care, Addis Ababa University
INTRODUCTION

Status epilepticus (SE) is a common neurological emergency that is associated with high morbidity and mortality. SE is defined as a condition in which there is either greater than 30 min of continuous seizure activity, or two or more sequential seizures without recovery of full consciousness between the seizures [1]. SE is classified as convulsive (CSE) and no convulsive status epilepticus (NCSE). CSE is a clinical diagnosis while an electroencephalogram (EEG) is required to diagnose NCSE. CSE has better prognosis among the two and can be further classified based on the clinical picture as generalized and partial. [2]

The estimated incidence of childhood status epilepticus (SE) is between 17 to 23 episodes per 100,000 per year. [3] Incidence rates, causes, and prognosis vary substantially by age. The incidence of status epilepticus is said to be higher in children as compared to adults and in younger children as to the older children. [4] There is a higher incidence in developing countries than the developed ones. Status epilepticus is common in patients admitted to hospitals in resource-poor countries (RPC). This is said to be due to lack of health care and a higher incidence of infectious disease. In sub-Saharan Africa, the high incidence of febrile illnesses might influence the incidence and outcome of CSE. The mortality associated with CSE in RPC is greater (11-15%) both in adults and children, but the long-term outcome in terms of premature mortality and neurocognitive sequel are undetermined. [5]

SE can be a complication of acute illness such as encephalitis, malaria or can occur as a manifestation of epilepsy. Between 10 and 20 % of children with epilepsy will have at least one episode of SE. SE occurs as the first seizure in 12% of children with epilepsy. Nearly a quarter of persons presenting with SE have preexisting epilepsy. In one-third of patients with a preexisting seizure disorder, no obvious precipitating factor can be identified for the occurrence of SE. Genetic factors are also risk factors for the development of status epilepticus. [6, 7]

STATEMENT OF THE PROBLEM

Ethiopia is one of the sub-Saharan countries where the incidence of infectious disease is high including meningitis, malaria, HIV, etc. which all contribute to high incidence of SE there is also a limitation in both diagnostic and management modalities of SE. There are no studies done on SE in pediatric patients previously in Ethiopia.

OBJECTIVE

To determine clinical presentation, causes, short-term outcome of status epileptics and its determinants.
PATIENTS AND METHODS

Tikur Anbessa specialized hospital is a teaching hospital for undergraduate and postgraduate students. In addition to teaching, the hospital gives both inpatient and outpatient service to patients referred from different parts of the country. The pediatric emergency department is the place for the management of acute and emergency conditions in those less than 13 years a definition for pediatrics age for the Hospital. In addition, patients are also admitted to the wards, based on the need for admission and the diagnosis. Patients who have chronic illness will have their visit from Monday to Friday on the appropriate follow-up a clinic. Neurology and seizure clinic are parts of these follow-up clinics where patients with different neurologic problems or seizure disorders are seen on Tuesday and Thursday respectively.

In this study 89 patients were included who were admitted to pediatric emergency unit, pediatrics ward, intensive care units with diagnosis of SE. Admission diagnosis was taken from the record book of specific wards. The cards of all patients with seizure disorder and neurologic problem on follow up at the neurologic clinic were revised to see if they were admitted for status epileptics in the time of the study period. Data was collected regarding the socio-demographic status, clinical presentation, laboratory result and outcome of patients by trained data collectors using pretested and modified questionnaire. The questionnaires were checked for completeness by the supervisor and principal investigator. Patients excluded from the study are those less than 1 month (since neonatal seizure is different), greater than 13 years (because this age group was seen in adult side), incomplete recording and unclear diagnosis. Data was cleaned and entered using SPSS-16, analyzed by univariate, bivariate, and logistic regression.

OPERATIONAL DEFINITION

Status epilepticus: is defined as a condition in which there is either greater than 30 min of continuous seizure activity, or two or more sequential seizures without recovery of full consciousness between the seizures

Acute symptomatic SE: Status epilepticus in a previously neurologically normal child, within a week of an underlying cause including central nervous system (CNS) infection, encephalopathy, traumatic head injury, cerebrovascular disease, and metabolic derangements or toxic injuries.

Febrile Status epilepticus: that develops in a previously neurologically normal child between the ages of 6 months and 5 years during a febrile illness apart from CNS infection.

Remote symptomatic: Status epilepticus in the absence of an identified acute insult but with a history of a pre-existing neurological abnormality more than 1 week before disorders.
**Idiopathic/cryptogenic SE:** is SE not symptomatic and occurs in a child with no prior neurological disorder or in a child in whom no neurological findings were detected via history physical examination and investigations.

**Unclassified:** Convulsive status epilepticus that cannot be classified into any other group.

**Short-term outcome:** condition of the patient at discharge from hospital.

**Neurologic squeal:** development of neurologic deficit at discharge like hemiplegia or mono paresis which was not there at admission.

**Delayed response to treatment:** no response after 2 hours of treatment.

The level of consciousness at initial evaluation was divided into conscious, lethargic (arousable and responsive), stuporous (arousable but not responsive), and comatose (un arousable).

Outcome at hospital discharge was recorded as improved (returned to baseline), deteriorated (alive but substantially impaired relative to baseline clinical condition), and died.

**Ethical considerations**

Data collection was started after written legal permission obtained from the department of Pediatrics and Child health and Addis Ababa university-Medical Faculty institutional review board.

**RESULT**

Data for 89 patients admitted with a diagnosis of SE in 5 years were analyzed. Of this 52 (58.4%) were males. Sixty-eight (76.4%) were from Addis Ababa. The age distribution was 22.5% were 1-12 months, 50.6% were 13-60months and the remaining 27% were greater than 60 months. Socio-demography and clinical profile are seen in Fig 1 and Table 1.

---

**Fig 1**  Sex and age distribution of Frequency of SE
Table 1: Clinical presentation of patients in relation to outcome

<table>
<thead>
<tr>
<th>Clinical profile</th>
<th>Total</th>
<th>Improved</th>
<th>Neurologic squeal</th>
<th>Died</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-12</td>
<td>20</td>
<td>8(9%)</td>
<td>9(10.1%)</td>
<td>3(3.4%)</td>
</tr>
<tr>
<td>13-60</td>
<td>45</td>
<td>26</td>
<td>16</td>
<td>3</td>
</tr>
<tr>
<td>&gt;60</td>
<td>24</td>
<td>17</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Time to treatment in hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;2</td>
<td>25</td>
<td>13</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>2-12</td>
<td>46</td>
<td>29</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>&gt;12</td>
<td>17</td>
<td>9</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Type of seizure:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generalized</td>
<td>66</td>
<td>43</td>
<td>19</td>
<td>4</td>
</tr>
<tr>
<td>Partial</td>
<td>13</td>
<td>6</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Partial with secondary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generalization</td>
<td>8</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Unknown</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Condition on arrival</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscious</td>
<td>7</td>
<td>2</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Convulsing</td>
<td>32</td>
<td>15</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>Lethargic</td>
<td>23</td>
<td>18</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Comatose</td>
<td>26</td>
<td>15</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Glasgow coma scale on arrival</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;8</td>
<td>45</td>
<td>23</td>
<td>19</td>
<td>3</td>
</tr>
<tr>
<td>9-12</td>
<td>28</td>
<td>21</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>&gt;13</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>unknown</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Previous history of</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>34</td>
<td>21</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Seizure disorder</td>
<td>No</td>
<td>55</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Preceding neurologic deficit</td>
<td>Yes</td>
<td>5</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>84</td>
<td>51</td>
<td>27</td>
</tr>
<tr>
<td>HIV Infection</td>
<td>positive</td>
<td>3</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>negative</td>
<td>25</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>61</td>
<td>43</td>
<td>15</td>
</tr>
</tbody>
</table>
In children, less than 12 months acute symptomatic status epilepticus was seen in 11 (55%) of cases followed by a febrile seizure. Remote symptomatic and idiopathic/cryptogenic SE was the commonest cause for children greater than 12 months 11.4% and 50.2% respectively.

**ETIOLOGY**

The most common cause of SE identified was idiopathic/cryptogenic 36 (40.4%) cases, followed by acute symptomatic 27 (30.3%), remote symptomatic 19 (21.3%), febrile seizure 6 (6.7%) and one case was unclassified.

Among the acute symptomatic cases pyogenic meningitis was the commonest 18 (20.2%), TB meningitis 5 (5.6%), viral meningitis and traumatic brain injury 3 cases each (3.4%) and one case each for hypoxic brain injury secondary to intraoperative cardiac arrest, hypoglycemia in a patient who had prior history of seizure and intracranial metastasis of acute lymphoblastic leukemia. Among patients with remote symptomatic cases 11 (12.4%) perinatal insult was suspected as a cause based on history and physical examination they also had clinically suspected cerebral palsy. (Table 2 )

Table 2: Organic causes identified in children with status epilepticus who presented to Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia

<table>
<thead>
<tr>
<th>Causes</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute symptomatic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyogenic meningitis</td>
<td>18</td>
<td>20.2</td>
</tr>
<tr>
<td>Tb meningitis</td>
<td>5</td>
<td>5.6</td>
</tr>
<tr>
<td>Viral meningoencephalitis</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>Traumatic brain injury</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>ALL with CNS metastasis</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Hypoxic brain injury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remote symptomatic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspected perinatal insult</td>
<td>11</td>
<td>12.4</td>
</tr>
<tr>
<td>Hypoxic encephalopathy</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>Congenital brain abnormality</td>
<td>1</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Time of arrival for treatment was less than 2 hours in 25 (28.1%) of cases, 2-12 hours in 46 (57%), greater than 12 hours in 17 (19.1%) of cases and unknown in 1 (1.1%) case. The most common seizure type observed was generalized seizure 66 (74.2%) followed by partial 13 (14.6%), partial with secondary generalization 8 (9%) of cases and 2 (2.2%) unknown.
The previous history of seizure disorder was seen in 55 (61.8%) of the cases where 5 (9.1%) discontinue their medication, 3 (5.4%) were taking a low dose of anticonvulsant, 5 (9.1%) presented with status epilepticus for the first and the rest 42 (76.3%) were taking the recommended drug and dose when they develop SE.

INVESTIGATIONS
Lumbar puncture was done for 61 (68.5%) patients the result was abnormal in 16 (26%). Random blood sugar was normal for 78 (87.6%), 1 patient has hypoglycemia and in the rest of (11.2%) not done. Serum electrolyte was done for 40 (44.9%) and 4 patients were having an abnormal result. Blood film was done for 41 patients all are negative. EEG was done for 21 patients after control of seizure and 19 (21.3%) has abnormal finding. CT was done for 20 cases and abnormal in 5 (25%) of cases. MRI was done only for 3 cases and all were abnormal. Serum anticonvulsant level was not determined for all of the patients.

OUTCOME AND COMPLICATIONS
Of the total number 51 (57.3%) discharged improved with no squeal, 32 (36.0%) had a neurologic deficit of which 5 were having a neurologic abnormality at admission, there were a total of 6 (6.7%) deaths. Complications were seen in 11 (12.3%) patients aspiration pneumonia 9 (10.1%) and renal failure in 2 (2.2%). Outcome neurologic squeal and death were analyzed for different variables. Neurologic squeal occurred 9 (45%) in age group less than 12 month, 16 (35.6%) in age group 13-60 month and 7 (29.2%) in greater than 60 months. Death occurs in 6 patients all less than 60 months.

Generalized CSE occurred in 66 (74.2%) of cases, partial seizure occurred in 13 (14.6%) the least common identified was partial seizure with secondary generalization accounting 8 (9%) of cases, and in one case type of seizure is unknown. Both neurologic squeal and death were high in partial seizure with secondary generalization type 5 (62.5%) and 1 (12.5%) respectively. Patients who presented with convulsion and coma neurologic squeal occurred in 15 (46.9%) and 8 (30.3%) of cases. Fifty percent of patients who presented with coma had died. A total of 40 (44.9%) patients had fever on arrival and 5 (83.3%) of the deaths were febrile. Neurologic squeal and death occurred in 50% of cases whose seizure control took greater than 12 hours. Acute symptomatic cases and remote symptomatic were associated with high neurologic squeal contributing 13 (40.6%) and 15 (46.9%) of cases.

