

The experience of implementing a 'TB village' for a pastoralist population in Cherrati, Ethiopia

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SUMMARY

SETTING: In Cherrati District, Somali Regional State (SRS), Ethiopia, despite a high burden of tuberculosis (TB), TB control activities are virtually absent. The majority of the population is pastoralist with a mobile lifestyle. TB care and treatment were offered using a 'TB village' approach that included traditional style residential care, community empowerment and awareness raising, provision of essential social amenities and essential food and non-food items.

OBJECTIVE: To describe 1) key aspects of the implementation of the TB village approach, 2) TB treatment outcomes and 3) the lessons learnt during implementation.

DESIGN: Descriptive study.

RESULTS: A total of 297 patients entered the TB village between September 2006 and October 2008; 271 (91%) patients were treated successfully, nine (3%) defaulted and 13 (4%) died.

CONCLUSIONS: For pastoralist populations, a TB village approach may be effective for improving access to TB care, ensuring proper adherence to treatment and achieving good overall TB outcomes. The successes and challenges of this approach are discussed.

KEY WORDS: tuberculosis; pastoralists; Ethiopia; TB village

ETHIOPIA has one of the highest burdens of tuberculosis (TB) in the world,¹ with a disproportionately high burden in the Somali Regional State (SRS) of Ethiopia. The latter is most probably linked to the region's long running history of conflict,^{2–5} which has severely undermined the social sector (people are consequently extremely poor),⁶ weakened the health service infrastructure and led to the virtual absence of TB control activities.^{7,8} In addition, most of the population in the SRS are pastoralists (for the purpose of this study, this term refers to nomads or semi-nomads raising cattle and other livestock). The population is typically mobile, frequently migrating with their livestock in search of fresh pasture and water. Conventional TB treatment strategies based on a fixed existing health infrastructure are therefore not adapted to this predominantly mobile group of people.⁹ Finding innovative ways of managing TB in this population and ensuring treatment adherence is vital to ensure good patient and programme outcomes.^{10,11}

In 2005, Médecins Sans Frontières (MSF), in collaboration with the National TB Control Programme (NTP), opened a TB project for pastoralists in Cherrati, a rural district in the South-East region of the

SRS. A holistic 'TB village' approach was used to try to adapt TB services as much as possible to the client and social context. In this study, we 1) describe key aspects of the implementation of the TB village approach, 2) report on TB treatment outcomes and 3) discuss the successes and challenges (lessons learnt) in implementing such a model for TB control.

METHODS

Setting and population

Cherrati is a rural district in the South-East region of the SRS with a population of approximately 79 000, consisting mainly of semi-nomadic pastoralists.

MSF, in collaboration with the NTP, initially conducted TB activities through one health centre in Cherrati town, the district capital. The main target population at this time was TB patients from nearby localities. However, over time, a growing number of patients from distant locations came to seek TB care. These patients were generally poor and had no means of supporting their stay in Cherrati while receiving TB treatment. To overcome this problem, in September 2006, MSF and the NTP decided to pilot a TB

village approach in a locality close to the existing health centre. The time period was slated for 2 years (2006–2008), after which the project was handed over to the NTP. The study analysis thus covers the period from September 2006 to October 2008. To cover the other basic health needs of the patients, their families and those that accompanied them, a primary health care consultation was also offered in the TB village.

Characteristics of the TB village

Patients were suitable for the TB village if they had no-one to accommodate and support them in Cherrati for the duration of their TB treatment. Severely sick patients who were eligible for the TB village were hospitalised until they were stable enough to move into the TB village.

Traditional *tukuls* (constructed from grass and sticks) were built to accommodate patients and their family members (Figure). The TB village was organised into clusters, with each cluster comprising 50 *tukuls*, one kitchen area, four to five latrines and one washing area. In the centre of the village, there was a communal area (for group meetings) and a waste area. Any cattle that patients brought with them were allowed to graze on the land surrounding the village.

During their stay in the village, each patient and one care giver received free food based on the staple diet (rice, beans, oil, meat [intermittently], salt and sugar rations), water and non-food items (such as a mosquito net, a cooking pot, a blanket). Patients and their care givers were provided with kitchen areas to cook for themselves.

