Short-term and long-term outcomes following DOTS-based treatment for tuberculosis patients in Burkina Faso

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A cross-sectional study was initiated in Burkina Faso's National Tuberculosis Programme to confirm successful treatment results within 3 months of completing treatment and to characterise longer-term outcomes 12–24 months after completion. The sample ($n = 278$) included 91 patients who had completed treatment 0–3 months earlier ('short-term' sample) and 187 patients who had completed treatment 12–24 months earlier ('long-term' sample). All sputum specimens from the short-term sample were confirmed as negative. In the long-term sample, among 154 patients with available information, 13 (8%) had died, 24 were not traced, and 117 (76%) were interviewed and had sputum examinations, of which 2 (2%) were smear-positive. Recording of successful treatment outcomes shows good validity.

Tuberculosis (TB) is a major health problem in Burkina Faso, with an estimated incidence of 55 cases per 100 000 population in 2010.¹ TB interventions are coordinated by the National Tuberculosis Control Programme (NTP) and adhere to the DOTS strategy.² The treatment success rate for sputum smear-positive (SS+) patients rose from 25% in 1995 to 76% in 2008 and 2009.^{1–3} No study, however, has previously been carried out in Burkina Faso to evaluate survival and persistence of cure for patients who successfully completed treatment.

The objectives of the present study were to confirm reported successful treatment outcomes of patients who had recently completed treatment, i.e., within the last 3 months, and to characterise longer-term outcomes (e.g., persistent cure, relapse or death) of patients who had completed treatment 12–24 months previously.

METHODS

Study design

In March 2008, a cross-sectional study was undertaken among patients enrolled in Burkina Faso's NTP. Burkina Faso is divided into 13 health regions, each of which includes 3–7 health districts. One district in each region was selected.⁴ In each selected district, all TB diagnosis and treatment centres were included.

Eligible patients were those aged ≥ 15 years, diagnosed with SS+ TB and who had completed treatment and achieved cure 0–3 months (short-term sample) or 12–24 months (long-term sample) previously.

The outcomes of interest were sputum smear results in the short-term sample and survival status with sputum smear results in the long-term sample.

Following these eligibility criteria, and also taking into consideration financial and time constraints, we aimed to select the 10 most recently registered patients for the short-term sample ($n = 130$), and the 25 most recently registered patients for the long-term sample ($n = 325$ patients) in each study district.

Data collection

Information on the selected patients was collected from TB registers, including data on age, sex, type of TB and human immunodeficiency virus (HIV) testing results. Patients were interviewed by a trained investigator on their current health status during a home visit. Two sputum samples for each patient were collected—one before and one after the interview—and analysed using Ziehl-Neelsen staining.

If the patient was away from home, information on current health status was obtained from a relative using a separate proxy questionnaire. A patient was classified as 'not found' if no information was available on his/her whereabouts.

Human subjects approval

The research protocol was approved by the ethics committee for health care research in Burkina Faso and by the Institutional Review Board at Macro International, Calverton, Maryland, USA.

RESULTS

A total of 278 patients met the study inclusion criteria. This total was 39% smaller than the anticipated target sample of 455 patients, as in some districts there were fewer than 25 eligible patients for the specified time period. Of the 278 eligible patients, 194 (70%) were traced for follow-up interview (Table).

Short-term sample

The short-term sample included a total of 91 patients. Among these, 14 were not found and 77 were successfully interviewed. Sputum smear samples were obtained for all of the interviewed patients, and all were confirmed negative.

Long-term sample

The long-term sample included 187 patients, for whom information on survival status was available for 154; 117 patients were alive and found for the interview, 24 patients were not found but were reported to be alive by their relatives and 13 (8.4%) patients were reported to have died (Figure). The sputum smear

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KEY WORDS

tuberculosis; Burkina Faso; DOTS; treatment follow-up

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TABLE Distribution of study participants

	Time since completion of treatment	
	0–3 months (<i>n</i> = 91) <i>n</i> (%)	12–24 months (<i>n</i> = 187) <i>n</i> (%)
Interviewed + sputum smear	77 (85)	117 (63)
Not found, but information available	5 (6)	37 (20)
Not found, no information	9 (10)	33 (18)

examinations of the 117 interviewed patients resulted in two positive cases (1.7%).