All deaths occur in the acute symptomatic group. No neurologic squeal or death occurred in febrile SE and idiopathic/cryptogenic cases.
TREATMENT
Drugs used for the management of SE were diazepam and Phenytoin in 45 (50.6%) of cases, diazepam and Phenobarbitone in 18 (20.2%) and diazepam, Phenytoin and Phenobarbitone in 19 (21.3%) cases in the rest of the cases carbamazepine, valproate or clonazepam was also added. In all 89 cases, diazepam was given intravenously and Phenobarbitone, Phenytoin, and the other anticonvulsants were given via NG tube. We tried to analyze time taken for the control of seizure it showed that >12hrs in 38 (42.7%) of cases, 2-12 hrs in 35 (39.3%) of cases, 30min-2hrs in 13 (14.6%) and 2 cases less than 30 minute and was unknown for one case.

DISCUSSION
The objective of the study was to analyze the clinical presentation, causes, outcome and determinants of outcome. In the definition of status epilepticus, there were different controversies the currently accepted definition for epidemiological studies is the 30-minute criteria. (8) The higher incidence is seen in those less than 12 months followed by 12-60 months the age difference was also seen in other studies done in London and Kenya. (9, 10) in our study, there is male sex predominance which is also seen in other studies. (9-10)
Duration of seizure before arrival to treatment was greater than two hours in 65 (76.1%) of cases delay in treatment was also seen in the research done in Ethiopia on adult patients in 1997. (11). This could be due to limited number of referral hospitals in the country to treat such emergency conditions and lack of accessible transport system like ambulance to every community.
The most common seizure type found in our study was generalized seizure followed by partial seizure. Idiopathic/cryptogenic status epilepticus was the commonest 40.4% cause of SE in our study where other risk factors are ruled out. The same finding was seen in a retrospective study done in Korean children where generalized seizure was the commonest type and idiopathic status epilepticus accounted for 40% of the causes in all age group. (12)
There is a significant difference on etiologies based on the age of the patient in our study. In children, less than 12 months acute symptomatic and febrile status epilepticus were the commonest causes and in those greater than 12 months idiopathic/cryptogenic and remote symptomatic are the causes frequently seen. Similar finding was also seen in study done in Turkey were children less than 2 years were found to have SE due to acute symptomatic and prolonged febrile seizure. (13) Another retrospective study done in New York, SE was found to be common in less than 2 years which was greater than 40% with more than 80% of the cases having acute symptomatic or febrile origin whereas in children greater than 2 years remote symptomatic and idiopathic where the commonest cause. (14)
In our finding for the remote symptomatic precipitating factors seen was fever with no CNS infection but in most cases it was not identified. In idiopathic/cryptogenic cases for some SE was entry for diagnosis, the rest are known epilepsy patients most taking properly their medication and few came after discontinuation of their medication. On those who are said to be taking drugs the information was taken from the cards which were documented based on the patients or attendants report since serum level is not determined.

Among acute symptomatic CNS infection was the commonest top being pyogenic meningitis 20.2%, followed by TB meningitis 5.6% and viral in 3.4%. This is also seen in other studies that CNS infections are common causes in especially in sub-Saharan Africa where there is a high incidence of malaria and other infectious causes due to low socioeconomic status. (5) The absence of malaria in our study could be due to since most patients are from Addis Ababa which said to be malaria free or the other factor may be the preventive methods which are being done against malaria.

There was a descriptive study done in Pakistan which showed acute symptomatic epileptic being commonest cause of SE, its specific causes being viral meningoencephalitis (32%), pyogenic meningitis (3.2%) a tubercles meningitis 2.4% which is also the cause for our set up even if pyogenic meningitis is the leading in our set up 20%.

All deaths occur in age group less than 60 months. And high death rate is found in those less than 12 months. No death was seen in greater than 60 months. The higher death rate in this age group is related to the etiologies where most of the cases are due to acute symptomatic. There was also no death in the remote symptomatic, idiopathic and febrile status epilepticus. Neurologic squeal were also high in acute symptomatic and age less than 12 months. Staticky significance association with the p value less than 0.05 was seen between etiologies and outcome. Similar studies done in different areas had also demonstrated the same association. In the Korean study, neurologic squeal and death were strongly associated with seizure type. (12) Also in research was done in France death and neurocognitive squeal were dependent on age and etiology. (16) We have a clinical association with age, duration of seizure, type of seizure, condition at presentation and time to control seizure with the poor outcome but no statistically significant association is seen.

The drug most commonly used was diazepam in almost all patients and it was administered IV in all cases. Followed by Phenytoin loading and maintenance 50.6%, in 20% phenobarbital was used, in patients whose response was longer Phenobarbitone and Phenytoin were used 21.3%. Based on our finding 82% of cases took greater than 2 hours to control their seizure.
The explanation may be due to the use of oral anticonvulsants which are less effective the other is a recording problem since progress notes are not written frequently especially in the pediatric emergency OPD and follow up sheets are not attached when patients are discharged. Due to these factors, this finding doesn’t go with research done in south Africa to analyze the efficacy of oral phenobarbitone which showed Seizure control was documented within 1 h (n=8), 1 1/2 h (n= 1), 3 h (n= 1) and 4 h (n= 5) following enteral phenobarbitone loading. No adverse effects were apparent from the enteral phenobarbitone administration Patients tolerated enteral loading with phenobarbitone. A single enteral loading dose resulted in adequate phenobarbitone exposure.

CONCLUSION AND RECOMMENDATION

The commonest age group with status epilepticus in our set up is children less than 1 year. Idiopathic SE is frequently seen cause. Mortality was found to be higher in children less than 1 year. Acute symptomatic causes are most frequently in less than 12 months with high mortality. Meningitis was the common cause for acute symptomatic cases. Delayed response to treatment more than 2 hours is seen in 82% of patients. Accessibility to parenteral anticonvulsants (phenytoin and phenobarbital) is vital to improving the response. Measuring serum antiepileptic drugs is important for patients with status epilepticus and it would be good if it is done in Tikur Anbessa Specialized Hospital.

REFERENCES


ORIGINAL ARTICLE
BIRTH INJURY AND ASSOCIATED FACTORS IN JIMMA UNIVERSITY SPECIALIZED HOSPITAL, SOUTHWEST ETHIOPIA

Workneh Tesfaye, Netsanet Workneh, Eshetu Girma

ABSTRACT

Background: Birth injury including perinatal asphyxia is the most preventable cause of neonatal mortality and morbidity in developing countries. Little can be done for a baby affected by birth injury especially in severe perinatal asphyxia. Hence, full attention to reduce them to an absolute minimum should nowadays be the golden standard.

Objectives: To assess magnitude of birth injury and its associated factors in Jimma University Specialized Hospital.

Design: Cross sectional study was conducted at JUSH labour wards from April to May 2014. Data were collected using structured data collection format at postnatal ward. The data analyzed using SPSS version 20 and frequency tables were constructed and association of birth injury with different variables was checked with multivariate logistic regression analysis.

Results: Among the study population 61% of the newborns were males. Birth injury was diagnosed in 42 (15.4%) of the newborns that can be sub-grouped to perinatal asphyxia 22 (8.1%) and mechanical birth trauma 22 (8.1%). Two newborns sustained both asphyxial and mechanical birth injury. Scalp injury was diagnosed in 63.6% of the newborns with birth trauma. Birth injury was associated with place of residence, parity, fetal presentation, fetal position, fetal distress, route of delivery (vaginal) and need of resuscitation.

Conclusion: The magnitude of birth injury is nearly comparable to the results found in most other developing countries but significantly higher than those in developed countries. Place of residence, parity, fetal presentation, fetal position, fetal distress; route of delivery and need of resuscitation were found to be associated with birth injury.

Key words: Birth injury, perinatal asphyxia

1Department of Paediatrics and Child Health, Jimma University, Email: konetsanet@gmail.com
2Department of Preventive Medicine, School of Public Health, Addis Ababa
BACKGROUND

Birth injury including perinatal asphyxia is the most important preventable cause of neonatal mortality and morbidity in developing countries. (1) According to the 2001 World Health Organization (WHO) estimates birth injury accounts about 29% of the Neonatal deaths only surpassed by neonatal infections. (2) Birth injury encompasses any systemic damages incurred during labour and delivery processes. Birth injury can occur before labour, during labour or postnatally during resuscitation. Birth injuries can be divided into those due to lack of oxygen (asphyxia) or due to physical trauma during the birth process (birth trauma). Thus these types of injuries (perinatal asphyxia and birth trauma) can occur separately or in combination. (3-5)

Birth asphyxia is an important cause of neonatal morbidity and mortality especially in less developed nations. About 3% of 130 million newborns delivered globally each year are asphyxiated and from these around 1.2 million die and the same number develop severe consequences, such as epilepsy, cerebral palsy, and developmental delay. (6) Newborns with low Apgar scores can have problems with their pulmonary, cardiovascular, central nervous system, gastrointestinal and renal system. (7, 8)

The Criteria for the assessment of asphyxia in many studies have been non-specific. The World Health Organization has defined perinatal asphyxia as a “failure to initiate and sustain breathing at birth”. (9) But according to American academy of Pediatrics (AAP) and American college of Obstetrics and Gynecology (ACOG), all the following must be present for designation of perinatal asphyxia. The criteria are profound metabolic or mixed academia (pH< 7.00) in cord, Persistence of Apgar scores 0-3 for longer than 5 minutes, neonatal neurologic sequelae (eg, seizures, coma, hypotonia), and multiple organ involvement (eg, of the kidney, lungs, liver, heart, intestine). (10) When resources are lacking like in developing countries, perinatal asphyxia can be crudely assessed by use of the Apgar score that is measured at 5 minutes. Apgar scores at 10 minutes provide useful prognostic data before other evaluations are available. (11)

Birth trauma also affects different parts of newborn during delivery. The spectrum of the common types of birth injuries (trauma) ranges from CNS trauma to skin and other soft tissue injuries. Superficial injury to the skin is the most common birth related trauma. Bruising, petechiae, and abrasions can occur on the scalp or on any other presenting part during passage through the bony pelvis or from instruments used in delivering the newborn.

Extracranial injuries like caput succedaneum and Cephalohematomas are the most common type of birth related head trauma. Nerve injuries can occur with different degree of
severity that varies from edematous compression to laceration. Injuries to the upper extremity including clavicular and humeral fractures may occur. Clavicular fractures are the most common fractures in newborns and usually associated with injury to brachial plexus. Humeral fracture is the most common long bone fracture. (4, 12-14)

The incidence of birth injury has great variation among developing and developed countries and is related to many factors that can be broken into three groups: maternal, delivery and baby related factors. Among the maternal factors are small maternal stature and the presence of maternal pelvic anomalies where as the newborn factors are macrosomia, post-maturity and malpresentation. The delivery factors which may have adverse effect on labor outcome include induction of labor, shoulder dystocia and operative vaginal delivery. Even though, birth injuries are suggested to be mostly due to difficult vaginal delivery especially shoulder dystocia and use of instruments, some of the injuries can occur in the absence of any predisposing factors. It has been suggested that despite optimal care, birth-related injury can occur with normal, uncomplicated hospital births. (4,12-14)

A newborn who has sustained birth injury is a great concern for the parents, obstetrician, pediatrician and as well as for the public health experts. Little can be done for a baby affected by birth injury especially severe perinatal asphyxia. Identification of high risk deliveries prior to labour, the use of less harmful obstetrical instruments and techniques as well as Cesarean sections delivery can decrease the incidence of birth injury. (1, 15) Now a day’s neonatal mortality is decreasing significantly globally. But compared to developed countries; the rate of birth injury remained high in developing countries. There are very few epidemiological data on birth injury in Ethiopia.

