Public Health Action

International Union Against Tuberculosis and Lung Disease
Health solutions for the poor

VOL 3 NO 2 PUBLISHED 21 JUNE 2013

Characteristics and treatment outcomes of tuberculosis retreatment cases in three regional hospitals, Uganda

A. Nakanwagi-Mukwaya,[1] A. J. Reid,[2] P. I. Fujiwara,[3] F. Mugabe,[4] R. J. Kosgei,[5] K. Tayler-Smith,[2] W. Kizito,[6] M. Joloba[7]

http://dx.doi.org/10.5588/pha.12.0105

Setting: Three regional referral hospitals in Uganda with a high burden of tuberculosis (TB) and human immunodeficiency virus (HIV) cases.

Objective: To determine the treatment outcomes of TB retreatment cases and factors influencing these outcomes.

Design: A retrospective cohort study of routinely collected National Tuberculosis Programme data between 1 January 2009 and 31 December 2010.

Results: The study included 331 retreatment patients (68% males), with a median age of 36 years, 93 (28%) of whom were relapse smear-positive, 21 (6%) treatment after failure, 159 (48%) return after loss to follow-up, 26 (8%) relapse smear-negative and 32 (10%) relapse cases with no smear performed. Treatment success rates for all categories of retreatment cases ranged between 28% and 54%. Relapse smear-positive ($P = 0.002$) and treatment after failure ($P = 0.038$) cases were less likely to have a successful treatment outcome. Only 32% of the retreatment cases received a Category II treatment regimen; there was no difference in treatment success among patients who received Category II or Category I treatment regimens ($P = 0.73$).

Conclusion: Management of TB retreatment cases and treatment success for all categories in three referral hospitals in Uganda was poor. Relapse smear-positive or treatment after failure cases were less likely to have a successful treatment outcome.

The management of previously treated tuberculosis (TB) patients (retreatment cases) is a challenge for National Tuberculosis Programmes (NTPs) in resource-limited settings such as Uganda, which ranks among the 22 high TB burden countries.[1] From 2009 to 2012, 7.0–7.5% of all TB cases in Uganda were reported to the World Health Organization (WHO) as retreatment cases.[1–4]

WHO case definitions for retreatment cases include relapse smear-positive, treatment after failure, return after loss to follow-up (LTFU) and retreatment other.[5] Studies from India and Africa have shown that retreatment, failure and return after LTFU cases have poor treatment outcomes, with success rates of 50–60%.[6–9] Patient characteristics such as male sex, alcoholism and illiteracy, and health system factors such as long distances to TB clinics, lack of anti-tuberculosis drugs, inadequate health education and poor management of drug side effects are risk factors for return after LTFU or retreatment default.[10–15] Some studies have identified characteristics of retreatment cases that influence their treatment outcomes: having failed or defaulted from initial treatment were risk factors for failure and default among retreatment cases, respectively.[10,13]

NTPs report to the WHO on the treatment outcomes of new sputum smear-positive TB patients and retreatment cases every year. However, outcomes for retreatment cases are not stratified according to the retreatment categories defined above. Such stratification might allow NTPs to identify the most vulnerable groups likely to interrupt treatment, fail, die or have multidrug-resistant TB (MDR-TB), thereby allowing them to prioritise limited resources, such as culture and drug susceptibility testing (DST), and administer the most appropriate treatment.

The present study aims to determine the treatment outcomes of the different categories of retreatment cases and factors influencing these outcomes in Uganda.

METHODS

Design, setting and study sites

This was a retrospective cohort study of routinely collected NTP data in Uganda, a country with a high burden of TB and human immunodeficiency virus (HIV) infection.[1,16] In Uganda, reporting on treatment outcomes of retreatment cases is not stratified by the four categories. This study was carried out in three regional referral hospitals: Gulu, Mbarara and Mbale, chosen because they report high numbers of smear-positive retreatment cases and had over 99% of their new smear-positive cases evaluated between 1 January 2009 and 31 December 2010.[17]

Management of retreatment tuberculosis cases

Although the WHO recommends that all retreatment cases undergo culture and DST,[5] due to limited resources the Ugandan NTP recommends these for smear-positive retreatment cases only. Culture and DST for patients seeking care in public health facilities are performed only at the National TB Reference Laboratory (NTRL). Sputum samples for smear-positive retreatment cases are transported from the peripheral health facilities to the NTRL by the national mail system, POSTA Uganda. Retreatment cases are supposed to receive the WHO Category II regimen.[5]

Patient sample

The study included all TB cases registered as 'relapse', 'failure' or 'default' (return after LTFU) between 1 January 2009 and 31 December 2010.