To enhance community ownership and empower-

ment, tasks were assigned to patients related to general hygiene, security and food distribution. In addition, a TB village committee, composed of 10–12 TB patients and their care givers (elected by the TB village members), ensured safety and security in the village and helped to ensure communal harmony among patients from different ethnic clans and geographical locations. With inter-clan problems commonplace in the SRS, the village committee was empowered to enforce rules and regulations on harmonious communal living. Individuals who were not prepared to abide by these rules were asked to leave the village and find alternative solutions. Only one patient was expelled from the village. The overall logistics management of the village fell under a logistical village supervisor, employed locally by MSF. TB village meetings were organised on a monthly basis with TB patients and their care givers, to discuss issues such as food distribution, water supply, sanitation, safety and security.

The cost of providing one patient and his/her care giver with a *tukul*, food and non-food items for the entire period of anti-tuberculosis treatment was the equivalent of respectively US\$315 and US\$390 for a 6-month and an 8-month TB treatment regimen.

Table 1 illustrates the key considerations, services and amenities offered in the TB village in Cherrati.

TB diagnosis, treatment and follow-up

TB was diagnosed and managed according to national guidelines.¹² In brief, diagnosis in adults was based on sputum smear microscopy and clinical examination by a medical doctor. TB diagnosis in children was based on the Edwards Score Chart.¹³ Patients were



Figure Example of the TB village *tukuls*. This image can be viewed online in colour at <http://www.ingentaconnect.com/content/ijatld/ijtld/2011/00000015/00000010/art00018>

Table 1 Key considerations, services and amenities offered in a TB village for pastoralists in Cheratti, Ethiopia

Aims	
• Offer a model of TB care to a population that is predominantly mobile and migrant within a framework of very limited/non-existent health infrastructure	
• Offer care that is patient centred and adapted to the cultural and social context	
• Build a residential setting for patients that mirrors as far as possible a traditional lifestyle and way of living	
• Enhance community empowerment, ownership, responsibility and solidarity in TB management and care	
• Have a strong component of community awareness and dissemination of information on TB, including the importance of treatment and treatment adherence	
• Mobilise influential community members (e.g., religious leaders, clan leaders) to impart this knowledge to the wider community	
• Deploy strategies (e.g., financial incentives) to encourage the retention and recruitment of health care staff in a remote setting	
Services and amenities offered	
• Individual household shelters (<i>tukuls</i>) built in the traditional manner	
• Free food rations based on the staple diet (rice, beans, oil, salt and sugar) and cooking facilities, allowing patients and care givers to cook food according to their taste and culture	
• Free non-food items (soap, mat, jerry can, blanket, bed-net, kerosene lamp, cooking utensils)	
• Free water and containers for patients and care givers (minimum 20 l/person/day)	
• Sanitation (latrines) and waste disposal facilities	
• Communal area for group meetings and gatherings	
• Land outside the perimeter of the village for cattle to graze on	
• Security for patients and those accompanying them	
• A community committee that could be contracted to raise issues of concern regarding patient and community welfare	
• A village logistic supervisor to maintain the upkeep of the village	

further categorised into new and retreatment cases according to standard practice.¹²

The different anti-tuberculosis regimens used for treatment and their indications are shown in Table 2. During the first 2–3 weeks of the intensive phase of treatment, patients were directly observed to take each dose of treatment (supervised swallowing of pills) by a health care worker. Thereafter, most patients followed a self-administered treatment (SAT) approach, collecting their drugs once weekly or biweekly during the intensive phase of treatment, and then biweekly during the continuation phase. Patients deemed to be at risk of poor treatment adherence by the management team continued on directly observed treatment (DOT) for as long as was considered necessary. Patients were followed up clinically every 2 weeks during the intensive phase of treatment and once monthly during the continuation phase of treatment.

Patients received two fixed individual counselling sessions, one prior to beginning treatment and one when changing from the intensive to the continuation phase of treatment, together with counselling sessions each time they collected their drugs.

Data collection and statistical analysis

Data from patient treatment cards and the TB registers were cross-checked. The following data were col-

Table 2 TB regimens and indications

TB treatment regimen	Drugs and duration*	Indication
8-month regimen	2RHZE/6EH	Adults with new smear-positive PTB, new smear-negative PTB and new EPTB
6-month regimen†	2RHZE/4RH	Adults with new smear-positive PTB, new smear-negative PTB and new EPTB
Retreatment regimen	2SRHZE/1RHZE/5RHE	Retreatment of any form of TB
Meningitis regimen (8 months)	2RHZS/6EH	TB meningitis in adults and children
Meningitis regimen (6 months)†	2RHZS/4RH	TB meningitis in adults and children
Paediatric regimen 1	2RHZ/4RH, later replaced by 2RHZE/4RH	Children with any form of new TB

*A regimen consists of two phases: the intensive and the continuation phase. The number before a phase is the duration of that phase in months.