**OBJECTIVE:**
To assess magnitude and types of birth injuries as well as factors associated with birth injuries in JUSH

**METHODS**

**Study design**- Cross sectional study was conducted in Jimma University Specialized Hospital. The hospital serves as referral teaching hospital and located at about 352KM southwest of Addis Ababa. Annually on average about 4000 deliveries are conducted in the hospital.

The study was conducted starting from beginning of April to beginning of May; 2014. All live born newborns that were born during the study period at JUSH and have no major malformations were included in the study. After checking for completeness, data was entered to the computer and verified. Data was analyzed using SPSS version 20. Frequency tables were constructed. Associations between birth injury and independent variables were computed using logistic
regression analysis. The data collectors were trained before embarking in data collection process to have common understanding about the variables of interest. Structured data collection format was used and completeness has been checked after every session of the data collection.

**Setting:** The study was conducted in Jimma University Specialized Hospital labor ward.

**Participant:** Permission and ethical clearance was granted from the university institutional ethics review board as well as hospital administration. The data was collected after verbal or written consent was taken from the mother or other responsible care giver. All live born neonates that were born during the study period at Jimma University Specialized Hospital and have no major malformations were included in the study.

**Operational definitions**

**Birth injury:** any newborn who has diagnosis of perinatal asphyxia, birth trauma or both.

**Perinatal asphyxia:** diagnosed as usual hospital routine practice based on the Persistence of Apgar scores 0-3 for longer than 5 minutes, and /or neonatal neurologic sequela (eg, seizures, coma, hypotonia ).

**Mild perinatal asphyxia:** if baby suspected of PNA and may be jittery or hyper alert, with increased muscle tone and poor feeding.

**Moderate perinatal asphyxia:** diagnosed if baby suspected with PNA and may be lethargic and have feeding difficulty with occa-

sional episodes of apnea and/or convulsions.

**Severe perinatal asphyxia:** if baby suspected of PNA and may be floppy or unconscious with convulsions and frequent apnea and does not feed. (16) If the newborn with perinatal asphyxia was diagnosed as stage I, II and III, data were recorded as mild, moderate and severe perinatal asphyxia respectively.

**Birth trauma:** any physical injury to parts of the newborn during birth process that can be identified by clinical evaluation.

**Fetal malpresentation:** refers to any non-vertex fetal presentation (face, brow or breech)

**Fetal malposition:** refers to any fetal position in labour that is not right occipitoanterior, occipitoanterior and left occipitoanterior

**Fetal distress:** if non-reassuring fetal heart rate pattern diagnosed in laboring mother

**Major congenital malformations:** are anatomic abnormalities which are severe enough to reduce life expectancy or compromise normal function such as neural tube defects.

**Antenatal care:** if the mother had at least one health institutional visit for the pregnancy.

**Data sources** - the data were collected from maternal chart that was documented at admission to the labour room or delivery summary after the mother has gave birth. But data related to educational status, place of residence other Sociodemographic variables that were not documented during intrapartal evaluation were collected verbally.
**Study size and technique**- All liveborns delivered at Jimma University specialized Hospital during the study period, who have no major malformations were the candidates for the study. The sample size calculated was 272 live newborns.

**RESULT**

Among the study population 61% of the newborns were males. The minimum birth weight recorded was 1200 grams where as the maximum birth weight was 4900 grams with mean birth weight of 3190 grams. From the total newborns 13.2% were low birth weight (LBW) and 4.8% were macrosomic. The proportion of postterm babies were only 2.2% where as preterm constitute 11.4% of the study population. Among study population 13.2% of the newborns had low 5th minute Apgar score (score of 0-7) but only 5 newborns (1.8%) had 5th minute Apgar score in 0-3 range. The 10th minute Apgar score was recorded for 30 newborns of which 13 (43.4%) had a score of 0-7 at 10th minutes.

From the total newborns, birth injury was diagnosed in 42 (15.4%) of the newborns. Two of the newborns had both perinatal asphyxia and birth trauma. About 11.4% of the newborns had 5th minute Apgar score of 4-7 and the remaining 86.8% had the 5th minute Apgar score of 8-10. The diagnosis of different degree of perinatal asphyxia was made in 8.1% of the newborns from which 72.7% of the newborns were diagnosed with moderate PNA. From the total newborns 8.1% of the newborns had clinical identifiable birth trauma with different degree of injuries contributing about 52.4% of the total birth injury. From those newborns with birth trauma, Scalp injury was diagnosed in 63.6% and skeletal and other birth traumas make up the remaining injuries. Among 14 newborns diagnosed with scalp injuries, 33.3% had bruising, 20.0% Subgaleal hemorrhage and the remaining 46.7% had other forms of scalp injuries.

Among the lists of risk factors of perinatal asphyxia, hypertensive disorder of pregnancy and cephalopelvic disproportion were the only identified risk factor in 1.1% and 2.7% of the mothers respectively. Majority of the mothers 156 (57.4%) who gave birth at JUSH during the study period lives outside of Jimma town and 23.9% of the mothers have no education and 76.1% had completed primary school or more. Most of the mothers (90.8%) were aged from 19-35 years but 5.5% were aged eighteen or below. Seven percent of the mothers delivered at JUSH during the study period were reactive for HIV antibody and 51.1% were not screened for HIV. About 74.6% of the mothers came after referred from health institutions and 258 (94.9%) of the mothers had at least one antenatal care visit during their pregnancy. More than half of the mothers (60.7%) were multiparous. The average duration of labour...
was 11.7 hours and 7.4% of mothers delivered by elective Caesarean section before labor begins for the different anticipated complications. Forty five (16.5%) and sixty (22.1%) of laboring mothers had diagnosis of fetal malpresentation (non-vertex) and fetal malposition during intrapartal evaluation respectively. Among 43 fetuses with diagnosis of meconium staining, 11.8% had grade II or III meconium stained liquor. Intrapartal fetal distress was diagnosed in 18.8% of the newborns. From the total newborns, 44.8% were born by caesarean section from which 16 (13.1%) were elective C/S. (Table 1)

Table 1: Pregnancy and labour related factors JUSH July, 2014

<table>
<thead>
<tr>
<th>Variables</th>
<th>frequency</th>
<th>percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source of referral</td>
<td>Health institution 203</td>
<td>74.6%</td>
</tr>
<tr>
<td>Self referral</td>
<td>69</td>
<td>25.4%</td>
</tr>
<tr>
<td>ANC</td>
<td>yes 258</td>
<td>94.9%</td>
</tr>
<tr>
<td>No</td>
<td>14</td>
<td>5.1%</td>
</tr>
<tr>
<td>Parity</td>
<td>Primiparous 108</td>
<td>39.7%</td>
</tr>
<tr>
<td>Multiparous</td>
<td>164</td>
<td>60.3%</td>
</tr>
<tr>
<td>electve</td>
<td>20</td>
<td>7.4%</td>
</tr>
<tr>
<td>Onset of labour</td>
<td>Spontaneous 235</td>
<td>86.4%</td>
</tr>
<tr>
<td>induced</td>
<td>17</td>
<td>6.3%</td>
</tr>
<tr>
<td>Fetal position</td>
<td>Normal fetal position 212</td>
<td>77.9%</td>
</tr>
<tr>
<td>Fetal Malposition</td>
<td>60</td>
<td>22.1%</td>
</tr>
<tr>
<td>Fetal presentation</td>
<td>Vertex 227</td>
<td>83.5%</td>
</tr>
<tr>
<td>Non-vertex</td>
<td>45</td>
<td>16.5%</td>
</tr>
<tr>
<td>Meconium stained</td>
<td>No 229</td>
<td>84.2%</td>
</tr>
<tr>
<td>yes</td>
<td>43</td>
<td>15.8%</td>
</tr>
<tr>
<td>Diagnosis of fetal distress</td>
<td>No 221</td>
<td>81.3%</td>
</tr>
<tr>
<td>yes</td>
<td>51</td>
<td>18.8%</td>
</tr>
<tr>
<td>Mode of delivery</td>
<td>Vaginal 150</td>
<td>55.1%</td>
</tr>
<tr>
<td>C/S</td>
<td>122</td>
<td>44.9%</td>
</tr>
</tbody>
</table>
According to the result of bivariate analysis of birth injury with maternal, pregnancy and labour related factors as well as neonatal factors, it was found to associated with some of the variables different degree of associations. It was associated with Place of residence (P< 0.05), source of referral (P< 0.03) and parity (P< 0.03). It was also associated with fetal position (p <0.001), fetal presentation (P< 0.001) and need of resuscitation (P<0.001).

Table 2: Birth injury with maternal, pregnancy and labour related factors JUSH July, 2014

<table>
<thead>
<tr>
<th>Variables</th>
<th>Birth injury</th>
<th>COR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outside Jimma town adm.</td>
<td>126(80.8%)</td>
<td>30(19.2%)</td>
</tr>
<tr>
<td>Within Jimma town adm.</td>
<td>104(89.7%)</td>
<td>12(10.3%)</td>
</tr>
<tr>
<td>Source of referral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health institution</td>
<td>166(81.8%)</td>
<td>37(18.2%)</td>
</tr>
<tr>
<td>Self</td>
<td>64(92.8%)</td>
<td>5(7.2%)</td>
</tr>
<tr>
<td>Primiparous</td>
<td>85(78.7%)</td>
<td>23(21.3%)</td>
</tr>
<tr>
<td>Multiparous</td>
<td>145(88.4%)</td>
<td>19(11.6%)</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal fetal position</td>
<td>188(88.7%)</td>
<td>24(11.3%)</td>
</tr>
<tr>
<td>Fetal malposition</td>
<td>42(70.0%)</td>
<td>18(30.0%)</td>
</tr>
<tr>
<td>Fetal position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertex</td>
<td>203(89.4%)</td>
<td>24(10.6%)</td>
</tr>
<tr>
<td>Non-vertex</td>
<td>27(60.0%)</td>
<td>18(40.0%)</td>
</tr>
<tr>
<td>Intrapartal fetal distress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>190(86.0%)</td>
<td>31(14.0%)</td>
</tr>
<tr>
<td>Yes</td>
<td>40(78.4%)</td>
<td>11(21.6%)</td>
</tr>
<tr>
<td>Route of delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal</td>
<td>126(84.0%)</td>
<td>24(16.0%)</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>104(85.2%)</td>
<td>18(14.8%)</td>
</tr>
<tr>
<td>Need of resuscitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No need of resuscitation</td>
<td>195(88.6%)</td>
<td>25(11.4%)</td>
</tr>
<tr>
<td>Needed resuscitation</td>
<td>35(67.3%)</td>
<td>17(32.7%)</td>
</tr>
</tbody>
</table>

When the different variables were checked for one class of birth injury, perinatal asphyxia, it was found that place of residence (p <0.05), fetal position (p < 0.001), fetal presentation (p < 0.001), degree of meconium staining (p <0.03), vaginal delivery (p< 0.02) and need of resuscitation (p <0.001) were associated. When the other class of birth injury: birth trauma was checked with different variables; fetal presentation and route of delivery were associated (p <0.001).
delivery were found to be associated (p < 0.009).

Antenatal care visit, maternal educational status, birth weight and sex of the newborn were not found to be associated with birth injury in general or with each category of birth injury i.e. perinatal asphyxia and birth trauma.

Birth injury was found to be associated with place of residence with (p < 0.05), fetal presentation (p<0.001) and route of delivery (p< 0.012) as evidenced by multivariate analysis.

Perinatal asphyxia found to be associated with fetal presentation with (P<0.001) and 95% CI of 6.92(6.92-18.55) in multivariate logistic regression. Newborns with non-vertex presentation had about seven times increased risk of getting asphyxiated. Fetus with intrapartal fetal distress had increased risk of getting asphyxiated by 6.4 as compared to fetuses without diagnosis of intrapartal fetal distress with (P<0.001) 95% CI of 6.38(2.14-16.88) .Birth trauma found to be independently associated with fetal presentation and route of delivery in multivariate logistic regression (p<0.001).