AFFILIATIONS
1 International Union Against Tuberculosis and Lung Disease, Kampala, Uganda
2 Médecins Sans Frontières (MSF), Operational Centre Brussels, MSF Luxembourg, Luxembourg
3 International Union Against Tuberculosis and Lung Disease, Paris, France
4 National Tuberculosis and Leprosy Control Programme, Ministry of Health, Kampala, Uganda
5 Department of Obstetrics and Gynaecology, University of Nairobi, Nairobi, Kenya
6 MSF Operation Centre Brussels, Kenya Mission, Brussels, Belgium
7 National Tuberculosis Reference Laboratory, Ministry of Health, Kampala, Uganda

CORRESPONDENCE
Anna Nakanwagi-Mukwaya
International Union Against Tuberculosis and Lung Disease
Plot 2 Lourdel Road
Nakasero Hill Wandegeya
PO Box 16094
Kampala, Uganda
Tel: (+256) 754 517 155
Fax: (+256) 414 341 598
e-mail: anakanwagi@theunion.org

KEY WORDS
TB-HIV; ART; NTP; laboratory; operational research

Received 29 December 2012
Accepted 25 February 2013

PHA 2013; 3(2): 149–155

Data collection

Data were sourced from TB health unit registers at the regional referral hospitals and from an electronic database for culture and DST at the NTRL using a structured data form. Variables collected were age, sex, retreatment category, HIV status, being on antiretroviral treatment (ART) or cotrimoxazole preventive therapy (CPT), TB regimen prescribed, number of retreatment cases who received culture and DST and treatment outcomes (cured, completed, failure, interruption, died, transferred out). TB treatment outcomes were based on standard WHO definitions.[5] Data validation could not be performed due to lack of access to individual patient TB treatment cards.

Analysis and statistics

Data were double entered by two independent encoders into a file using EpiData software version 3.1 (EpiData Association, Odense, Denmark). Discordances between the files were resolved by cross-checking with the paper forms. The data were analysed using EpiData Analysis version 2.2. Univariate and multivariate analyses were performed to explore characteristics associated with treatment outcomes. Differences between groups were compared using the χ^2 test for categorical variables, with differences at the 5% level regarded as significant.

Ethics approval

Permission to review TB registers and the NTRL database for culture and DST was granted by the Uganda Ministry of Health, the Directors of the regional referral hospitals and the NTRL. Ethics approval was obtained from the International Union Against Tuberculosis and Lung Disease, Paris, Makerere University College of Health Sciences, Kampala, and the Uganda National Council for Science and Technology, Kampala, Uganda.

RESULTS

Demographic and clinical characteristics of retreatment patients

Of 331 retreatment patients, 58 (18%) were from the Gulu, 116 (35%) from the Mbale and 157 (47%) from the Mbarara regional referral hospitals. The demographic and clinical characteristics stratified by retreatment category are shown in Table 1. Overall, 224 (68%) were males and the median age was 36 years (interquartile range [IQR] 30–44). The most common retreatment category was return after LTFU (n = 159, 48%), followed by relapse smear-positive cases (n = 93, 28%); 188 (57%) retreatment cases were HIV-positive.

Culture and DST

The Figure shows the proportion of sputum samples sent to the NTRL for DST and culture and what proportion underwent these tests. Of the 29 sputum samples received by the NTRL, the majority were for treatment after failure cases (n = 12, 41%) and relapse smear-negative or relapse cases with no smear testing performed (n = 12, 41%). No culture growth was observed in 10 (35%) samples. DST was performed on 18 (62%) samples, for which results were recorded for 89% (16/18).