†The 6-month regimen replaced the 8-month regimen in July 2007.

TB = tuberculosis; R = rifampicin; H = isoniazid; Z = pyrazinamide; E = ethambutol; PTB = pulmonary tuberculosis; EPTB = extra-pulmonary tuberculosis; S = streptomycin.

lected and entered into an Excel database (Microsoft, Redmond, WA, USA): date of registration, age, sex, treatment regimen, treatment outcome and date of outcome. TB treatment outcomes for all patients were the primary outcome measure of interest, as based on the standard national¹² and World Health Organization definitions.¹⁴ The χ^2 test was used to compare groups where relevant. The level of significance was set at $P \leq 0.05$. Data were analysed using STATA/IC 8.0 software (Stata Corp, College Station, TX, USA).

Formal approval for this study was obtained from the Somali Regional Health Bureau in Ethiopia, together with ethics approval from the MSF ethical review board and the Ethics Advisory Group of the International Union Against Tuberculosis and Lung Disease. Data in this study did not include any patient-identifying information.

RESULTS

Characteristics of the study population

Between September 2006 and October 2008, a total of 340 TB patients were admitted into the TB village in Cherrati. A total of 43 (11%) patients had unknown TB outcomes and were excluded from the study. Close to half of these unknown outcomes relate to a period of instability and conflict in the region and we believe that patient cards were misplaced or lost.

Of the 297 patients included in the analysis, there were 134 (45%) women. Over half ($n = 161$, 54%) had smear-positive pulmonary TB (PTB), 49 (17%) smear-negative PTB and 55 (19%) extra-pulmonary TB. Table 3 shows the baseline characteristics of the 297 patients.

Table 3 Baseline characteristics of TB village patients in Cherrati

Variable	n (%)
Total	297
Sex	
Female	134 (45)
Male	163 (55)
Age, years	
<15	45 (15)
15–34	108 (36)
≥35	144 (49)
Median [IQR]	33 [20–47]
TB type	
New patients	
Smear-positive PTB	161 (54)
Smear-negative PTB	49 (17)
EPTB	55 (19)
Retreatment patients	
Smear-positive PTB	17 (6)
Smear-negative PTB	13 (4)
EPTB	2 (0.7)

TB = tuberculosis; IQR = interquartile range; PTB = pulmonary tuberculosis; EPTB = extra-pulmonary tuberculosis.

TB treatment outcomes

Table 4 shows standardised TB treatment outcomes by TB type, category and regimen. The overall treatment success rate was 91%, while the default and death rates were respectively 3% and 4%. Even when patients with unknown outcomes ($n = 43$) were included in the analysis, the treatment success rate was 80%. Treatment outcomes did not differ significantly between the 8-month and the 6-month regimens (data not shown).

DISCUSSION

This experience shows that for a pastoralist population in Ethiopia, a TB village approach to TB care de-

livery is associated with very high treatment success and low adverse (defaulter and deaths) outcomes.

We believe that the success of the TB village approach in Cherrati is underpinned by a number of factors. First, anecdotal evidence suggests that the most attractive component of the TB village approach to patients (and the main reason for the very low defaulter rate) was the offer of free housing coupled with free food and other amenities. A previous study in Ethiopia found that poor physical access to health care services was one of the main reasons for low TB treatment adherence, and this hurdle for patients was overcome through the TB village approach.¹⁵ Furthermore, the offer of free food in a context where food insecurity is a problem provided a strong incentive for patients to remain in one place for the entire duration of their treatment.¹⁶ Interestingly, after treatment completion, we did not face any problems sending patients away.

Second, we embarked on community awareness activities, targeting and mobilising influential community members (religious leaders, clan elders and traditional healers) to impart knowledge about TB and its treatment to the wider community. With no active case-finding systems present in the SRS, and no health infrastructure to rely on, we believe that the large number of patients who came from distant locations (sometimes more than 100 km away) to seek TB care in Cherrati was due to the extensive TB awareness raising activities undertaken by MSF at the beginning of the project. These activities also likely contributed to the high treatment success and low defaulter rates. Other studies have shown that limited community TB awareness negatively impacts on health-seeking behaviour.^{7,17,18}

Third, we were flexible in using a treatment strategy comprised of 2–3 weeks of DOT during the

Table 4 TB treatment outcomes for pastoralists in Cherrati, Ethiopia ($n = 297$)