Table 3: Multivariate analysis of birth injury with maternal, pregnancy and labour related factors  JUSH July, 2014

<table>
<thead>
<tr>
<th>Variables</th>
<th>Birth injury</th>
<th>COR(95% CI)</th>
<th>AOR(95% CI)</th>
<th>P -value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place of residence</td>
<td>Outside Jimma</td>
<td>30</td>
<td>126</td>
<td>0.49(1.86,7.73)</td>
</tr>
<tr>
<td></td>
<td>Within Jimma</td>
<td>12</td>
<td>104</td>
<td>reference</td>
</tr>
<tr>
<td>Parity</td>
<td>Primiparous</td>
<td>23</td>
<td>85</td>
<td>0.48(0.25,0.94)</td>
</tr>
<tr>
<td></td>
<td>Multiparous</td>
<td>19</td>
<td>145</td>
<td>Reference</td>
</tr>
<tr>
<td>Fetal presentation</td>
<td>Non-vertex</td>
<td>18</td>
<td>42</td>
<td>5.64(2.71,11.72)</td>
</tr>
<tr>
<td></td>
<td>Vertex</td>
<td>24</td>
<td>188</td>
<td>1.00</td>
</tr>
<tr>
<td>Intrapartal fetal distress</td>
<td>yes</td>
<td>11</td>
<td>40</td>
<td>1.69(0.78,3.63)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>31</td>
<td>190</td>
<td>Reference</td>
</tr>
<tr>
<td>Need of resuscitation</td>
<td>Needed</td>
<td>17</td>
<td>35</td>
<td>3.79(1.86,7.73)</td>
</tr>
<tr>
<td></td>
<td>Not Needed</td>
<td>25</td>
<td>195</td>
<td>Reference</td>
</tr>
<tr>
<td>Route of delivery</td>
<td>Vaginal</td>
<td>24</td>
<td>126</td>
<td>0.91(0.24,0.99)</td>
</tr>
<tr>
<td></td>
<td>C/s</td>
<td>18</td>
<td>104</td>
<td>Reference</td>
</tr>
</tbody>
</table>
Table 4: Multivariate analysis of birth trauma with maternal, pregnancy and labour related factors in JUSH July, 2014

<table>
<thead>
<tr>
<th>Variables</th>
<th>Birth trauma</th>
<th>COR(95% CI)</th>
<th>AOR(95% CI)</th>
<th>P -value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fetal presentation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-vertex</td>
<td>8</td>
<td>37</td>
<td>3.29(1.29,8.29)</td>
<td>8.89(2.75,28.76)</td>
</tr>
<tr>
<td>Vertex</td>
<td>14</td>
<td>213</td>
<td>Reference</td>
<td>1.00</td>
</tr>
<tr>
<td>Intrapartal fetal distress</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>16</td>
<td>205</td>
<td>1.71(0.63,4.61)</td>
<td>6.23(1.73,22.47)</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>45</td>
<td>Reference</td>
<td>1.00</td>
</tr>
<tr>
<td>Source of referral</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health institution</td>
<td>20</td>
<td>183</td>
<td>0.27(0.62,1.20)</td>
<td>4.31(0.92,20.17)</td>
</tr>
<tr>
<td>Self</td>
<td>2</td>
<td>67</td>
<td>Reference</td>
<td>1.00</td>
</tr>
<tr>
<td>Route of delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal</td>
<td>18</td>
<td>132</td>
<td>0.25(0.08,0.76)</td>
<td>17.63(4.15,74.83)</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>4</td>
<td>118</td>
<td>Reference</td>
<td>1.00</td>
</tr>
</tbody>
</table>

DISCUSSION

Birth injury was diagnosed in 15.4% of the newborns. Fetal presentation, need of resuscitation and route of delivery were found to associate with birth injury both in bivariate and multivariate logistic regression. Fetuses with non-vertex presentation had more chance of sustaining birth injury with adjusted Odds ratio (AOR) of 8.39, 95% CI (confidence interval) of (3.38-20.86). The other variables need of resuscitation and route of delivery were associated with birth injury with AOR 2.72 and 3.34 at 95% confidence interval respectively. The finding is nearly comparable to the studies done in developed countries but there were limitations of literatures which studied birth injury with similar definition.

In the study perinatal asphyxia was diagnosed in 8.1% of the newborns using either 5th minute Apgar score or involvement of different organs like CNS.(10)The asphyxia definition used in the study was Persistence of Apgar scores 0-3 for longer than 5 minutes, and /or neonatal neurologic sequelae (eg, seizures, coma, hypotonia).According to study done in Uganda referral hospital perinatal asphyxia was diagnosed in 12.8% of the live births using the Apgar score of 0-4.(17) But according to Zambian study the proportion of perinatal asphyxia was 23%. According to study done in New Delhi, India; perinatal asphyxia was diagnosed in 3.6% of the newborns.(18) Compared to most studies in developing countries the rate of perinatal asphyxia was lower in this study.
This variation can be due to the lack of consistency in definition of perinatal asphyxia and over estimation of Apgar score. Multivariate regression analysis revealed fetal presentation and intrapartal fetal distress were significantly associated with perinatal asphyxia. Other variables like antenatal care, sex of the newborn were not associated in this study and the result was similar to findings in some studies. In case control study in India to identify risk factors for perinatal asphyxia, factors that were independently associated with perinatal asphyxia were instrumental delivery, inadequate antenatal visits, and meconium stained amniotic fluid. According to study done in Uganda referral hospital perinatal asphyxia, fetal distress and meconium stained liquor were associated significantly with birth asphyxia. The mechanical birth trauma was diagnosed in 8.1% of the newborns. Majority of newborns with birth trauma (63.6%) had scalp injury. The commonest scalp injury diagnosed was bruising and Subgaleal hemorrhage identified 20.0% of the scalp injury. With multivariate logistic regression birth trauma was significantly associated with fetal presentation, route of delivery (P<0.001) and fetal distress (p<0.005). Newborns with intrapartal fetal distress, non-vertex presentation and born vaginally had increased chance of sustaining birth trauma with AOR of 6.23, 8.89 and 17.63 respectively. In this study the rate of birth trauma is slightly higher than the Saudi Arabian study (5.2%) as well as the average worldwide prevalence of birth trauma which ranges from 2-7%. According to studies done in USA at single hospitals, birth trauma was associated with malpresentation, malposition and cephalopelvic disproportion. According to the study done at postnatal ward and neonatal intensive care unit in Bombay Hospital, the most common birth injury identified was bleeds (51.16%). Birth trauma was diagnosed in 83.9% of vaginal deliveries but only in 16.1% of caesarean deliveries. The associated variables more or less similar to the other studies. For example, according to study done in Nigeria; newborns with fetal distress had increased odds for all birth trauma and infants born by cesarean delivery had decreased odds ratio for all types of birth trauma. Cephalohematoma was the commonest injury identified. The variation in definition of birth trauma and study population (eg. Inborn and outborn newborns) used makes comparison slightly difficult. In this study imaging studies to screen internal organ injury was not used and only birth traumas that were identified clinically included. Most other studies used both in born and out born babies which may be preferable than my sample population which is limited to the inborn babies. In study done in our country in Addis Ababa, Subgaleal hemorrhage was the commonest birth trauma identified and make up 61%. In that study
Primiparity was found to be also strongly associated with birth trauma.

Limitations: Diagnosis of perinatal asphyxia needs combination different variables like Cord blood PH and blood gas values with Apgar score. But in this study only AAP definition of perinatal asphyxia that uses fifth minute Apgar score of 0-3 with systemic involvements (eg CNS) was used. Internal organ injuries and other injuries that cannot be identified with clinical examination were not considered in this study. As the study was conducted in the referral teaching hospital where most of deliveries attended were referral cases from catchment area possibly raising prevalence of birth injury than the real community estimates of birth injury in the catchment area.

CONCLUSION AND RECOMMENDATION
The magnitude of birth injury in the study was nearly comparable to the similar studies done in developed countries. Place of residence, parity, fetal presentation, fetal position, fetal distress; route of delivery and need of resuscitation were found to be associated with birth injury in this study.

Even though total prevention of birth injury may not be possible, the number can be reduced by improving obstetric care services and training of health professionals in all levels. Moreover, improving the referral system and strengthening health facilities in the JUSH catchment area could play significant role in the reducing the occurrence of birth injury.

Further study that may include deliveries that occur in the non referral health institutions in the area as well as use of investigative modalities when needed is recommended.

ACKNOWLEDGEMENT
We would like to extend our heartfelt gratitude to Jimma University, College of Public Health and Medical Sciences, department of Pediatrics and child health for letting us conduct this study by providing financial support. And we would like to thank all individuals involved in the study.

REFERENCES
11. Natasha Padayachee; Daynia E Ballot: Outcomes of neonates with perinatal asphyxia at a tertiary academic hospital in Johannesburg, South Africa. SAJCH. September 2013 7(3).

ORIGINAL ARTICLE

PREVALENCE OF DISCLOSURE OF HIV POSITIVE STATUS AND ITS PREDICTORS AMONG CHILDREN AND ADOLESCENTS WITH HIV INFECTION ATTENDING THE PAEDIATRIC INFECTIOUS DISEASE CLINIC AT TIKUR ANBESSA SPECIALIZED TEACHING HOSPITAL, ADDIS ABABA, ETHIOPIA

Tigist Argaw, M.D, Etsegenet Gedlu, M.D*

ABSTRACT

Background: With the advent of antiretroviral therapy (ART), there has been a significant reduction in morbidity and mortality of HIV-infected children and many of the children are surviving through childhood and into adolescence. Despite emerging evidence of the benefits of disclosure, when and how to disclose the diagnosis of HIV to children remains a clinical dilemma.

Objective: We investigated the prevalence and factors associated with disclosure of HIV positive status to children and effects of disclosure among children with HIV infection.

Methods: A cross-sectional study was conducted among 233 HIV positive children aged 6-18 years from May- July 2013. Data on socio-demography, disclosure status, age at disclosure and caregivers profile were collected by direct interviewing of caregivers and children. Medical diagnosis, WHO clinical staging, treatment compliance and CD4+ count was obtained from medical records directly. Data was analysed using SPSS version 17.0 software. Descriptive statistics such as frequency, mean, median, standard deviation and range were used to summarize the results. Significance tests and odds ratio were calculated using logistic regression models to examine the predictors and effects of HIV disclosure.

Results: The prevalence of disclosure was 32%. The most common reason for non-disclosure was that the child was not mature enough to understand and/or cope with their diagnosis (64.4%). Almost all caregivers agreed that HIV positive status should be disclosed to the children in the future. More than half (52.3%) preferred disclosure to be done by health-care providers only. Age of child >10 years at disclosure, the level of education of the child, longer duration on HIV medication were significantly associated with disclosure. (P ≤ 0.05). Fewer admission rate and administration of owns medication among the disclosed group was identified as significant positive effect of disclosure.

*Corresponding author, Addis Ababa University, Department of Pediatrics and Child Health
Email: gedlue@gmail.com
**Introduction:** Introduction of Highly Active Anti-Retroviral Treatment (HAART) and increased accessibility significantly reduced morbidity and mortality of HIV-infected children. More and more children are surviving through childhood and entering to adolescence and young adulthood.\(^{(1)}\)

With increased survival, one of the greatest challenges that parents and caregivers face is disclosing HIV infection to the infected children.\(^{(2)}\) Many caregivers are reluctant to disclose for fear of stigma and isolation, parental sense of guilt, and fear that the child is too young to cope with stress associated with the illness or fearing that children would not keep the diagnosis to themselves.\(^{(3,4,5)}\)

Although several studies both in resource rich and low income countries have documented the benefits of disclosure of the HIV status to infected children; health workers especially in low income settings are not comfortable to disclose the positive HIV status to child/adolescent themselves. They think that it is more sensitive and complicated than adult disclosure because many of these settings currently lack standardized, culturally appropriate guidelines and resources for undertaking disclosure.\(^{(6,7,8,9)}\)

The available evidences regarding disclosure of HIV status of children support a process-oriented approach; which has to be initiated early in patients' childhood and continue throughout adolescent. It is recommended for health care providers to discuss a disclosure plan with caretakers from the outset so that caregivers can prepare themselves for the task of disclosure ahead of time. This gives them confidence to discuss the disease with their children as they mature cognitively, emotionally and sexually.\(^{(9,10,11)}\)

The aim of this study was to estimate the proportion of disclosure of HIV positive status, to identify predictors of disclosure and to identify effects of disclosure in selected health parameters in children and adolescents attending the paediatric infectious disease clinic of Tikur Anbessa specialized Teaching Hospital in Addis Ababa, Ethiopia.

