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Integration of HIV services into the National Tuberculosis Program of Cameroon: the experience of the Littoral Province

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ABSTRACT

Objective: To evaluate the implementation of collaborative HIV/TB activities recommended by the World Health Organization in the Littoral Province of Cameroon from 2007 to 2009.**Methods:** Data from the tuberculosis (TB) and HIV registers of 30 health facilities (basic management units for TB) from 2007 to 2009 were analysed. During this time period, standard operating procedures for antituberculous therapy, HIV testing of TB patients, and cotrimoxazole prophylaxis for HIV positive TB patients, had been introduced and monitored. Measures had been taken to ensure the continuous availability of HIV test reagents and cotrimoxazole, and charges for HIV tests and cotrimoxazole had been abolished.**Results:** The HIV testing rate rose from 55.0% in 2007 to 91.7% in 2009 ($P < 0.0001$). The cotrimoxazole prescribing rate in TB/HIV co-infected patients increased from 76.1% in 2008 to 93.5% in 2009 ($P < 0.0001$). The mortality of newly-recruited TB patients fell from 7.2% in 2007 to 3.1% in 2009 ($P < 0.0001$).**Conclusions:** A structured approach towards integration of HIV and TB services effectively improves HIV case detection and cotrimoxazole prescription among TB/HIV co-infected patients in Cameroon. This approach can achieve a significant reduction of the mortality in this patient group.

1. Introduction

Cameroon, a country of about 20.5 million inhabitants, bears a high burden of tuberculosis (TB) and HIV infection. According to the World Health Organization (WHO) estimates of 2012, the TB incidence (all forms) in Cameroon is 190 per 100000 inhabitants, of which 80 are “open” cases (*i.e.* sputum smear positive pulmonary TB). This translates to an expected 37000 TB cases and 15600

“open” TB cases, respectively. In 2004, the prevalence of HIV in the 15-49 years age group was estimated to be 5.5% (men 4.1%, women 6.3%)[1].

No nationwide survey has been done to determine the TB/HIV co-infection rate in Cameroon. One study in the Northwest Province of Cameroon found a HIV prevalence of 68.5% among TB patients, while a study in Douala reported 51.6% of the TB to be HIV positive[2,3].

Like most other countries in sub-Saharan Africa, and in agreement with the WHO recommendations of that time, Cameroon’s policymakers had responded to the AIDS epidemic, and to the surge of TB cases during the 1990’s, by setting up two separate “vertical” programs, the National AIDS Control Program (NACP, established in 1989), and the National Tuberculosis Program (NTP, established in 1997). Over time, the need for coordination and collaboration between these two programs became more evident, and in 2003, the Republic of Cameroon allotted budget funds for the addition of HIV services to NTP. National recommendations were issued to systematically offer HIV

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testing to all TB patients, and cotrimoxazole preventive treatment along with other services, to HIV-infected TB patients. In addition, columns for recording HIV test results and cotrimoxazole treatment were to be added to all TB treatment registers.

In 2004, WHO recommended that, as part of the “STOP TB” strategy for the decade from 2006 until 2015, HIV and TB control services should be combined in order to serve the three purposes of establishing collaboration between HIV and TB services; reducing the burden of TB in patients with HIV; and reducing the burden of HIV in patients with TB[4]. To diminish the HIV burden in TB patients, the WHO recommended five activities: Providing HIV testing and counseling; Introducing HIV prevention methods; Introducing cotrimoxazole preventive therapy for HIV positive TB patients; Ensuring HIV/AIDS care and support; and introducing HIV antiretroviral therapy.

In 2007, an evaluation study carried out by the TB Control Unit of the Littoral Province showed that most of the local hospitals and health centers comprising basic management units (BMUs) for the diagnosis and treatment for TB failed to carry out the national policy, even though the patient fees charged for HIV testing had been waived that year. As a consequence, measures were drafted in order to implement, as a minimum, HIV testing for all TB patients, and preventive cotrimoxazole treatment for all HIV positive TB patients, in all BMUs of the Littoral Province. In addition, measures were taken to ensure an uninterrupted supply of HIV test reagents and cotrimoxazole to all BMUs, and to enforce regular performance monitoring for each BMU.

