Paediatric HIV Infection in Western Africa: The Long Way to the Standard of Care

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Summary

In sub-Saharan Africa, newborns and children continue to suffer from insufficient access to early diagnosis and antiretroviral (ARV) treatments. A survey had been conducted in Burkina Faso, Ghana and Ivory Coast, from January 2010 to February 2011 to identify the major challenges regarding HIV prophylaxis and treatment of children in western Africa. The results of this survey highlight that only a small proportion of HIV-exposed newborns receive ARV prophylaxis. However, this problem is often not perceived at the national level. The problem could be faced by improving the communication process between the peripheral health services and the national procurement system. Moreover, supporting the development of local pharmaceutical industries could facilitate the availability of child-sized drugs, contextualized to the socio-cultural needs of such area, adequate not only in terms of efficacy, safety and tolerability, but also in terms of palatability, storage, distribution and cost.

Key words: pediatric, HIV, prophylaxis, treatment.

Introduction

According to the United Nations Program on HIV/AIDS (UNAIDS), more than 90% of the 2.5 million children living with HIV worldwide live in sub-Saharan Africa; moreover, more than one out of six AIDS-related deaths in this area occur in children [1–3].

HIV infection is more aggressive in newborns and children than in adults. One report estimates that in the absence of antiretroviral therapy (ART) and/or co-trimoxazole prophylaxis, 35% of HIV-infected children in sub-Saharan Africa die in the first year of life, and 53% before the age of two, as compared with a mortality rate of 5 and 8%, respectively, in HIV-uninfected infants. However, in both cases, infant death is also attributable to poverty and its effects, such as unclean water, poor sanitation, inadequate nutrition and limited access to health care [4, 5].

Several studies performed in sub-Saharan Africa outlined that early ART in HIV-infected newborns and children is associated with a dramatic reduction in morbidity and mortality [6–8]. However, mortality rates in HIV-African cohorts remain high, mainly during the period immediately after starting ART, mostly because the treatment is often started late, when the child already presents compromised health conditions because of the associated malnutrition or severe immune depression [7, 9, 10].

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Since all the international HIV treatment guidelines recommend early initiation of ART in vertically HIV-infected infants, the need for paediatric appropriate drug options is greater than before [11]. The problem of getting access to HIV treatment remains the lack of infrastructures for early diagnosis and treatment, the cost for testing and laboratory investigations and the availability of sufficient stocks of antiretroviral (ARV) drugs, especially in child-friendly formulations [4]. Also, the aspects related to product quality have to be considered, because it has been reported that spurious, falsely labelled, falsified and/or counterfeit drugs have sometimes been distributed [12, 13].

Finally, despite the impressive progresses made during the past few years about ARV procurement by several African countries, the situation remains worrisome. In fact, even when ARVs are available, the majority of children are treated with adult fixed-dose combination (FDC) tablets that are split to the approximate paediatric dose [14]. This approach, while giving advantages in terms of improving access to ART and reducing morbidity and mortality, could be responsible for frequent inappropriate dose prescriptions causing early treatment failures, development of drug resistances and disease progression as a medium- to long-term result.

This work analyses the major challenges in treating vertically HIV-infected children in three countries in western Africa.

Materials and Methods

A survey had been conducted in three African countries (Burkina Faso, Ghana and Ivory Coast) from January 2010 to February 2011.

The study was promoted by the Italian Government through the African Development Bank (AfDB) and the partnership between the National Bureau of Technical Studies and Development (BNETD) and the Technology Development for Africa (TDA), a spin-off of Tor Vergata University (Rome, Italy), with the support of the United Nations Programme on HIV/AIDS (UNAIDS) office in Ghana.

Objective of the study was to analyse the real condition of paediatric HIV infection in these western African countries in terms of prevalence, morbidity and ARV availability.