Among the 114 patients registered as relapse smear-positive or treatment after failure, 15 (13%) had sputum samples sent to the NRTL for culture and DST.

Treatment outcomes

TB treatment outcomes according to the characteristics of the retreatment cases are shown in Table 2. Among the 331 retreatment cases, 180 (54%) had a treatment outcome registered in the health unit register; 94 (28%) cases were transferred out and 57 (17%) had no record of outcome in the register.

Treatment success rates (patients who were cured or completed treatment) were 54% (n = 50/93) for relapse

ACKNOWLEDGEMENTS

The authors thank the Ugandan Ministry of Health, National Tuberculosis and Leprosy Control Programme, the Directors of Gulu, Mbale and Mbarara regional referral hospitals and the Director of the National Tuberculosis Reference Laboratory for their support and for granting permission to conduct this study. The authors also thank R Zachariah for providing guidance in statistical analysis and the interpretation of results.

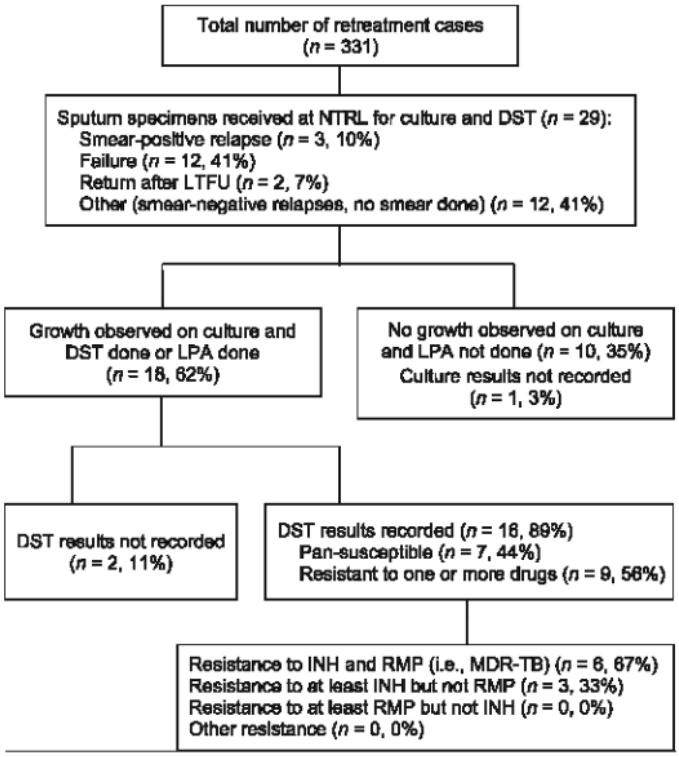
This research was supported through an operational research course that was jointly developed and run by the Centre for Operational Research, International Union Against Tuberculosis and Lung Disease (The Union), Paris, France, and the Operational Research Unit, Médecins Sans Frontières (MSF), Brussels-Luxembourg. Additional support for running the course was provided by the Institute for Tropical Medicine, Antwerp, Belgium, the Centre for International Health, University of Bergen, Bergen, Norway, and the University of Nairobi, Nairobi, Kenya. Funding for the course was from an anonymous donor, the Department for International Development, London, UK, and MSF, Brussels Operational Center, MSF-Luxembourg. Additional funding for this study was provided by The Union, Paris, France.

Conflict of interest: none declared.