**Subject and Methods**
The study was done at paediatric infectious diseases follow up clinic of Tikur Anbessa
Specialized Teaching Hospital. Two hundred thirty-three children between 6-18 years of age and their caretakers were recruited after calculating the sample size by using single population proportion formula. Estimated prevalence of HIV positive status disclosure of 17.4% which was taken from a previous study in Addis Ababa.\(^4\) 95% confidence interval and a precision margin of 5% (0.05) were used in the equation to determine the number of participants. Caregivers and children who were visiting the clinic from May - July 2013 were selected by consecutive sampling method and interviewed using structured questionnaire. Socio-demographic characteristics, family status, and information related to disclosure were obtained. Interview about knowledge of HIV status was done separately to avoid unintentional disclosure. Information regarding WHO staging, treatment compliance, hospital admission and CD4 count were taken from the hospital medical records.

For the purpose of this study, care givers were defined as biological parent/s or a person who lives with the child, participate in the child daily care and are knowledgeable about the child's health.

Complete disclosure was considered when the child describes his /her disease as HIV. Non-disclosure defined when the care giver said that the child doesn’t know his /her HIV infection status and/or if the caretaker was not sure if the child knew his/her status.

Pre-test was done in a similar study population who are not included in the sample. There was no major problem identified with the questionnaire.

Data were analyzed using SPSS version 17.0 software. Descriptive statistics such as frequency, mean, median, standard deviation and range were used to summarize the results. Significance tests and odds ratio were calculated using logistic regression models to examine the predictors and effects of HIV disclosure.

Ethical clearance was obtained from Department of Paediatrics and Child Health Research and Publication Committee (DRCP) and from Institutional Scientific Review Board (IRB) of College of Health Sciences. Verbal and written consent of caregivers as well as oral assent from children older than 12 years was obtained. The right of the respondent not to participate or withdraw from the interview was respected.

**RESULT**

The demographic and clinical characteristics of the 233 children and their caregivers enrolled into the study are illustrated in Table1. Of the 233 children 54.1% of the children were females, and 68.6% (160/233) were attending grade level of five or below. Most care givers (47.6%) earn at least a monthly income of 500ETB. At the time of the study all children except 27 of them were on HAART, and more than half of them had CD4 cell count greater than 500.
Table 1. Socio Demographic Data of Study Population who are on follow up at Infectious Disease Clinic of Tikur Anbessa Specialized Hospital.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Disclosed (76)</th>
<th>Non-disclosed (157)</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>32</td>
<td>75</td>
<td>107</td>
<td>45.9</td>
</tr>
<tr>
<td>Female</td>
<td>44</td>
<td>82</td>
<td>126</td>
<td>54.1</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;10</td>
<td>4</td>
<td>92</td>
<td>96</td>
<td>41.2</td>
</tr>
<tr>
<td>&gt;10</td>
<td>72</td>
<td>65</td>
<td>137</td>
<td>58.8</td>
</tr>
<tr>
<td>Educational level Child (grade)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;6</td>
<td>27</td>
<td>133</td>
<td>160</td>
<td>68.7</td>
</tr>
<tr>
<td>6-10</td>
<td>47</td>
<td>24</td>
<td>71</td>
<td>30.5</td>
</tr>
<tr>
<td>&gt;10</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0.85</td>
</tr>
<tr>
<td>Caretaker relation to the child</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological parents</td>
<td>43</td>
<td>105</td>
<td>148</td>
<td>63.5</td>
</tr>
<tr>
<td>Adaptive parents</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0.85</td>
</tr>
<tr>
<td>Grandparents</td>
<td>5</td>
<td>14</td>
<td>19</td>
<td>8.15</td>
</tr>
<tr>
<td>Uncle/Aunt/Elder siblings</td>
<td>19</td>
<td>29</td>
<td>48</td>
<td>20.62</td>
</tr>
<tr>
<td>Care provider in Orphanage</td>
<td>6</td>
<td>2</td>
<td>5</td>
<td>2.14</td>
</tr>
<tr>
<td>others</td>
<td>3</td>
<td>5</td>
<td>11</td>
<td>4.72</td>
</tr>
<tr>
<td>Monthly income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;500 ETB</td>
<td>43</td>
<td>68</td>
<td>111</td>
<td>47.6</td>
</tr>
<tr>
<td>500-1000 ETB</td>
<td>19</td>
<td>46</td>
<td>65</td>
<td>27.9</td>
</tr>
<tr>
<td>1000-2000 ETB</td>
<td>8</td>
<td>28</td>
<td>36</td>
<td>15.5</td>
</tr>
<tr>
<td>&gt;2000 ETB</td>
<td>6</td>
<td>15</td>
<td>21</td>
<td>9.01</td>
</tr>
<tr>
<td>HAART therapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not on HAART</td>
<td>6</td>
<td>21</td>
<td>27</td>
<td>11.6</td>
</tr>
<tr>
<td>On HAART</td>
<td>70</td>
<td>136</td>
<td>206</td>
<td>88.4</td>
</tr>
</tbody>
</table>

Disclosure had been made to seventy-six (32.4%) of the children and adolescents. The mean age at disclosure was 10.6 years (SD = 2.01). The main reasons for disclosure of HIV positive status given were; the children asking about their illness and medications (37.62%), and health care providers asked them do so (35.64%). Twenty-two (28.9%) of the disclosed children reported that they knew their status before disclosure.
Five children from non-disclosed group were able to describe their disease as HIV despite caretakers declared them as non-disclosed. The main sources of information for inadvertent disclosure were overhearing discussion between health workers and caretakers, reading posters on follow up clinic, and learning about CD4 count at school.

As illustrated in Figure 1, the main reasons for non-disclosure of HIV positive status to children included: child not sufficiently mature to understand and/or cope with their diagnosis (64.3%), failure to keep family secrets outside the home (30.7%) and lack of emotionally readiness of caretakers to disclose.

**Figure 1**: Reason for disclosure by caregivers who are on Follow up at Infectious Disease Clinic of Tikur Anbessa Specialized Hospital

![Figure 1](image_url)

Among the non-disclosed group, 69% (108/157) of the caretakers did not disclose the diagnosis despite persistent questioning of the children about their illness and medications. More than two third of the caretakers of the non-disclosed group were planning to disclose the HIV status at the mean age of 12.56 (SD =2.23). More than half (52.27%) of them wanted the disclosure to be done by health care providers only. Table 2 illustrated predictors of disclosure Age>10 years at disclosure, child’s grade≥ 6, (P<0.05) were significantly associated with disclosure.
As illustrated on Table 3. A fewer number of hospital admission and administration of own medications were observed as positive effect of disclosure (P<0.05). Adherence to treatment, treatment failure, behavioural problems, current WHO Stage of disease, recent CD4 showed no significant difference among the disclosed and non-disclosed group.
DISCUSSION

Out of 233 participants, the majority of children were above the age of 10 years, most of them were on HAART and on follow up for more than five years. Unfortunately, only 32.4% of them knew about their HIV infection status. This low proportion of disclosure was also observed in other studies in sub-Saharan Africa with disclosure ranging from 1.7%-39.6%.\(^{(4,12,13)}\)

Table 3. Effects of HIV Infection Disclosure on Selected Health Variables of the study the population who are on follow up at paediatric infectious disease clinic of Tikur Anbessa Specialized Hospital

<table>
<thead>
<tr>
<th>Items</th>
<th>Disclosed (76)</th>
<th>Non-disclosed (157)</th>
<th>OR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n/%)</td>
<td>(n%)</td>
<td></td>
</tr>
<tr>
<td>Number of Hospital admission</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤3</td>
<td>26 (11.15)</td>
<td>62 (26.6)</td>
<td>0.87 (0.45, 0.65)</td>
</tr>
<tr>
<td>&gt;3</td>
<td>3 (1.28)</td>
<td>3 (1.28)</td>
<td></td>
</tr>
<tr>
<td>No Adherence</td>
<td>47 (20.17)</td>
<td>92 (39.5)</td>
<td></td>
</tr>
<tr>
<td>Adherence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>65 (27.89)</td>
<td>129 (55.36)</td>
<td>0.70 (0.21, 2.3)</td>
</tr>
<tr>
<td>Fair</td>
<td>3 (1.28)</td>
<td>5 (2.14)</td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>2 (0.85)</td>
<td>2 (0.85)</td>
<td></td>
</tr>
<tr>
<td>Treatment failure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>3 (1.28)</td>
<td>7 (3.0)</td>
<td>0.83 (0.21, 3.25)</td>
</tr>
<tr>
<td>No</td>
<td>67 (28.8)</td>
<td>129 (55.4)</td>
<td></td>
</tr>
<tr>
<td>Who administer HARRT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>43 (18.45)</td>
<td>26 (11.15)</td>
<td>6.1 (4.34, 8.17)</td>
</tr>
<tr>
<td>Caregiver</td>
<td>27 (11.6)</td>
<td>101 (43.34)</td>
<td></td>
</tr>
<tr>
<td>Both</td>
<td>0</td>
<td>9 (3.86)</td>
<td></td>
</tr>
<tr>
<td>Behavioural problem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>17 (7.2)</td>
<td>35 (15.02)</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>59 (25.3)</td>
<td>122 (52.36)</td>
<td></td>
</tr>
<tr>
<td>Current WHO stage of disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>57 (24.46)</td>
<td>111 (47.63)</td>
<td>1.2 (0.66, 2.32)</td>
</tr>
<tr>
<td>II</td>
<td>16 (6.86)</td>
<td>43 (18.45)</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>1 (0.42)</td>
<td>3 (1.28)</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>2 (0.85)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Recent CD4 count</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;200</td>
<td>1 (0.42)</td>
<td>5 (2.15)</td>
<td>0.83 (0.38, 1.16)</td>
</tr>
<tr>
<td>200-500</td>
<td>26 (11.15)</td>
<td>58 (24.9)</td>
<td></td>
</tr>
<tr>
<td>&gt;500</td>
<td>49 (21.03)</td>
<td>94 (40.3)</td>
<td></td>
</tr>
</tbody>
</table>
In this study caregivers decided to inform their children of their HIV status due to either questions the children had about their illness and medications or following advice of health care providers to disclose. This is in line with studies from other countries. (3,8,10) Opposing or tiring of secrets, believing in child’s right to know their health status, fear the child would get involved in sexual activities without protection and better self-care were additional reasons cited for disclosure in several studies (3, 5, 14, 15)

Concerns about young age and maturity of the child to cope with the stress, to keep the disease as a family secret, and emotional readiness of caretakers were reasons given for non-disclosure and it is similar to other studies from both high and low income countries. (3-5,10,8,15)

The mean age at disclosure was 10.6 years and those caretakers who did not disclose the diagnosis prefer disclosure to happen when the child is older ( mean 12.6) these findings are lower than what is reported by Biadgilign et.al in which most caregivers prefer to delay disclosure up to the age of 14 and above (4). Recent review on disclosure of HIV status to children found higher median age of disclosure in low and middle income countries as compared to high income countries with median age of 9.6 and 8.3 years respectively (16). According to WHO children have to have their HIV infection disclosed at school age. It is suggested that disclosure can be planned incrementally according to their cognitive skills and emotional maturity in preparation for full disclosure (17).