This study evaluates the functioning of the described collaborative HIV/TB activities during the two years since their implementation in the Littoral Province in 2007, its effects on TB patient care, and consequences for the TB programs of other Cameroonian provinces.

2. Materials and methods

This retrospective study was conducted in the Littoral Province of Cameroon, which includes Douala, the economic capital of Cameroon, with an estimated population of about 3 000 000 inhabitants. The Littoral Province accounts for about 20% of TB cases in Cameroon.

Over the study period, data were obtained from thirty BMUs that provided health care for TB patients. Of these, 18 were government owned, and 12 were church-owned. Data from all TB patients aged 15 years or older, who had been identified and registered by the NTP in the Cameroonian Province of Littoral between the fourth quarter of 2007 and the fourth quarter of 2009, were included in this study.

For this study, data were extracted from the hand-written patient standard TB registers (WHO format) of 30 BMUs, since computerized record-keeping did not exist in any of these health care facilities. Nineteen of these BMUs were situated in the City of Douala, while eleven BMUs were situated in the three rural districts of the Province, Sangara Maritime, Nkam and Moundou. Many health care facilities with BMUs polled for this study were as follows: Center of Pneumology and Tuberculosis, Laquintinie Hospital, Catholic Health Center Barcelone, Urban District Hospital of Bonassama, Hospital “Saint Albert the Great”, District Hospital, District of Deido, Hospital of the District of New Bell, Hospital of the District of Nylon, Integrated Catholic Health Center of Oyack, Military Hospital of Douala, Medical Center of the Arrondissement Cité Sic, Hospital of the District of Log-

Baba, Baptist Hospital at Mboppi-Douala, Catholic Health Center Miséricorde, Medical Center of the Arrondissement de Bépanda, Hospital “Ad Lucem” Bonamoussadi, Hospital of the District of the Cité des Palmiers, General Hospital of Douala, Medical Center of the Arrondissement de Delangue, Catholic Medical Center of the Arrondissement de Dibamba, Health Center of Ekol-Mbeng, District Hospital of Loum, District Hospital of Mbanga, Hospital “Saint John of Malta”, Douala, CEBEC Hospital of Ndongue, District Hospital of Nkondjock, District Hospital of Nkongsamba, Catholic Hospital of Pouma, EPC Hospital of Sakbayémé, District Hospital and District of Yabassi.

In order to extract patient data, one of the authors (JCP) visited each BMU during the second quarter of 2010. These visits had been announced, and their purpose had been explained, by representatives of the Provincial Health Delegation in close cooperation with the German Technical Cooperation (now German International Cooperation).

During these visits, data were extracted from the TB and HIV patient registers of the facilities visited. The data were entered into Microsoft™ EXCEL tables, and summarized for each quarter. In addition, the data from standardized TB treatment registers were cross-checked against the quarterly reports of the NTP, which had been validated by external monitoring. The following parameters were evaluated to obtain both base line data (fourth quarter of 2007) and follow-up data (first quarter of 2008 until fourth quarter of 2009): the number of all newly registered TB patients; the number of the TB patients who agreed to HIV testing and were tested from HIV; the number of positive HIV test results; the number of HIV positive TB patients who received cotrimoxazole prophylaxis; the number of newly-registered TB patients who died during each quarter.

Additional information was obtained through semi-structured interviews with the hosts of each BMU by asking about difficulties encountered while integrating HIV-related services into TB patient care.

Numbers and frequencies were calculated for each category and quarter and analyzed with the software packages statistical analysis systems and “Statistical Package for the Social Sciences” (SPSS) by *Chi-square* testing and Mantel-Haenszel testing. *P* values of 0.05 or lower were considered significant.

3. Results

3.1. Base line evaluation: fourth quarter of 2007

The base line evaluation covered 1 396 newly identified TB patients, registered in 30 health care facilities in the Littoral Province of Cameroon during the fourth quarter of 2007. Only 773 of these (55.0%) were tested for HIV, and 600 of 773 patients (77.6 %) were HIV positive.