TABLE 1 Demographic and clinical characteristics of retreatment tuberculosis patients from three regional hospitals by retreatment category, Uganda

Variable	Total *n* (%)	Relapse, smear-positive *n* (%)	Treatment after failure *n* (%)	Return after LTFU *n* (%)	Relapse, smear-negative *n* (%)	Relapse, no smear done *n* (%)
Total	331 (100)	93 (28)	21 (6)	159 (48)	26 (8)	32 (10)
Sex						
Male	224 (68)	60 (65)	14 (67)	106 (67)	17 (65)	27 (84)
Female	107 (32)	33 (35)	7 (33)	53 (33)	9 (35)	5 (16)
Age, years						
<15	13 (4)	5 (5)	0	4 (2)	1 (4)	3 (9)
15–34	130 (39)	37 (40)	9 (43)	65 (41)	10 (38)	9 (28)
35–54	146 (44)	36 (39)	9 (43)	70 (44)	15 (58)	16 (50)
≥55	42 (13)	13 (16)	3 (14)	20 (13)	0	4 (13)
Median [IQR]	36 [30–44]					
HIV status						
Positive	188 (57)	50 (54)	14 (67)	89 (56)	14 (54)	21 (66)
Negative	105 (31.7)	34 (36)	5 (24)	53 (33.3)	8 (31)	5 (15)
Unknown	1 (0.3)	0	0	1 (0.6)	0	0
Not recorded	37 (11)	9 (10)	2 (9)	16 (10.1)	4 (15)	6 (19)

LTFU = loss to follow-up; IQR = interquartile range; HIV = human immunodeficiency virus.



smear-positive cases, 48% (n = 10/21) for treatment after failure, 31% (n = 50/159) for return after LTFU, 38% (n = 10/26) for relapse smear-negative and 28% (n = 9/32) for relapse cases with no smear performed.

Although the Category II regimen is recommended by the WHO and the NTP for retreatment cases, only 105 (32%) patients received it. Seventy (21%) patients continued to receive the Category I regimen, 155 (47%) received other regimens that were neither Category I nor II, and 1 (0.3%) patient had no record of the treatment regimen. The treatment success rate among the retreatment cases on the Category II regimen was 46% (n = 48/105); it was 47% (n = 33/70) for those on Category I and 31% (n = 48/155) among those who received neither Category I nor II treatment. Treatment success among those receiving ART was 46% (n = 34/73), 39% (n = 16/41) for those not on ART and 17% (36/217) among those with no record of being on ART.

Patients who did not have a record of treatment outcome (n = 57) were excluded from the risk factor analysis. Patients whose HIV, ART or CPT status was unknown, and those on neither

FIGURE Proportion of retreatment cases who underwent culture and DST from three regional hospitals, Uganda. NTRL = National Tuberculosis Reference Laboratory; DST = drug susceptibility testing; LTFU = loss to follow-up; LPA = line-probe assay; INH = isoniazid; RMP = rifampicin; MDR-TB = multidrug-resistant tuberculosis.

TABLE 2 TB retreatment outcomes by patient characteristics, Uganda

Variable	Total *n*	Treatment success *n* (row %)	Failed *n* (row %)	Interrupted *n* (row %)	Died *n* (row %)	Transfer out *n* (row %)	No record *n* (row %)
Total	331	129 (39)	5 (2)	24 (7)	22 (7)	94 (28)	57 (17)
Sex							
Male	224	83 (37)	4 (2)	17 (8)	20 (9)	63 (28)	37 (16)
Female	107	46 (43)	1 (1)	7 (6)	2 (2)	31 (29)	20 (19)
Age, years							
<15	13	6 (46)	0	0	0	3 (23)	4 (31)
15–34	130	55 (42)	4 (3)	9 (7)	5 (4)	33 (25)	24 (19)
35–54	146	54 (37)	1 (1)	11 (7)	16 (11)	41 (28)	23 (16)
⩾55	42	14 (33)	0	4 (10)	1 (2)	17 (41)	6 (14)
HIV status							
Positive	188	83 (44)	2 (1)	14 (7)	16 (9)	45 (24)	28 (15)
Negative	105	31 (29)	2 (2)	10 (10)	4 (4)	34 (32)	24 (23)
Unknown	1	0	0	0	0	1	0
Not recorded	37	15 (40)	1 (3)	0	2 (5)	14 (38)	5 (14)
Retreatment category							
Relapse, smear-positive	93	50 (54)	3 (3)	3 (3)	3 (3)	26 (28)	8 (9)
Treatment after failure	21	10 (48)	1 (5)	0	1 (5)	3 (14)	6 (28)
Return after LTFU	159	50 (31)	1 (0.6)	14 (8.7)	14 (8.7)	51 (32)	29 (18)
Relapse, smear-negative	26	10 (39)	0	4 (15)	0	5 (19)	7 (27)
Relapse, no smear done	32	9 (28)	0	3 (9)	4 (13)	9 (28)	7 (22)
TB treatment regimen							
2SRHEZ/RHEZ/5RHE (Category II)	105	48 (46)	0	2 (2)	9 (9)	33 (31)	13 (12)
2RHEZ/6EH (Category I)	66	33 (50)	0	3 (5)	5 (8)	18 (27)	7 (10)
2RHEZ/4RH (Category I)	4	0	0	0	0	1 (25)	3 (75)
Other	155	48 (31)	5 (3)	19 (12)	8 (5)	41 (27)	34 (22)
Not recorded	1	0	0	0	0	1	0
ART							
Yes	73	34 (46)	0	8 (11)	4 (6)	16 (22)	11 (15)
No	41	16 (39)	2 (5)	1 (2)	3 (7)	15 (37)	4 (10)
Not recorded	217	79 (36)	3 (1)	15 (7)	15 (7)	63 (29)	42 (20)
CPT							
Yes	169	72 (42)	2 (1)	13 (8)	13 (8)	45 (27)	24 (14)
No	40	16 (40)	2 (5)	1 (2)	3 (7)	15 (38)	3 (8)
Not recorded	122	41 (33)	1 (1)	10 (8)	6 (5)	34 (28)	30 (25)