For this intent, three specific working groups composed by the local experts and international consultants were set up. The team work of the international consultant multidisciplinary composed by a paediatrician, a biologist, a chemical engineer, an economist, a UNESCO chairman expert in technology transfer, a public health expert and supported by the representative of UNAIDS and AfDB office in Ghana, designed a specific questionnaire based on literature issues about the needs of African children and, in particular, HIV-infected children [4, 11, 14, 23, 28]. The questionnaire collected the following information: demographic and epidemiological data related to the prevalence of HIV/AIDS and access to HIV treatment in the general population, pregnant women, newborns and children; ARV’s availability with regards to treatment access for newborns and children, including information about the formulations; finally, data about the most common diseases responsible for admission in paediatric age, according to the available public hospitals’ information.

Therafter the questionnaire was filled in by a team of experts of the Ministry of Health (MoH), the National Committee to fight against HIV/AIDS and the General Direction of Pharmacy of each country. The team of experts was composed of an expert in public health, a representative in pharmacists direction, an industrial engineer, a member of national committee to fight against HIV/AIDS, a statistician and a paediatrician.

The results of the questionnaire have been collected and discussed during the working group meetings. Subsequently, they have been partially coded by the epidemiologist to be explained better and they have been integrated and compared with data from UNAIDS and WHO Global Report 2010.

Results

The data provided by the local experts, together with the data obtained from the reports of UNAIDS and WHO 2010, are given in Table 1.

About 40% of the population living in the three countries (Burkina Faso, Ghana and Ivory Coast) is <15 years of age. The prevalence of HIV infection in the general population is 1.6% in Burkina Faso and 3.4% in Ivory Coast; between 0.23 and 0.7% in children <15 years of age in Ghana and Ivory Coast, respectively.

Majority of the women followed during pregnancy and/or at delivery in the public hospitals are tested for HIV, with a disease prevalence rate between 1.4 and 2.2%. However, only 27, 32 and 54% of the pregnant women in Ghana, Burkina Faso and Ivory Coast, respectively, receive ART during pregnancy.

Access to ARV prophylaxis for HIV-exposed newborns is 13% in Ghana and 33% in Burkina Faso and Ivory Coast.

Moreover, whereas the percentage of adult people receiving ART is 24% in Ghana, 46% in Burkina Faso and 28% in Ivory Coast, the proportion in children decline to 12% in Ghana and 17% in Burkina Faso and 15% in Ivory Coast.

According to the 2009 public hospital admissions’ data, HIV remains one of the main causes of morbidity and hospitalization in paediatric age (Table 2).

The results of the questionnaire submitted to the National Pharmacies and the Statistic Health
Services in each country and the national availability of ARVs in paediatric formulations (syrups) are given in Table 3.

According to these data, the personnel working at the national pharmacies reported that the availability of ARVs is adequate, although still not excellent to cover the treatment needs of the peripheral health services. However, they reported that the main obstacle for really adequate availability of drugs is related to the transmission of inaccurate information about the real needs (Ghana and Ivory Coast) from the peripheral health facilities to the national procurement system. An inefficacious storage and/or distribution system (Burkina Faso), and other reasons including sensitization and education of the population, especially the female ones, about HIV infection and transmission (Ghana, Burkina Faso and Ivory Coast), have been reported to be other critical issues.

**Discussion**

African children continue to face huge burden of mortal diseases during both pregnancy and early years of life; diseases often preventable, treatable or controllable with appropriate drugs. Among these, as confirmed by the hospital admission’s data collected...
during this survey conducted in Burkina Faso, Ghana and Ivory Coast (Table 3), HIV remains one of the main causes of disability together with malaria, respiratory and gastrointestinal infections [15–17].

During the past few years, thanks to the efforts of many government, non-governmental and international agencies who worked dreadfully for the procurement and distribution of ARVs in SSA, the availability of ARVs, including paediatric formulations, improved significantly, although remaining inadequate to cover the real needs [18–20].

One important aspect shown by our data is regarding the inconsistency between the low proportion of newborns and children receiving ARV prophylaxis and/or treatment, and the perception of adequacy of the procurement of ART existing at the national level.