The reported cause of death for four patients was TB or a pulmonary disease, while the cause of death for the other nine patients is unknown. Among the 113 patients with HIV test results, 10 were positive, including 9 among the surviving patients and 1 among the 8 patients who had died. For the latter, the underlying cause of death could not be definitively attributed to HIV-positive status.

DISCUSSION

For all interviewed patients in the short-term sample, the sputum smear results confirmed the treatment success reported in the district records. Although the results of anti-tuberculosis treatment

are not always satisfactory in many resource-limited regions,⁵ this study offers encouraging findings regarding the quality of reporting outcomes in Burkina Faso's NTP.

In the follow-up examinations undertaken in the long-term sample, only two patients (1.7%) among the 117 interviewed were found to be smear-positive. These patients may have been positive due to 1) relapse of the original infection, 2) new infection followed by progression to active disease, or 3) misreporting of the original outcome. Based on the data collected in this study, it was not possible to distinguish which of the reasons explain the positive follow-up results.

A substantial proportion (8%) of the patients in the long-term sample had died. Differences in mortality rates based on age, sex, residential area or serological status were not statistically significant, due in part to the small number of overall deaths. However, the proportion of deaths among TB patients in Burkina Faso is lower than the 30% mortality recorded among TB patients in Malawi in 1998.⁶ This difference could be explained in part by the mortality rate calculation from the beginning of treatment in Malawi. High mortality among TB patients has been noted in other developing countries,⁷ and raises questions as to the probable cause of death. Although cause of death was not ascertained in all cases in our study, the cause in 31% of cases was reported to be TB or other lung disease. One possibility is that high mortality is related to co-infection with TB and HIV;^{8,9} however, our study could not positively establish significantly higher mortality due to HIV-positive status.

The main limitation of the present study was the lack of complete patient records, in particular HIV results. Another limitation was the lack of sputum culture results, which are more sensitive than sputum smear microscopy.

CONCLUSION

The results of successful treatment outcomes under Burkina Faso's DOTS programme were validated in follow-up testing after treatment completion. However, it is important to continue efforts to improve the completeness of patient treatment records.

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FIGURE Results of follow-up interviews and examinations among patients who had completed treatment in the previous 12–24 months.

Une étude transversale a été conduite sur le Programme National Tuberculose du Burkina Faso afin de confirmer les résultats du traitement avec succès dans les 3 mois après l'achèvement du traitement et caractériser les résultats à long terme du traitement 12–24 mois après l'achèvement du traitement. L'échantillon ($n = 278$) comptait 91 patients ayant terminé le traitement 0–3 mois plus tôt (échantillon du court terme) et 187 patients ayant terminé le traitement

12–24 mois avant l'enquête (échantillon du long terme). Tous les frottis de crachat de l'échantillon du court terme ont été confirmés négatifs. Dans l'échantillon du long terme, parmi 154 patients dont les informations étaient disponibles, 13 (8%) étaient décédés, 24 n'ont pas été interviewés et 117 (76%) ont été interviewés et subi des examens de crachats, révélant 2 patients (2%) à frottis positif. L'enregistrement des résultats du traitement avec succès montre une bonne validité.

En el marco del Programa Nacional contra la Tuberculosis de Burkina Faso se llevó a cabo un estudio transversal, con el fin de confirmar los resultados de tratamiento exitoso, hasta 3 meses después de haber completado la pauta terapéutica y de caracterizar los desenlaces clínicos a largo plazo, 12 meses y 24 meses después de la compleción. Conformaron la muestra ($n = 278$) 91 pacientes que habían completado el tratamiento como máximo 3 meses antes, en el subgrupo 'de corto plazo', y 187 pacientes que habían completado el tratamiento

entre 12 y 24 meses antes, en el subgrupo 'de largo plazo'. En la rama de corto plazo se confirmó la negatividad de todas las muestras de esputo. En el subgrupo de largo plazo se obtuvo información acerca de 154 pacientes, de los cuales 13 (8%) habían fallecido, 24 no participaron a los entrevistas y 117 (76%) respondieron entrevistas y aportaron muestras de esputo; de estos pacientes examinados, dos pacientes (2%) presentaron una baciloscopia positiva. Se confirmó la validez del registro de los desenlaces terapéuticos favorables.