TB = tuberculosis; HIV = human immunodeficiency virus; LTFU = lost to follow-up; S = streptomycin; R = rifampicin; H = isoniazid; E = ethambutol; Z = pyrazinamide; ART = antiretroviral treatment; CPT = cotrimoxazole preventive therapy.

TABLE 3 Characteristics of patients by treatment outcome

Variable	Total *n*	Treatment outcome: Successful *n* (row %)	Treatment outcome: Unsuccessful *n* (row %)	*P* value*
Sex				
Total	274	129 (47)	145 (53)	
Male	187	83 (44)	104 (56)	
Female	87	46 (53)	41 (47)	0.19
Age, years				
Total	274	129 (47)	145 (53)	
≤34	115	61 (53)	54 (47)	
≥35	159	68 (43)	91 (57)	0.09
HIV status				
Total	241	114 (47)	127 (53)	
Positive	160	83 (52)	77 (48)	
Negative	81	31 (38)	50 (62)	0.045†
Retreatment category				
Total				
Relapse smear-positive	274	129 (47)	145 (53)	
Yes	85	50 (59)	35 (41)	
No	189	79 (42)	110 (58)	0.009†
Treatment after failure				
Yes	15	10 (67)	5 (33)	
No	259	119 (46)	140 (54)	0.12
Return after LTFU				
Yes	130	50 (39)	80 (61)	
No	144	79 (55)	65 (45)	0.006†
Relapse smear-negative				
Yes	19	10 (53)	9 (47)	
No	255	119 (47)	136 (53)	0.6
Relapse no smear done				
Yes	25	9 (36)	16 (64)	
No	249	120 (48)	129 (52)	0.2
TB treatment regimen				
Total	152	81 (53)	71 (47)	
Category II	92	48 (52)	44 (48)	
Category I	60	33 (55)	27 (45)	0.73
ART				
Total	99	50 (51)	49 (49)	
Yes	62	34 (55)	28 (45)	
No	37	16 (43)	21 (57)	0.26
CPT				
Total	182	88 (48)	94 (52)	
Yes	145	72 (50)	73 (50)	
No	37	16 (43)	21 (57)	0.48

*χ^2 test for categorical variables.
†Statistically significant.
HIV = human immunodeficiency virus; LTFU = lost to follow-up; TB = tuberculosis; ART = antiretroviral treatment; CPT = cotrimoxazole preventive therapy.

the Category I nor the Category II treatment regimens were also excluded from further analysis. Bivariate analysis of retreatment cases showed that relapse smear-positive ($P = 0.009$), return after LTFU ($P = 0.006$) and HIV status ($P = 0.045$) were significantly associated with treatment success; other categories of retreatment cases ($P \geq 0.05$), sex ($P = 0.19$), age ($P = 0.09$), ART ($P = 0.26$) and CPT ($P = 0.48$) were not. There was no difference in treatment success among patients who received the Category II or Category I regimen ($P = 0.73$; Table 3).