	Treatment success* n (%)	Died n (%)	Lost to follow-up n (%)	Transferred out n (%)	Failures n (%)
All TB patients	271 (91.3)	13 (4.4)	9 (3.0)	1 (0.3)	3 (1.0)
TB type					
Smear-positive PTB	166 (93.3)	5 (2.8)	3 (1.7)	1 (0.6)	3 (1.7)
Smear-negative PTB	53 (85.5)	5 (8.1)	4 (6.5)	0	0
EPTB	52 (91.2)	3 (5.3)	2 (3.5)	0	0
TB category					
New TB case	242 (91.3)	12 (4.5)	9 (3.4)	0	2 (0.8)
Retreatment**	29 (90.6)	1 (3.1)	0	1 (3.1)	1 (3.1)
Relapse	26 (92.9)	1 (3.6)	0	0	1 (3.6)
Failure	3 (75.0)	0	0	1 (25.0)	0
TB treatment					
Short-course (6 months)	111 (89.5)	8 (6.5)	4 (3.2)	0	1 (0.8)
Short-course (8 months)	93 (93.0)	2 (2.0)	3 (3.0)	1 (1.0)	1 (1.0)
Retreatment	27 (93.1)	1 (3.5)	0	0	1 (3.5)
Paediatric	35 (89.7)	2 (5.1)	2 (5.1)	0	0

*Includes both patients who were cured and those who completed TB treatment.

**Includes any patient who received at least 1 month of TB treatment in the 5 past years and returns with a diagnosis of TB.

†There were no cases of return after default and no failures.

TB = tuberculosis; PTB = pulmonary tuberculosis; EPTB = extra-pulmonary tuberculosis.

intensive phase of treatment, followed by a SAT approach. In a setting with only one health centre and limited human resources, the SAT approach freed up time for the limited number of health care staff, allowing them to manage larger TB case loads and additional non-TB-related health care activities.

Fourth, we adapted living conditions as much as feasible to the patients' traditional lifestyle as a means of encouraging them to stay in the TB village for the entire duration of treatment. We believe this contributed to the low defaulter rate and allowed effective monitoring of outcomes. The concept of a TB village was first developed and implemented in Kenya in 1987 through the Manyatta Project, which provided TB care and treatment for Kenyan nomads.¹⁹ Unlike our model of care delivery, however, the Manyatta Project provided patients with food and housing only during the intensive phase of treatment, after which patients were discharged from the village to continue a 3-month regimen unsupervised. Among 996 new smear-positive patients treated in two nomadic districts in Kenya, the treatment success rate was 78% and loss to follow-up 21%. The relatively high loss to follow-up using this approach, compared with that observed here, reflects the fact that a substantial proportion of patients never returned for follow-up at the end of treatment and were declared defaulters.

There were a number of challenges associated with running the TB village and the TB project as a whole. First, with the highly attractive offer of free food for 6–8 months, there were reported incidents of 'non-TB' patients bribing staff to be admitted into the village. Second, in a remote context such as Cherrati, recruiting and retaining health care workers proved a major challenge. MSF was able to address this problem to some extent by offering staff higher salaries. Third, with the SRS a conflict-prone area, there were the usual challenges of feasibility and sustainability of interventions, as well as programme quality.¹⁶ During conflict periods, MSF expatriate staff were often evacuated and general standards of supervision and management fell in their absence. This highlights the importance of increased emphasis on national staff capacity development.

The major challenge of implementing a TB village approach nationally in a resource-poor setting such as Ethiopia is the economic implications. In Cherrati, the cost of providing each TB patient with a tukul, food and non-food items alone for the duration of their TB treatment was nearly US\$400. While it has not been possible to conduct a cost-effectiveness analysis of the TB village approach in this paper, these costs need to be weighed against a number of operational considerations: 1) the burden of TB is high among pastoralist communities and interventions to address this are urgently needed; implementing TB treatment is made ever more challenging by the fact that pastoralist communities often dwell in highly

volatile and insecure environments; 2) the health infrastructure is seriously dilapidated, and TB control activities are often absent;^{7,8,20} 3) as health care is not decentralised, geographic access is difficult; and 4) financial and human resources are severely limited. The overall cost of US\$400 should thus be balanced against the usual alternative model, which would have involved the costs and time required to build new TB centres, in-patient wards, provide decentralised transport for supervision teams, etc., which are likely to cost substantially more and would not necessarily ensure high treatment adherence or sustainability. Although we also provided primary care consultations in addition to TB care, it would be worthwhile to consider how a 'platform' like the TB village could be used to address certain other health care needs of the population. Such additions would further increase the cost-effectiveness of TB villages. The ideal would be for national health authorities to run and fund such initiatives. Given that TB control is a global priority and essential to achieving the Millennium Development Goal (MDG) targets, donor funding for such adapted initiatives seems justified as one manner of approaching the TB burden in specific populations.