The decision on who should disclose the diagnosis is different among the two groups. Half of the non-disclosed group prefer the disclosure to be done by health professional only, while the majority of the disclosed group did the disclosure by themselves. Decision regarding who should be the primary discloser was found to be variable. Several studies reported the care taker was preferred as primary disclosure (10,12) while few preferred the health professional. (2,4) The differences can be explained by several factors including the socio-cultural background of care takers or the level of communication skills of health professional. (6,10,12)

Delaying disclosure is often associated with unintentional disclosure of child infection status and happens during clinic visits or casual discussions among friends or other family members. In this study one third of the children from the disclosed group knew about their disease before disclosure and five children from non-disclosed describe their illness as HIV. Overhearing discussion between health workers and caretakers, reading posters on follow up clinic, and learning about CD4 count at school were how they knew their illness before disclosure. Although not looked specifically in this study; according to literatures those children who accidentally learn of their diagnosis have a more difficult
time adjusting to the situation and/or develop fear and anxiety; which might result in lack of trust and anger toward caretakers and health care providers \(^{(12, 18)}\).

Similar to findings from previous studies \(^{(3, 10, 15)}\), age \(\geq 10\) years, education of child grade \(\geq 6\), longer durations on HAART were found to be predictors for disclosure.

Fewer numbers of hospital admissions and administration of own medications were benefits observed in the disclosed group. Some health related quality of life parameters such as adherence, treatment failure, and behavioural problems, current severity of the diseases according to WHO Staging and recent CD4 + count showed no significant difference among the two groups. Literatures dealing with health benefits of disclosure showed a mixed result \(^{(11, 12, 15, 16, 19)}\).

**LIMITATION OF STUDY**

The study is cross-sectional and the associations observed may not be causal. As retrospective study may also have subjected to some degree of recall bias.

**CONCLUSION:**

Prevalence of disclosure is low, accounting only in 32% of the children. The main reason for disclosure was children asking questions about their illness and medication. The disclosure was initiated by health workers only in one third of cases. Non-disclosed caregivers delayed disclosure because of concerns about young age, the child’s ability to cope with the stress and to keep the disease as a family secret. In this study the barrier of disclosure in perspective of health workers was not addressed and needs to be studied. Health related quality of life and disclosure has to be further investigated. Qualitative and prospective longitudinal studies are recommended.

**REFERENCES**


ABSTRACT

Background: Early diagnosis of HIV infection in exposed infants save lives; without treatment, 35% of HIV-infected infants would die before their first birthday and 50% would die before the age of two. This study assessed the follow-up outcomes of HIV exposed infants born in health centers; and the PMTCT status of their mothers in two regions of Ethiopia.

Methods: A cross-sectional review was conducted on the records of HIV-exposed infants born at health centers in Amhara and Tigray regions from Oct 1st 2011 to Sept 30th, 2013.

Results: Seven hundred eleven (711) HIV-exposed infants born in 23 health centers were included; 72.7% were from Amhara and 27.3% were from Tigray with 96% of them having active follow-up at the respective health centers at the time of the study. Of the 691 infants whose gender was recorded, 311(45%) were female. Most (82.4%) were enrolled within 45 days of birth. The DNA PCR test was done for 658 (93%) and 630(95.7%) had negative and 9 (1.37%) had positive results, for 8 (1.22%) the result was pending and for 11 (1.67%) the result was not recorded. Six of the DNA PCR positive infants were started on ART at the health centers and 3 were referred to hospital.

The records showed that 624 (87.8%) HIV infected mothers have received some form of PMTCT, and most (57.7%) were on HAART before/during pregnancy. The records showed 636 (89.5%) infants received some form of PMTCT, in which 43.5% received NVP for 4-6 weeks. The records of 682 showed that 678 (95.4%) received co-trimoxazole prophylaxis (CPT), and 86.1% began CPT within 45 to 60 days from birth. Most (91.1%) of the HEIs were exclusively breastfed. Out of the 9 HIV-positive infants, 7 were exclusively breastfed and two experienced mixed feeding.

Two hundred eleven (211) infants had confirmatory test done at or above 12 months of age, and an additional two infants turned out to be HIV positive and were started on ART treatment.

Conclusion: Enrolling 82.4% of the infants in the first 45 days (6 weeks) after birth has helped 93% to receive DNA PCR tests there by early identification of the 1.37% HIV-positive infants who were started on ART. Most (86.1%) of the infants were started on CPT within 45 to 60 days of birth and most (91.1%) HEIs were exclusively breastfed which all there according to the current WHO recommendations. Most (87.8%) mothers have received PMTCT service of

*Corresponding author, Addis Ababa University, Department of Pediatrics and Child Health
which 57.7% were on HAART before/during pregnancy, however only 3.7% received option B+. Most (89.5%) of infants have received PMTCT intervention and Option B+ was given to only 44.6% of them; based on the current recommendation option B+ uptake should be improved to maximize protection against HIV. Significant gaps in growth assessment (<70%) and immunization (only 76.2% HEIs were properly vaccinated) were identified which need to improve to minimize the morbid effects of malnutrition and vaccine preventable disease among HIV exposed infants.

INTRODUCTION

An estimated 3.2 million children were living with HIV at the end of 2013, 91% of them were in sub-Saharan Africa, majority of them acquired HIV from their HIV-infected mothers, however with efficacious interventions the risk of mother-to-child HIV transmission can be reduced to 2% in non-breast feeding and to less than 5% in breast feeding population.(1) While much progress has been made in preventing and treating HIV in children and women, a large proportion of HIV-positive pregnant women still do not receive antiretroviral (ARV), in 2012 only 6 out of 10 pregnant women received ARV to prevent transmission of HIV to their kids; similarly only 5 out of 10 HIV exposed infants received ARVs to prevent acquisition of HIV from their mothers. (2)

The Global Plan towards the Elimination of new HIV infection in children and keeping their mothers alive focused on 22 high-priority countries, of which 21 are in sub-Saharan Africa. Ninety percent of the estimated 1.4 million pregnant HIV-positive women live in the high-priority countries, including Ethiopia. (3)

In Ethiopia in 2011 the number of HIV positive adults (age 15-49) was estimated to be 800,000 including more than 38,000 pregnant, women. Additionally, 182,249 children age 0-14 years were estimated to be HIV-positive, most having been infected through mother-to-child transmission. New HIV infections were estimated at 24,236 among adults and 13,008 among children. The Government of Ethiopia (GOE) has given high priority to prevention of mother-to-child transmission (PMTCT). Strides have been made in the coverage and quality of PMTCT services. For instance, PMTCT services expanded from 32 to 1445 health facilities between 2003/4 and 2010/11. Despite these achievements, 52% of facilities offering maternal newborn, and child health (MNCH) services do not include PMTCT services as part of their service packages. Moreover, opportunities are often missed to retain women in PMTCT care in settings where the services are available. In 2010/11, 34% of an estimated 2.9 million pregnant women were tested for HIV, however only 40% of those
identified as HIV-positive received antiretroviral (ARV) prophylaxis, and just 24% of HIV-exposed newborns received prophylaxis.(4)

Prevention of mother to Child Transmission (PMTCT) of HIV has been one of the key developments in the fight against HIV and AIDS. WHO first issued recommendation for the use of ARV drugs for PMTCT in 2000, and as well recommendations related to infant feeding in HIV infected mothers. (5) PMTCT interventions started with the provision of a single dose Nevirapine (sdNVP) to the infant and mother with short duration of breast feeding or replacement feeding. Later in 2006 WHO issued an improved regimen of antepartum AZT starting at 28 weeks of gestation followed by AZT/3TC/sdNVP intrapartum and AZT/3TC for 7 days and the infants should receive AZT for 7 days or 4 weeks based on the duration of maternal prophylaxis for greater than or less than 4 weeks respectively.(6)

In 2010 WHO came with modified PMTCT guidance, with option to choose between two prophylaxis regimens for pregnant women living with HIV with CD4 greater than 350 cells/mm3: Option A and Option B. Under Option A, women receive antenatal AZT starting at 14 weeks of gestation and intrapartum sdNVP and first dose of AZT/3TC followed by AZT/3TC for 7days postpartum; while infants receive postpartum daily NVP throughout the duration of breastfeeding until one week after and if the mother is not breast feeding through age 4-6 weeks. Option B, on the other hand, is providing triple ARVs starting at 14 weeks of gestation, continued intrapartum and throughout the duration of breastfeeding until 1 week after cessation of all breastfeeding. Those who do not yet require ART for their own health would discontinue the prophylaxis and continue to monitor their CD4 count, eventually re-starting ART when the CD4 level falls below 350cells/mm3. And infants on the option B regimen are provided with daily NVP or AZT from birth through age 4-6 weeks regardless of infant feeding method. A third approach came up in 2012 called Option B+, in which all pregnant women living with HIV are offered life-long ART, regardless of their CD4 count; and their infants provided with daily NVP for 6 weeks if breast feeding and either daily NVP or twice daily dose of AZT from birth through age 4-6 weeks. (7)

In countries where option B+ is not feasible, Option B was recommended and Option A (2006 guidelines) was only cited as a last resort. (8)

The 2013 WHO guidelines recommend option B+ as the only acceptable regimen to ensure maximum protection of babies from acquiring HIV infection. (9)
Regarding infant feeding, by mothers known to be HIV-infected (and whose infants are HIV uninfected or of unknown HIV status) WHO recommends exclusive breastfeeding for the first 6 months of life, introducing appropriate complementary foods thereafter, and continued breastfeeding for the next 6 months. Breastfeeding should then only be stopped once a nutritionally adequate and safe diet without breast milk can be provided. (9)

Early diagnosis of HIV infection in infants is vital; without treatment, 35% of HIV-infected infants would die before their first birthday while 50% would die before their second birthday. (1) All HEIs should have HIV virological testing at 4 to 6 weeks of age or at the earliest opportunity thereafter. In infants with an initial positive virological test result, ART should be started without delay and, at the same time, a second specimen should be collected for confirmation. The results from virological testing in infants should be returned to the clinic and to the parents/caregivers as soon as possible. Positive test results should be fast-tracked to the mother–baby pair as soon as possible to enable prompt initiation of ART. (9) Infants with an initial negative PCR test result, HEIs undergo HIV serological testing at around 9 months of age (or at the time of the last immunization visit). (9) Ethiopian guidelines recommend doing so at 9 to 12 month of age. Infants who have reactive serological assays at 9 to 12 months should have a virological test to identify HIV-infected infants who need ART. Children 18 months or older, should have the HIV serological testing according to algorithm used for adults. (11)

Co-trimoxazole prophylaxis is recommended for all HIV-exposed children born to mothers living with HIV starting at 4 to 6 weeks after birth and continuing until HIV infection has been excluded and the infant is no longer at risk of acquiring HIV through breastfeeding. (10)

Growth and development of an HEI should be assessed and recorded on the infant chart whenever the baby comes for both scheduled and nonscheduled visits. The visits of the mother and the baby are scheduled every month until 6 months of age and every 3 months thereafter until 18 months of age if the infant has no other health problem. (11)

In Ethiopia, the Federal Ministry of Health (FMoH) revised the national PMTCT guideline and developed the manual for implementation of EID in 2012. The guidelines aim to: help program managers plan, implement, coordinate, monitor, and evaluate EID services at the national, regional, zonal, woreda (district), and health facility levels; assist health care providers on the identification of HEI; provide guidance on the collection and transportation of HIV-1 DNA-PCR dry blood sample (DBS); assist with PCR result delivery and patient notification; and
facilitate the integration of EID services into MNCH outlets. (5)

The USAID funded Ethiopia Network for HIV/AIDS Treatment, Care, and Support (ENHAT-CS) program supported the government of Ethiopia from 2011-2014 on comprehensive HIV care, in which PMTCT and follow-up of HEIs were important components, the pilot field testing revealed that of the total number of HEIs on follow-up in the Amhara and Tigray regions about 50% were estimated to be born at the health centers. Thus this operational research tried to assess the standard delivery of components of HEI follow-up care and identify gaps in service delivery and to know the HIV positivity rate among the HEIs born in selected ENHAT-CS supported health centers.

