



SHORT COMMUNICATION

Does the type of treatment supporter influence tuberculosis treatment outcomes in Zimbabwe?

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Zimbabwe National Tuberculosis Guidelines advise that direct observation of anti-tuberculosis treatment (DOT) can be provided by a family member/relative as a last resort. In 2011, in Nkayi District, of 763 registered tuberculosis (TB) patients, 59 (8%) received health facility-based DOT, 392 (51%) received DOT from a trained community worker and 306 (40%) from a family member/relative. There were no differences in TB treatment outcomes between the three DOT groups, apart from a higher frequency rate of 'no reported outcomes' for those receiving family-based DOT. Family members should be trained to use a suitable DOT support package.

Zimbabwe is one of the world's 22 high tuberculosis (TB) burden countries, and $\geq 60\%$ of its TB patients are infected with the human immunodeficiency virus (HIV).¹ In 2010, the treatment success rate for new sputum smear-positive TB patients was 81%, lower than the 90% rate recommended by the new Global Plan to Stop TB.²

The World Health Organization's (WHO's) Stop TB strategy recommends supervised treatment and support, including direct observation of treatment (DOT), ensuring that every dose of medication is swallowed under observation. The Zimbabwean National TB Guidelines recommend that DOT should be provided, in order of priority, by a health facility-based worker, a trained community worker or a family member/relative as a last resort, with the belief that untrained family members/relatives might not be the best people to perform DOT.³ However, health facility-based DOT may be challenging due to distances travelled by patients, time spent away from home/work and transport costs. Studies in Thailand, Nepal, Malawi and Tanzania have shown that family- or community-based DOT is associated with good treatment outcomes.⁴⁻⁷

There is no published information on whether TB treatment outcomes are influenced by different types of DOT supporter in Zimbabwe. We therefore conducted this study in a district of Zimbabwe to describe 1) the number and proportions of registered TB patients receiving different types of DOT in relation to baseline characteristics and 2) the association of different types of DOT with TB treatment outcomes.

METHOD

This was a record review-based retrospective cohort study conducted in Nkayi District in Matabeleland

North Province, Zimbabwe. Nkayi is entirely rural, with a population of 130 000 served by 15 rural health centres, one mission hospital and one district hospital. The diagnosis and treatment of TB follow the national guidelines,³ which are based on the WHO treatment guidelines.⁸ New patients receive a standardised daily 6-month rifampicin-containing treatment regimen (2RHZE/4RH), and previously treated cases receive a standardised daily 8-month retreatment regimen, with daily streptomycin (SM, S) injections during the first 2 months along with the other oral medications at a health facility (2SRHZE/1RHZE/5RHE).^{*} Treatment outcomes are well defined,^{3,8} monitored and recorded in the TB registers. There is limited resource capacity to trace patients who default from treatment.

In Zimbabwe, the patients decide on their DOT supporter after receiving counselling at the time of registration, and the initial choice of supporter continues unchanged for the full duration of anti-tuberculosis treatment. Information on the type of DOT supporter is recorded in the TB register. Antiretroviral therapy (ART) for HIV is provided in the ART clinics, with drug intake observed by a family member.

All patients registered in the two TB registers at Nkayi District Hospital and Mbumba Mission Hospital from January 1 to December 31, 2011, were included in the study.

Data variables were collected in September 2012 into a paper-based structured questionnaire from both TB registers; they included age, sex, type and category of TB, type of DOT, HIV status and TB treatment outcomes. The data were single-entered into an electronic EpiData database version 3.1 (EpiData Association, Odense, Denmark). Categorical variables were analysed in relation to type of DOT and TB treatment outcomes using the χ^2 test, odds ratios (OR) and 95% confidence intervals (CI), where appropriate. Levels of significance were set at 5%.

Ethics approval was provided by the Medical Research Council of Zimbabwe and the Ethics Advisory Group of the International Union Against Tuberculosis and Lung Disease.

RESULTS

Of 763 TB patients registered in 2011, fewer than 10% selected health facility-based DOT, 51% selected

*R = rifampicin; H = isoniazid; Z = pyrazinamide; E = ethambutol. Numbers before the letters indicate the duration in months of the phase of treatment.