In fact, despite the fact that national pharmacies of the evaluated countries are considering the drug availability in paediatric formulations adequate to cover 100% of the national needs, only 13–33% of newborns of HIV-infected women received an appropriate Preventing Mother-to-child Transmission of HIV (PMTCT) prophylaxis, and only 12–17% of children are on ART.

Moreover, the reported diagnostic difficulties in newborns and children could be facilitated by disseminating the Dry Blood Spot testing on filter paper for sample collection, transport and testing, which is easy and cheap, and provides a powerful tool for perinatal screening programmes and for facilitating the early initiation of ART in paediatric HIV infection, as recommended by all the international HIV-treatment guidelines [23, 24].

It is well known that key aspects of treatment access and efficacy in HIV are connected to the awareness of the population, especially women and health workers, on the advantages of ARV treatment in rural area and lack of adequate diagnostic support.

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Table 3

<table>
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<tr>
<th>Drugs</th>
<th>Ghana</th>
<th>Burkina Faso</th>
<th>Ivory Coast</th>
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<tbody>
<tr>
<td>AZT syrup</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<tr>
<td>3TC syrup</td>
<td>3</td>
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<tr>
<td>d4T syrup</td>
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<td>3</td>
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<tr>
<td>ABC syrup</td>
<td>2–3</td>
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<td>2–3</td>
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<tr>
<td>ddI syrup</td>
<td>3</td>
<td>3</td>
<td>2–3</td>
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<tr>
<td>NVP syrup</td>
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<td>LPV/r syrup</td>
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a0: Drug not available; 1: Drug available, but insufficient. Availability allowed to cover <50% of national needs; 2: Drug available, but insufficient. Availability allowed to cover <100% of national needs; 3: Drug available in adequate quantity. Availability allowed to cover 100% of national needs.

b1: Insufficient budget; 2: Inadequate information about the real needs; 3: Inefficacious storage and/or distribution system; 4: Other (minor sensibility of the population, especially women, about the advantage of ARV treatment in rural area and lack of adequate diagnostic support).
appropriate dosing, children acceptability and reducing the number of treatment failures [23, 24].

In fact, an ideal pediatric formulation to target HIV infected African children should have specific characteristics which are not currently taken into consideration by big pharmaceutical companies mostly settled in Developed Countries. For example, even if the syrups remain a useful formulation in newborns and infants, to be well accepted by African children, they should respect the local social-alimentary habits and flavouring of tropical and desert fruits (such as mangoes, bananas and dates) instead of strawberries or vanilla. In this context, following the indications of the WHO and the African Network for Drugs and Diagnostics Innovation (ANDI), it would be crucial to develop a local African unit for the production of ARVs, which should also take into consideration special features of African children such as high enzyme and intestinal activity, higher acidic gastrointestinal pH and reduced fatty mass [27].

Furthermore, the access to ARVs in dry granules or dispersible mini tablets could facilitate distribution and peripheral availability of drugs because such formulations do not need a conservation chain and, therefore, are ideal both for urban, tropical and desert areas [28, 29].

In conclusion, paediatric ARV treatment is successful when implemented with consistent supplies of high-quality drugs in a context of strengthened clinical and social support for children. Unfortunately, this is not the reality for most of the world’s children living with HIV, especially for western African children. This survey shows that antiretrovirals drugs are often available in these countries but do not reach the overall pediatric needs, particularly in rural areas.

Treatment expansion is a multidisciplinary issue, requiring increased development of early diagnosis, information system and the availability of child-sized drugs, specifically formulated to be delivered to newborns and children.

In December 2007, WHO launched ‘make medicines child size’, a global campaign to improve availability and access to paediatric-specific drugs, including ARVs, which will help to focus on the necessary resources to reach this goal.

ARVs formulated in dry granules and dispersible tablets seem to be the answer to all treatment needs for African children. The production of such kind of formulation could be directly organized locally, thus improving the children drugs’ availability and the development of the African paediatric research.

References