In settings such as the SRS, other community-based strategies to tackle the high burden of TB among pastoralist populations should also be considered and may be cost-effective.^{20,21} The implementation of 'TB clubs' and the involvement of traditional healers, for example, have been shown to significantly improve treatment adherence.^{22–27}

Finally, a better understanding of the migratory patterns of pastoralist communities may allow for the more strategic placement of health care services to improve access for these communities. The migration patterns of pastoralists vary from a stable migration, where migration takes place between two well-defined grazing areas, to unpredictable migration, guided by the availability of water and pasture.^{8,28} Previous studies have suggested that the migration routes of pastoralists in the SRS are predictable.^{20,28} If this is indeed the case, temporary outreach TB management facilities could be established in strategic villages so that pastoralists are able to access these facilities in both the dry and wet seasons.

In an era where TB control is an international priority, TB control among pastoral communities remains a relatively neglected issue in the Horn of Africa, with many pastoralists still struggling to access TB care²⁹ due to their mobile lifestyle.⁹ A TB village approach may be an effective way of filling the gap of access to TB care while also ensuring good overall TB treatment outcomes.

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R É S U M É

CONTEXTE : Dans le district de Cherrati, État régional Somali (SRS), Ethiopie, en dépit d'un fardeau élevé de tuberculose (TB), les activités de lutte antituberculeuse sont virtuellement absentes. La majorité de la population est constituée d'éleveurs de bétail nomades. Les soins et le traitement de la TB leur ont été offerts en utilisant une approche « TB village » qui comportait des soins résidentiels de style traditionnel, la responsabilisation de la collectivité, l'augmentation de la prise de conscience, la fourniture des ressources sociales essentielles et des items essentiels nutritionnels ou non.

OBJECTIF : Décrire 1) des aspects de la mise en œuvre de l'approche TB village, 2) des résultats du traitement

de la TB et 3) des leçons tirées au cours de la mise en œuvre.

SCHÉMA : Etude descriptive.

RÉSULTATS : Entre septembre 2006 et octobre 2008, 297 patients sont entrés dans le programme TB village ; 271 (91%) ont été traités avec succès, neuf (3%) ont abandonné et 13 (4%) sont décédés.

CONCLUSION : Pour les populations pastorales, une approche TB village peut être efficace pour l'amélioration de l'accès aux soins TB, pour garantir une bonne adhésion thérapeutique et obtenir des résultats globaux favorables dans la TB. Les succès et défis de cette approche sont discutés.

R E S U M E N

MARCO DE REFERENCIA: En el distrito de Cherrati, en el Estado Regional Somali en Etiopía, donde pese a una alta carga de morbilidad por tuberculosis (TB) y prácticamente no existen medidas de control de la TB. La mayoría de la población está compuesta por pastores con un modo de vida nómada. Se ofrecieron servicios de atención y tratamiento de la TB con una estrategia de 'aldea de atención de la TB' (TB village) en la cual se prestaba la atención residencial tradicional, la capacitación y la habilitación de la comunidad, la sensibilización, la provisión de servicios sociales básicos y el suministro de alimentos y otros artículos esenciales.

OBJETIVOS: 1) Describir los aspectos fundamentales de la introducción de la estrategia TB village, 2) evaluar los

desenlaces terapéuticos y 3) analizar las enseñanzas extraídas durante la puesta en práctica de la estrategia.

MÉTODO: Fue este un estudio descriptivo.

RESULTADOS: Entre septiembre del 2006 y octubre del 2008 ingresaron a la aldea de tratamiento de la TB 297 pacientes. Se logró el tratamiento exitoso de 271 (91%) pacientes, se presentaron nueve abandonos (3%) y 13 pacientes fallecieron (4%).

CONCLUSIÓN: La estrategia TB village puede constituir un enfoque eficaz en las poblaciones pastorales, con el fin de mejorar el acceso a la atención de la TB, lograr un buen cumplimiento terapéutico y alcanzar desenlaces clínicos globales adecuados. En el artículo se analizan los éxitos y las dificultades de esta estrategia.