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KEY WORDS

tuberculosis; DOT; treatment supporter; Zimbabwe; treatment outcomes; operational research

Received 6 January 2013
Accepted 26 April 2013

PHA 2013; 3(2): 146–148
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TABLE 1 Baseline characteristics of patients with tuberculosis in relation to types of DOT in Nkayi District, Zimbabwe, in 2011

Category	Total <i>n</i>	Type of DOT			
		Health facility-based <i>n</i> (%) [*]	Trained community worker <i>n</i> (%)	Family-based <i>n</i> (%)	Not recorded <i>n</i> (%)
All registered TB patients	763	59 (8)	392 (51)	306 (40)	6 (1)
Sex					
Male	369	37 (10)	184 (50)	145 (39)	3 (1)
Female	394	22 (6)	208 (52)	161 (41)	3 (1)
Age group, years					
0–14	90	1 (1)	59 (66)	30 (33)	0
15–49	524	40 (8)	265 (50)	216 (41)	4 (1)
≥50	139	18 (13)	61 (44)	58 (42)	2 (1)
Not recorded	10	0	8 (80)	2 (20)	0
Type of TB					
New smear-positive PTB	144	9 (6)	85 (60)	49 (34)	1 (<1)
New smear-negative PTB [†]	428	17 (4)	237 (55)	173 (41)	1 (<1)
New extra-pulmonary TB	86	3 (3)	33 (38)	47 (55)	3 (4)
Previously treated TB [‡]	102	30 (29)	36 (35)	35 (35)	1 (1)
Not recorded	3	0	1 (33)	2 (67)	0
HIV and ART status					
HIV-positive	556	42 (8)	286 (51)	224 (40)	4 (1)
HIV-negative	201	17 (8)	104 (52)	78 (39)	2 (1)
HIV status not recorded	6	0	2 (33)	4 (67)	0
ART for HIV-positive TB	485	39 (8)	255 (53)	187 (39)	4 (<1)

^{*}Undertaken at one of the hospitals or at one of the rural health centres.

[†]Includes three patients with smears not done.

[‡]Includes relapse smear-positive PTB (*n* = 21), failure of first-line treatment (*n* = 6), treatment after default (*n* = 1) and retreatment others (*n* = 74). DOT = directly observed treatment; TB = tuberculosis; PTB = pulmonary TB; HIV = human immunodeficiency virus; ART = antiretroviral therapy.

trained community worker DOT and 40% selected family-based DOT. Baseline characteristics in relation to type of DOT are shown in Table 1. More males, more adults and more patients previously treated for TB received DOT from health facilities compared with females, children and new patients (*P* < 0.01). More children and more new patients received DOT from trained community workers compared with adults and previously treated patients (*P* < 0.01). Types of DOT were similar in relation to HIV status and initiation on ART.

TB treatment outcomes in relation to type of DOT are shown in Table 2. The outcomes of treatment success, death, loss to follow-up and transfer-out were not significantly different between the different types of DOT. However, significantly more patients receiving family-based DOT did not have their outcomes recorded in the TB register compared with those who received DOT from trained community workers (OR 2.3, 95%CI 1.4–3.8, *P* < 0.01).

DISCUSSION

This is the first study to describe different types of DOT selected by patients in Zimbabwe and to evaluate how these relate to TB treatment outcomes. Fewer than 10% of the patients opted for health facility-based DOT, and these tended to be males, adults and those on retreatment. The latter observation is not surprising, as retreatment regimens involve daily SM injections for 2 months given at a health facility.

Although Zimbabwe's National Tuberculosis Control Programme (NTP) recommends family-based DOT as a last resort, this option was taken up by 40% of the patients. TB treatment outcomes were not different between the three groups of DOT supporter, except that those receiving family-based DOT had a higher frequency of 'no outcomes' recorded in the TB register. This may be related to delays in updating TB registers from the DOT registers maintained at the peripheral health facilities, or a lack of information on deaths and defaulters. This area needs further assessment.