METHODOLOGY

A cross-sectional review was conducted on the records of 711 HIV-exposed infants born at health centers in Amhara and Tigray regions from Oct 1st 2011 to Sept 30th, 2013. The sample size was determined by the formula for a single population proportion taking the assumptions of occurrence of the HEI DBS sample taken within 12 months of birth to be 58%, at 95% confidence level, and a precision of 5%; with the design effect of 2 for the two regions and was calculated to be 748. Twenty three high caseload health centers were selected from each of the zones of Tigray and Amhara regions, and assuming that 50% of these infants have been born at the respective health center.

A pre-tested data abstraction tool was used to extract data from HEI charts, registers of HEIs, mothers’ charts, registers for labor and delivery and mother support groups (MSGs). Demographic data and all components of HEI follow-up such as PMTCT status of the mothers and infants, co-trimoxazole prophylaxis, infant feeding status, infant diagnosis and enrollment and linkage into ART services, and growth monitoring and immunization data were captured. For data not found on the registers, additional support was sought from the health care providers, MSGs, and the case managers at the respective health centers.

Trained pediatricians carried out data abstraction; data officers categorized, coded, and entered the data into Epi Info™ statistical software and was cleaned and exported to SPSS software for analysis by the principal investigator.

RESULTS:

Socio-demography: Seven hundred eleven (711) HIV exposed infants out of the 748 sampled were included in this study. The rest 37 were excluded for gross lack of data in their records.

The 711 infants were on follow up in 23 health centers; 16 in the Amhara and 7 health
centers in Tigray regions. Five hundred seventeen (517) HEIs were from Amhara (72.7%) and 194 (27.3%) were from Tigray. Twenty-one health centers had a mother support group (MSG). Three hundred ninety-three (393) mothers were MSG members, 282 were not, and the MSG status of 36 mothers was unknown.

**Registration on HEI care**

Out of the 711 HEIs, the study found 688 infants on the HEI register. Data for the rest of 23 children was retrieved from labor and delivery and MSG records, and 668 infants had HEI follow-up cards and 682 (96%) had active follow-up, 3 (0.42%) were transferred out to nearby hospitals, 22 (3%) were lost to follow-up, and 4 (0.56%) died. Of those who died, one had his first DNA PCR test positive and was started on ART, and the other three did not have DNA PCR tests.

Of the 711 infants only 691 children had their gender recorded and of these 311 (45%) were female. Age at the time of enrollment was recorded for 681 infants. The age range was 1 to 300 days with a mean age of 30.5 days; 44.5% of the infants were enrolled on the day of their birth.

Overall, 82.4% of the infants were enrolled within 45 days (6 weeks) of birth (Figure 1).

**Figure 1:** Age of infants at the time of enrollment in to HEI care in Amhara and Tigray health centers, April 2014 (n=711)
DNA PCR HIV test
Of the 711 HEIs, the records of 658 (93%) showed that the first DNA PCR test was taken and most (71.1%) of these infants had their first test at 45 days/6 weeks of age. Out of these 658 HEIs tested, 639 results were sent back to the respective health center; 630 (95.7%) had negative results, and 9 (1.37%) had positive results. The results for 8 infants were recorded as pending at the time of the study, and for 11 infants the results were not recorded. (Table 1)

What was the reason for not having the PCR test?
Of the 682 children who have been on active follow-up, 24 infants did not have the test. Twelve did not receive the test for the following reasons: health personnel were not available to take the sample, the mother missed the appointment date or did not come at all (LTFU), health workers’ negligence, the mother refused to attend at the health center and went to another facility, or mother and baby transferred out to another facility. The reasons for the remaining 12 (50%) were not documented.

Were the HIV-positive infants started on ART? At what age?
All of the nine children identified as HIV-positive by a DNA PCR test were identified in the first six weeks after birth. Six of the children were started on ART at the respective health centers and three were referred to a hospital because they had been exposed to NVP and needed to receive Kaletera. As to the time of ART initiation, one baby was started when he was two months old but later died. Two babies were started when they were three months old, and three infants each were started at four, five, and six months of age respectively.

Table 1: Age of HEIs at first DNA PCR test compared with the test results in Amhara and Tigray health centers, April 2014 (n=658)

<table>
<thead>
<tr>
<th>Age at 1st PCR test (In weeks)</th>
<th>1st DNA PCR Result</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>&lt;= 6</td>
<td>9</td>
<td>446</td>
</tr>
<tr>
<td>6 - 8</td>
<td>0</td>
<td>96</td>
</tr>
<tr>
<td>9 - 12</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>13 - 16</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>17 - 24</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>&gt; 24</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Age Not recorded</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>630</td>
</tr>
</tbody>
</table>
Maternal PMTCT intervention

Of the 711 infants, the mothers of 624 (87.8%) received some form of ART for PMTCT. Most (57.7%) were on HAART before/during pregnancy; 12.5% of them were on the 2006 guideline which was AZT from 28 weeks followed by AZT+3TC+sdNVP in labor and then AZT+3TC for one week postpartum; 11.8% were on Option A; only 3.7% of mothers received Option B+; 0.7% of mothers received option B; 0.7% took only single dose of Nevirapine during initiation of labour, and 4.2% of mothers took no prophylaxis and for 8% of mothers there was no documentation. Five mothers (0.7%) took unclassified regimens for PMTCT. (Figure 2).

Figure 2: Mothers’ PMTCT status in Amhara and Tigray health centers, April 2014 (n=711)

Infant PMTCT status

Out of the total 711 HEI records evaluated, 649 infants have documentation about their PMTCT status. Six hundred thirty-six (89.5%) infants received some form of PMTCT: 43.5% received NVP based Option B/B+ regimen, 24.3% received sd NVP + AZT for 1 week, 13.6% received NVP based Option A regimen, 2.3% received sd NVP + AZT for 1 month, 1.55% received single dose NVP and 1.13% took AZT based Option B/B+ regimen; four (0.56%) were given unclassified regimen of NVP for 6 months and 13(1.83%) infants were not given any form of prophylaxis. Sixty-two (8.7%) infants did not have any record of PMTCT prophylaxis. (Figure 3).
Co-trimoxazole prophylaxis (CPT)
Among the 711 HEIs assessed, the records showed that 678 (95.4%) received CPT but four infants did not. The records for 29 infants lacked information on CPT. Most (86.1%) of the infants received CPT at 45 to 60 days from birth.

Infant feeding status
Most (91.1%) of the HEIs were exclusively breastfed, 2% received replacement feeding, and 0.8% received breast milk mixed with formula in the first 6 months after birth. Feeding status for 6% of the infants was not recorded.

Out of the nine (9) HIV-positive infants, seven (7) of them were exclusively breastfed and two of them experienced mixed feeding.

Repeat PCR test for HIV-positive infants
Of the six HIV positive infants taking ART at the health centers, repeat PCR test was done only for two of them who turned out positive. One infant died, and the test was not repeated for the rest of three infants.

Repeat test for HIV-negative infants
Out of the 630 children whose first PCR test was negative 211 (33%) had their confirmatory antibody test done at 12 months; 209 children’s second test became negative, and unfortunately, two children who had been breastfeeding turned out to be HIV positive and were started on ART treatment. Of those whose confirmatory test was negative 202 were discharged from follow-up when they were older than 12 months.

Growth assessment
Seventy-three percent (73%) had their weight-for-age curves attached and plotted, 69.2% had their height-for-age curves attached and plotted, and 66.9% had their head circumference curves plotted and attached at the respective health centers.

Developmental assessment
Records for 417 (59%) HEIs showed that the developmental assessments were normal for their age. Records for five (1%) of children showed developmental failure, and records
for 289 (40%) infants were not filled out, including those who were transferred out, LTFU, or deceased.

Of those who had developmental failure, one was HIV positive and the rest (4) were HIV negative.

**Immunization status**
The overall appropriateness of immunization status to all age groups of HEIs was 76.2%; 18.7% have missed one or more vaccinations and 5.8% of infants had no record of immunization.

**Evaluation for OIs**
Six hundred twelve (86%) HEIs were evaluated for OIs and only 18.3% (13) were positive. Of these only one infant was HIV positive, 9 were HIV negative, and for 3 their HIV status was not yet ascertained. The identified OIs were bloody diarrhea/gastroenteritis, oral candidiasis, pneumonia, and severe skin lesions.

**DISCUSSION**
The fact that 82.4% of the infants have been enrolled in the first 45 days (6 weeks) after birth has helped 93% to receive DNA PCR tests. This has enabled in early identification of 1.37% of the HIV-positive infants in alignment with the WHO recommendation for identification and diagnosis of HIV-infected infants. 13

From 6 infants who were started on ART at the respective health centers five of them survived but one died. The infant who died had been started at two months of age; this could indicate that the infant was infected intrauterine. The other three were referred to a nearby hospital because they had received NVP and needed to begin Kaletera, according to WHO recommendations.

Ninety-five percent (95.4%) of the HEIs received CPT and most (86.1%) of the infants were started on CPT within 45 to 60 days of birth. This was in accordance with the 2006 WHO guideline on CPT prophylaxis for infants and children, but the failure to start the other 14% on CPT should be addressed. This result is better than the study finding in South Africa of failure to start CPT in 33% of HEIs even at 6 month. (12)

Nearly eighty-eight percent (87.8%) of the mothers have received some type of PMTCT intervention and most of them (57.7%) were on HAART before/during pregnancy. Despite the recommendation that Option B+ as the most effective intervention only 3.7% of mothers received it. This might be for the reason that Ethiopia began implementing Option B+ after first half of 2013.

Most (89.5%) of infants have received some type of PMTCT intervention. Option B+ (daily NVP or twice daily AZT from birth until 4 to 6 weeks of age) was given to 44.6% of the infants, and the rest were on various previously recommended regiments. Again the same reason for Option B+ applies here as well.
Most (91.1%) of the HEIs were exclusively breastfed, 2% received replacement feeding, and 0.8% received a mix of breast milk and formula milk in the first six months after birth. This is in line with the WHO recommendation on breast feeding of HIV exposed infants in resources limited countries. Out of the nine (9) HIV-positive infants, seven (7) were exclusively breastfed and two experienced mixed feeding.

Significant gaps in growth assessment were identified: 27% for weight-for-age assessment, 31% for height-for-age assessment, and 43% for head circumference/age assessment. Similarly, 40% of the infants lacked developmental assessment documents. Also, immunization status was not appropriate for their age for 18.7% of infants and had never been recorded for 5.8% of the infants. These critical gaps should be addressed.

RECOMMENDATION
Ethiopia as a country should work hard towards the implementation of the Option B+ regimen to mothers and infants in order to sustain the achievement gained through the PMTCT program.

Following nationally standardized follow-up procedures for HEIs is very important to deliver the follow up care and this in turn will enable to identify, diagnose and treat HIV infected infants on time, hence need to be practiced as continuum of care integrated with MNCH platform in all facilities.

Gaps in immunization services should be talked as soon as possible to avert vaccine preventable disease among HIV exposed infants.

Gaps in the measurement and recording of growth and developmental parameters should improve in the follow up of HIV exposed infants.

It is possible that many of the HEI services assessed in this study are actually provided with the care however due various factors in relation to health workers and health services deliveries, proper documentation is neglected, we recommend that we should work towards improving our record keeping along with the clinical services.

Limitation of the study: As this study has been retrospective review of patient records there were significant gaps in getting some of the data for capturing.

ACKNOWLEDGEMENT
We are very thankful to Management Science for Health (MSH) for granting fund to undertake this study.

We deeply acknowledge all Ethiopia Network for HIV/AIDS Treatment, Care, and Support (ENHAT-CS) field staffs for their active participation in the data collection of this study.

We would like to extend our gratitude to Dr.Denis Tindyebwa for revision and his valuable feedbacks.
We would like to thank Mr. Hussien Ismail for assisting in the methodology and preparation of data template.