Cotrimoxazole prophylaxis for HIV positive TB patients had already been part of the 2004 guidelines of the Cameroonian NTP. However, it was not yet recorded in the TB registers since they did not have a column for recording cotrimoxazole prophylaxis at that time. Interviews with the staff of the BMU’s revealed that other reasons for inconsistent HIV testing and failure to prescribe cotrimoxazole included lack of staff awareness, as well as logistical problems. HIV tests were offered for free only in 11 of 30 health care facilities, while others charged between 500 FCFA (0.76 Euros or 1.01 US dollars at the time) and 3 000 FCFA (4.57 Euros or 6.04 US dollars at the time). In many health care facilities, HIV test kits and

cotrimoxazole were unavailable at that time. In addition, 70.0%-80.0% of the patients reported that logistical or financial difficulties prevented them from traveling to the health care facilities regularly and accessing the needed medical care.

3.2. Organizational measures implemented as a consequence of the baseline evaluation

Standard operating procedures addressing antituberculous therapy, HIV testing of TB patients, and prescribing cotrimoxazole prophylaxis for HIV positive TB patients, were issued for the Littoral Province. The health staff was familiarized with the new rules in the course of their annual workshops as well as during regular meetings outside of the annual workshops. Compliance with these rules was monitored through quarterly program supervision visits, and the staff of the health care facilities received feedback regularly. In addition, regular assessment of the required quantities of HIV test reagents and cotrimoxazole, based on the number of recruited TB patients and on HIV test results, was performed, and the planning and delivery of these materials through the state-owned pharmaceutical supply chains was supervised and improved. All these changes were monitored monthly by a designated staff member in each health care facility who had to file quarterly compliance reports, which also led to improved record-keeping.

Changes in the number of HIV tests performed, HIV positivity rates, and cotrimoxazole prescribing in new TB patients over time are recorded in Table 1.

Table 1

New TB patients, HIV tests performed, HIV positivity rates, and cotrimoxazole prescribing between the 4th quarter of 2007 and the 4th quarter of 2009.

Time period (Quarter)	New TB patients	Pts. tested for HIV [n (%)]	HIV positive patients [n (%)]	Pts. receiving cotrimox. [n (%)]	Patients who died [n (%)]
4-2007	1396	773 (55.0)	600 (77.6)	0* (0.0)	101 (7.2)
1-2008	1547	1118 (72.3)	429 (38.4)	0* (0.0)	85 (5.5)
2-2008	1203	937 (77.9)	347 (37.0)	264 (76.1)	63 (5.2)
3-2008	1383	1118 (80.8)	419 (37.5)	328 (78.3)	68 (4.9)
4-2008	1407	1154 (82.0)	415 (36.0)	392 (94.5)	67 (4.8)
1-2009	1524	1238 (81.2)	454 (36.7)	432 (95.2)	71 (4.7)
2-2009	1396	1200 (86.0)	421 (35.1)	344 (81.7)	62 (4.4)
3-2009	1248	1132 (90.7)	413 (36.5)	385 (93.2)	52 (4.2)
4-2009	1442	1323 (91.7)	433 (32.7)	405 (93.5)	45 (3.1)

*: Cotrimoxazole prophylaxis started with the second quarter of 2008.

Between the 4th quarter of 2007 and the 4th quarter of 2009, between 1 200 and 1 550 new TB patients were identified during each quarter.

The proportion of patients tested for HIV was 55.0% in the 4th quarter of 2007. It rose to 91.7% until the 4th quarter of 2009. This rise was significant ($P < 0.0001$; *Chi-square test*). During the same time, the share of positive HIV test results fell from 77.6% to 32.7% ($P < 0.0001$; *Chi-square test*).

Systematic prescribing of cotrimoxazole for HIV positive TB patients started with the second quarter of 2008, and the proportion of HIV positive TB patients who received cotrimoxazole rose from 76.1% during the second quarter of 2008 to 93.5% during the 4th quarter of 2009 ($P < 0.0001$; *Chi-square test*).

The mortality of newly-recruited TB patients fell from 7.2% during the 4th quarter of 2007 to 3.1% during the 4th quarter of 2009 ($P < 0.0001$; *Chi-square test*).

4. Discussion

While several countries have integrated important components of HIV care into their national TB programs in a fashion similar to the reorganization described here[5-10], this pilot study is, to our knowledge, the first detailed timeline study of the reorganization of a national TB program with the integration of HIV testing. It shows how such a reorganization can greatly improve the rates of HIV testing among TB patients, and the rates of cotrimoxazole prescribing to HIV positive TB patients. It also shows that such a program offers the chance to reduce the mortality in a sample of TB patients with a high prevalence of HIV.