TABLE 2 TB treatment outcomes in relation to different types of DOT, Nkayi District, Zimbabwe, 2011

Category	Starting treatment <i>n</i>	Treatment success <i>n</i> (%)	Died <i>n</i> (%)	Lost to follow-up <i>n</i> (%)	Transfer out <i>n</i> (%)	Failure <i>n</i> (%)	Outcome not recorded <i>n</i> (%)
All TB patients	763	549 (72)	112 (15)	11 (1)	8 (1)	8 (1)	75 (10)
Health facility-based [*]	59	43 (73)	9 (15)	0	0	4 (7)	3 (5)
Trained community worker	392	290 (74)	66 (17)	5 (1)	1 (<1)	4 (1)	26 (7)
Family-based	306	214 (70)	36 (12)	6 (2)	7 (2)	0	43 (14)
Type of DOT not recorded	6	2 (33)	1 (17)	0	0	0	3 (50)

^{*}Health facility-based DOT undertaken at one of the hospitals or at one of the rural health centres.

TB = tuberculosis; DOT = directly observed treatment.

ACKNOWLEDGEMENTS

This research was supported through an operational research course that was jointly developed and run by the Centre for Operational Research; The International Union Against Tuberculosis and Lung Disease, Paris, France; and the Operational Research Unit, Médecins Sans Frontières, Brussels–Luxembourg. Additional support for running the course was provided by the Institute for Tropical Medicine, Antwerp, Belgium; the Center for International Health, University of Bergen; and the University of Nairobi, Kenya.

The authors thank the Ministry of Health and the Child Welfare Zimbabwe staff at the Provincial Medical Director's office and Nkayi District, who participated in the data collection. TB CARE I, Zimbabwe, also provided support for registration costs with the Medical Research Council of Zimbabwe as well as logistics support for data collection in the field. Funding for this course came from an anonymous donor and the Department for International Development, United Kingdom, and Médecins Sans Frontières, Brussels Operational Centre, MSF–Luxembourg. Conflict of interest: none declared.

The strengths of this study are that it was conducted within an NTP setting in a rural district of the country and the most recent annual treatment outcome data were used. Limitations reflect the retrospective nature of the study, with some incomplete outcome data, and we were unable to verify in each of the three categories of DOT supporter whether anti-tuberculosis medications were truly directly observed.

The findings of our study are similar to those reported in Thailand, Nepal, Malawi and Tanzania,⁴⁻⁷ and have implications for Zimbabwe's NTP. Patients with TB in rural areas have difficulty in accessing health facilities,⁹ and are likely to choose family or trained community workers as DOT providers. ART policy allows family members to supervise treatment,¹⁰ and it makes sense to have TB treatment administered in a similar way. The NTP should ensure that some resources are used to better orient and support family members/relatives for DOT.

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Les directives nationales en matière de tuberculose au Zimbabwe conseillent que l'observation directe du traitement antituberculeux (DOT) puisse être fournie par un membre de la famille ou par un autre parent, et ce en dernier ressort. En 2011, dans le District de Nkayi, 762 patients tuberculeux ont été enregistrés, parmi lesquels 59 (8%) ont reçu un DOT à partir des services de santé, 392 (51%) un DOT provenant d'un travailleur formé de la collectivité et 306 (40%) d'un

membre de la famille ou d'un autre parent. Il n'y a pas eu de différences en matière de résultats du traitement de la TB entre ces trois groupes DOT, à l'exception d'une fréquence plus élevée de non-signalement des résultats chez ceux recevant un DOT par un membre de leur famille. Les membres de la famille devraient être formés à utiliser un ensemble adéquat de soutien au DOT.

Las directrices nacionales sobre la tuberculosis (TB) en Zimbabwe recomiendan que, como último recurso, un miembro de la familia nuclear o extensa se pueda encargar de la observación directa del tratamiento antituberculoso (DOT). En el 2011, en el Distrito de Nkayi se registraron 763 pacientes con diagnóstico de TB, de los cuales 59 (8%) recibieron el DOT en un establecimiento de salud, 392 (51%) lo recibieron de un trabajador comunitario capacitado y 306 pacientes (40%)

lo recibieron de un miembro de su familia nuclear o extensa. No se observaron diferencias en los desenlaces terapéuticos entre los tres grupos, con la excepción de una mayor frecuencia de desenlaces no comunicados en el grupo donde un familiar suministraba el tratamiento. Es preciso capacitar a los miembros de la familia sobre la utilización de un módulo apropiado de apoyo al DOT.