We deeply thank Dr. Adamu Addisie for sacrificing his time to help on the data analysis.

Finally, we would like to acknowledge all the health center health care providers and the health center heads in Amhara and Tigrai regions who supported for the success of this study.

REFERENCES


3. Federal Ministry of health of Ethiopia (FMoH), Accelerated plan for scaling up prevention of Mother to Child Transmission (PMTCT) services in Ethiopia, 2014 page 3


5. World Health Organization, Anti-retroviral drugs for treating pregnant women and preventing infection in infants in resource limited setting towards universal access, recommendation for public health approach, Geneva, Switzerland 2006, Page 29

6. UNICEF, Option B and B+; key consideration for countries to implement an equity – focused approach; Eliminating new HIV infections with HIV alive and well; July 2012.


8. World health Organization, Consolidated guidelines on the use of Antiretroviral; Antiretroviral treatment for pregnant and breastfeeding women, Geneva, Switzerland: WHO 2013 page 59


ABSTRACT

Familial hypercholesterolemia (FH) is an autosomal dominant genetic disorder characterized by elevated plasma levels of low-density lipoprotein-cholesterol (LDL-C). FH often leads to accumulation of cholesterol in the skin, where xanthomas can occur. We report a case of FH in an 11 year old female child which is alerted by multiple nodular lesions over the buttock, knee and elbow. Lipid profile showed elevated serum levels of LDL-C in the child and her mother. Biopsy taken from the lesion showed focal aggregates of foamy macrophages with a conclusion of Tuberous Xanthoma.

Key Words: Xanthomas, Familial hypercholesterolemia, LDL-C

INTRODUCTION

There are both ‘heterozygous’ (heFH) and ‘homozygous’ (hoFH) forms of Familial hypercholesterolemia (FH). In the general population, the prevalence of the heFH phenotype has been reported as 1 in 500 and the prevalence of the hoFH form is estimated to be 1 in 1 million.¹ The highest prevalence of FH is seen in the Afrikaner population—estimated as 1 in 70 in the heFH form. Xanthomas are well circumscribed lesions in the connective tissue of the skin, tendons or fascia that predominantly consist of foam cells. These specific cells are formed from macrophages as a result of an excessive uptake of LDL particles and their oxidative modification. Xanthomas particularly affect the tendons: elbows, Achilles tendons, and hands.² There is no single internationally accepted set of criteria for the clinical diagnosis of FH. The most commonly used are the USMEDPED³, the UK (Simon Broome)⁴ and the Dutch Lipid Clinic⁵ sets of criteria that have been statistically and genetically validated. Genetic testing may give a definitive diagnosis of FH by detection of pathological mutation.⁶

CASE PRESENTATION

An 11 year old female child was presented with a 5 year history of skin lesion. The lesion began from the knee and buttock area.

¹ Pediatrician, Pediatric endocrinologist, Email: berushaas@yahoo.com
² Pediatric Resident Department of Pediatrics, St. Paul’s Hospital Millennium Medical Collage, Addis Ababa, Ethiopia
and gradually involved her elbow and flexor area of forearm. She was born from a non-consanguineous marriage and her prenatal, natal and postnatal history was uneventful. She had no past history of illness. The parents denied any family history of chronic illness. Her parents were divorced when she was 2 years old and she was raised by her mother. Physical examination revealed normal vital signs and anthropometry. On dermatologic examination there were multiple nodular yellowish colored lesions over the knee (figure 1), buttock (figure 2), forearm (figure 3), and elbow (figure 4), the maximum measuring 4cm by 5cm.

Laboratory examination showed elevated lipid profile with Total Cholesterol of 698 mg/dl, LDL-C of 646.2 mg/dl, HDL-C was low(27 mg/dl). Triglyceride value was in the normal range. Biopsy taken from the lesion showed focal aggregates of foamy macrophages with a conclusion of Tuberous Xanthoma. The mother’s lipid profile was also done and showed elevated LDL-C value with 261.4 mg/dl. Total Cholesterol was also slightly elevated with 322 mg/dl. HDL-C was 43 mg/dl and Triglyceride value was in the normal range.

All investigations for secondary causes of hypercholesterolemia were non-revealing. The patient fulfilled the ‘definitive’ criteria for FH according to both the UK\(^4\) and Dutch Lipid Clinic\(^4\) criteria for clinical diagnosis of FH. The patient was started on low dose of statin and appointed for 6 weeks to follow up clinic.

Figure 1

Figure 2
DISCUSSION

Familial hypercholesterolemia comprises a minimum of three separate genetic conditions due to mutations in the genes for (i) LDLR, (ii)Apob, and (iii)PCSK9. The consequences of LDLR gene mutations are high total cholesterol and high serum LDL-C. Plasma levels of key lipoprotein particles, including LDL-C levels, are major determinants of the initiation of changes in vascular endothelial damage, of monocyte differentiation into macrophages and foam cell formation, leading to the development of atherosclerotic lesions, premature coronary artery disease (CAD), peripheral arterial disease and valvular disease (predominantly aortic stenosis).

Concerning the targets of treatment in FH guidelines from the US NLA and NICE in the UK recommend a reduction in LDL-C concentration of >50% from levels before treatment in patients with FH. First-line treatment for patients with heFH is with statins. Ezetimibe, a cholesterol absorption inhibitor, use results in compensatory increase in hepatic LDLRs and an about 20% reduction in LDL-C. Bile acid sequestrants also have a strong LDL-C lowering effect and are frequently used at high doses in monotherapy when statins alone are not well tolerated or in combination with statins when statins alone are not able to achieve the LDL-C target. Statins may be effective in some hoFH patients. Ezetimibe combined with a statin resulted in clinically important reductions in LDL-C concentrations in patients with hoFH. The current treatment offered to patients with hoFH is weekly or biweekly apheresis.
Historically, left untreated clinical symptoms of premature cardiovascular disease (CVD) typically manifest in men in their fourth decade and in women in their fifth decade of life in heterozygous FH (heFH). In contrast homozygous FH (hoFH) patients can experience serious cardiovascular events as early as childhood and, on average, in their twenties.¹¹¹³

CONCLUSION

Xanthomas are manifestations of an underlying lipid disorder. Therefore patients as well as their family members should be screened for lipid profiles so that appropriate medications can be started earlier to delay the development of premature CVD. In our patient, we couldn’t trace the father and hence we considered heFH because of epidemiologic reason.¹

Conflict of Interests : None

REFERENCES


Instruction to Authors

1. **Scope**: The Ethiopian Journal of Pediatrics and Child Health (Ethiop J Ped Child Health) is an official organ of the Ethiopian Pediatric Society and regularly publishes merited scientific contributions in the broader field of pediatrics, child health and related to health and medicine with significance to Ethiopia and the World at large. Its broader mission is the advancement of evidence-based Pediatrics and Child Health academics, policy guidance, and care service standards. Regular and Special Supplemental Issues will form the standard publications of the Journal. Conditional to merit and timeliness, the Journal will accept Editorial, Policy Brief, Original Article, Review Article, Brief Communication, Case Study, Teaching Articles, Letters, etc. Review and Teaching Articles will get published upon specific invitation and recommendation by the Editorial Board. With the aim of ensuring highest possible publication quality and thus reputation, the journal will subject all submissions to independent rigorous review to inform decision for or against; minimum of two reviewers for Original Articles. The Editorial Board will guide as well as oversee the quality of the review of submitted manuscripts including the identification of the qualified expertise and acceptance or rejection of a contribution falls under the sole discretion of the Editorial Board. Also, the Editorial Board will implement the utmost effective, efficient, and objective possible review system. Equally, the Editorial Board will observe the fundamental ethical requirements along the review continuum.

2. **Authorship, Acknowledgement, Ethics and Conflict(s) of Interest Policy**: Authorship roles and Acknowledgments need to get cleared upon merit right before submission. The Ethiopian Journal of Pediatrics and Child Health will require optimal ethical fulfillment of research processes and hence thereof products subject for possible publication. Likewise, a prior declaration of possible conflict of interest of the Author(s) is a standard requirement.

3. **Uniformity of the Standard of Practice**: The Ethiopian Journal of Pediatrics and Child Health will follow uniformly applicable standards of practice including formats and style to which Contributing Author(s) are required to fulfill upon submission of a contribution.

4. **Submission and Typescript**: All submissions are to get accepted only through the Editor-in-Chief together with a duly signed by all contributing members (Co-Authors) formal cover letter with clear declaration that the Manuscript has not been published or submitted elsewhere. Submission to the Editor-in-Chief may be made via regular and/or electronic mail enclosures. All forms of manuscripts submitted for consideration of publication must get typed on one side of an A-4 size paper, in double spacing and with 12 point font size, left side margin of 3 cm, right side margin of 1.0 cm, and top-bottom
margins of 1.5 all across. Triple copies of the entire content are required upon hard copy-based submission.

5. **Format and Style:** Overall, the Ethiopian Journal of Pediatrics and Child Health does subscribe to the International Committee of Medical Journal Editors, i.e., Vancouver’s Uniformly Accepted Style which should include author’s or authors’ name(s) and initial(s), full title, correctly abbreviated name of the journal, year, volume number and first and last page numbers (list all authors if six or less; when seven or more list only first three and add et al) for Scientific Articles and Contributing Authors are required to meet the specified Style all across. Reference to a book should contain author’s (s’) name(s) and initials, title of chapter, name of editors, title or book, city and name of publisher, year, first and last page numbers.

For example:


Unless specifically advised, Manuscript contributions should comprise duly structured Abstract (not more than 250 words), concise enough Introduction, Subject and Methods, Results, Discussion, Discussion, Acknowledgements, References, Tables and/or Figures, and other pertinent parts. Abstracts whilst required to get structured accordingly by the main heading parts (Introduction, Subjects and Methods, Results, and Conclusion) will have to get submitted on separate sheet. The title page should contain (i) the title of the article, (ii) Author(s) full names, signature(s), degrees, designations, name of institution of affiliation of the piece of work, most current mailing address, telephone and e-mail contacts of each, and (iii) name and address of the Author to whom all correspondences should get directly addressed to.

6. **Metric System and Scientific terms:** Where applicable the corresponding metric system of nomenclature should be used. All scientific terms should get stated as exactly appearing in the corresponding dictionary of reference for such. Both generic and trademark names may appear in the very first instance of describing a term but only the generic along the subsequent citations.

7. **Abbreviations, acronyms and symbols:** All of the applicable abbreviations, acronyms and symbols are required to get spelled out in full at first appearance and the corresponding abbreviation, acronym and symbol indicated alongside in parenthesis.
8. **Tables and Figures**: Like with all the other components of the Manuscript, Tables, Pictures, Figures and Charts are required to get submitted in triplicates; each should get typed and submitted in separate sheet; clarity and legibility of them are critical. Scientific paper format and style of Tables and Figures must get observed.

9. **References**: Consistent to the specification of the Vancouver’s style, references should be numbered and listed consecutively; typed double-spaced and keyed (cited) to the corresponding text; Author(s) should ensure accuracy of every details of the reference quoted.

10. **Galley Proof**: Galley Proof reading is a standard requirement in order to be able to correct possible editing and type errors in particular. Galley Proof review and revision is set at 98 hours or one week long of return at maximum. The Corresponding Author will take direct responsibility for fulfilling this requirement.

11. **Copyright privileges**: Papers already accepted for publication in the Ethiopian Journal of Pediatrics will automatically become the copy right of the Journal and hence Contributing Authors are required to clear through completing and signing the Copyright Form in accordance prior to actual publication.

12. **Reprints**: Upon publication of the corresponding contribution, at a limit of 25 reprints of the specific issue will get supplied to the Corresponding Author.

13. **Retention policy**: The Editorial Board reserves the right to retain rejected manuscripts.

14. **Updates**: Prospective Contributing Author(s) are advised to regularly check both on the latest hard copy and web site versions of the Journal for possible progressive up-dates of the Guidance and Requirements