An earlier study of the reorganization of existing TB and HIV programs in the Banteay Meanchey Province of Cambodia had shown that the HIV testing rate among TB patients increased from 432/814 (52.0%) during 2003 (*i.e.* before the reorganization) to 240/322 (71.0%) during the last nine months of 2005 (*i.e.* after the reorganization)[8]. Another study performed in Cambodia confirmed that a significant number of HIV infections can be identified by including HIV testing in the National TB Programme[5], while another study performed in India demonstrated that TB case detection could be improved by combining the diagnostic programs for the detection of HIV and TB, even though in sharp contrast to most regions of sub-Saharan Africa, the HIV prevalence in India is below 1.0%[6]. A 2004/4005 survey of the National TB and HIV/AIDS Programs of the Latin American and Caribbean countries strongly suggests that close cooperation between TB and HIV/AIDS programs will improve the health and the quality of life for persons suffering from both TB and HIV, but that a lack of trained staff is a major obstacle for reaching this goal[7].

The study presented here also notes an association between increased HIV testing rates and decreased HIV positivity rates. An earlier study performed in the Littoral Province during the first trimester of 2007, had shown that, only 451 of the 867 new TB cases (52.0%) were tested for HIV, with 407 of 451 HIV tests (90.2%) giving a positive result[11]. After HIV tests had been offered systematically to all new TB patients starting in 2008, the testing rates increased from 55% during the 4th quarter of 2007 to 91.7% during the 4th quarter of 2009. During the same time, the HIV positivity rate decreased from 77.6% to 32.7%. This decrease was probably due to the fact that, before 2008, HIV tests were offered mainly to patients with clinical symptoms suggesting HIV infection, while, by the end of 2009, over 90% of all patients with newly detected TB were tested for HIV. A similar decrease of the HIV positivity rates among TB patients from 77/432 (18%) in 2003 to 32/230 (14%) was also observed in Cambodia[8].

Another important effect of the reorganization in the Littoral Province of Cameroon was the increase of the proportion of TB-HIV co-infected patients receiving cotrimoxazole prophylaxis from 76.1% in the second quarter of 2008 to 93.5% in the 4th quarter of 2009. During the first trimester of 2007, only 45 of 407 HIV-positive TB patients (11.1%) had received cotrimoxazole prophylaxis in the Province of Littoral[11].

Other African publications describe an increase in the rate of cotrimoxazole prescription from 33% (846/2595) in 2005 to 46% (1835/3955) in 2006 in Kenya[12], and from 0% to 72% (90/125) in Rwanda[9]. One study from Kongo describes a cotrimoxazole prescription rate of 90% (184/205 eligible patients) in a situation where sufficient staff seems available for the follow-up of patients[10]. In the study presented here, the regular staff meetings

and ongoing training and feedback probably have contributed to the high prescribing rates of cotrimoxazole prophylaxis.

This study also shows a decrease in the mortality over time from 7.2% to 3.1% between the 4th quarter of 2007 and the 4th quarter of 2009. Several causes may contribute to the improved survival. Cotrimoxazole, which is used as a prophylaxis against opportunistic infections in HIV, has been shown to decrease morbidity and mortality in HIV infected patients in sub-Saharan Africa[13,14]. This is especially true for HIV/TB co-infected patients[15,16]. Therefore, it is possible, that improved prescribing of cotrimoxazole has contributed to a decrease of mortality described here. Besides preventing “classical” opportunistic infections and common bacterial infections, the antimalarial effect of cotrimoxazole may have played a role as well[17,18].

To summarize, this pilot study shows how a multimodal approach to reorganization of health care programs can improve the performance of a health system in Africa, especially if regular evaluations and meetings offer feedback and encouragement for the staff. The results of this study are in agreement with observations from other countries shows that integration of HIV and TB health services is essential for improving the diagnosis, treatment, and outcomes for patients affected by both diseases[19]. Accordingly, the approach presented here is now used in other Cameroonian provinces as well.

Conflict of interest statement

We declare that we have no conflict of interest.

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