The results of logistic regression (Table 4) show that relapse smear-positive cases had a 59% lower chance of treatment success (odds ratio [OR] 0.41, 95% confidence interval [CI] 0.23–0.73, $P = 0.002$), while treatment after failure cases had a 72% lower chance of treatment success than other categories of retreatment cases (OR 0.28, 95%CI 0.08–0.93, $P = 0.038$). Return after LTFU and HIV status were not significantly associated with treatment outcome.

DISCUSSION

This first in-depth study of retreatment cases in Uganda reveals issues regarding their management that may be cause for concern. Very few retreatment cases underwent culture and DST, and treatment success rates for the different categories were low, ranging between 28% and 54%. These findings suggest a number of operational challenges that have to be addressed if the management of retreatment cases is to improve.

The return after LTFU category formed the largest number of retreatment cases. This is contrary to reports from the NTPs in Malawi and Zimbabwe,[8,18] where relapse smear-positive cases and smear-negative 'others' contributed the highest number of retreatment cases. In Uganda, this finding indicates a weak follow-up system for new TB patients on treatment, and calls for strategies to strengthen it.

Half of the retreatment cases were HIV-positive, a similar proportion to new TB patients in Uganda.[1] Despite a WHO policy of culture and DST for all retreatment cases, together with Uganda's policy of culture and DST for smear-positive retreatment cases, fewer than 15% of smear-positive cases in the three study hospitals had sputum specimens sent to the NTRL for culture and DST, highly compromising the quality of their care. Delays in diagnosis and treatment of MDR-TB increase the risk of mortality and expose the communities where these patients reside to MDR-TB strains. This situation continues to hamper global and national efforts to control MDR-TB.

The study also highlights problems in submitting sputum samples from health facilities to the NTRL. At health facilities, clinicians may have inadequate knowledge about the management of retreatment cases, and consequently may not request culture and DST. There may be problems in the transport system, such as the long distances to the pickup points, lack of transport funds and loss of samples between health facilities and the NTRL. Decentralising culture and DST services, along with education of local health staff, would help to increase the number of retreatment cases who receive culture and DST.

It is worth noting that only one third of retreatment cases received the recommended Category II regimen. A similar finding was observed in Malawi,[9] where 38% of smear-negative 'other' TB cases received the Category II regimen and 51% received Category I. This finding indicates a lack of knowledge of or adherence to national guidelines that could be addressed by training clinicians.

The high transfer-out rate could be explained by the return of referred patients to their home health facilities to continue treatment after a diagnosis of TB. This situation is worsened by a weak follow-up system for these patients. Although the receiving health facilities are responsible for reporting patient treatment outcomes to the referring facilities, this communication is failing. Missing outcomes in the registers could be due to heavy workload and low staffing levels at the health facilities, leading to failure to update the registers. Regular support and supervision could help to identify and address these problems.

Treatment success rates were low for the different categories of retreatment cases: relapse smear-positive cases had better treatment outcomes than other categories, in line with studies conducted in Malawi and Zimbabwe,[8,18] but contrary to a study in India,[19] which showed that 'retreatment other' (including patients with smear-negative TB) had better treatment outcomes than patients with smear-positive TB. The low success rate among the 'relapse no smear done' category may be related to their being treated for other conditions, as TB was not bacteriologically confirmed.

The study shows that relapse smear-positive and treatment

TABLE 4 Factors associated with a successful treatment outcome

Variable	Successful outcome *n/N* (%)	OR (95%CI)	Adjusted OR (95%CI)*	*P* value
Sex				
Male	83/187 (44)	1		
Female	46/87 (53)	0.71 (0.43–1.19)		
Age, years				
≤34	61/115 (53)	1		
≥35	68/159 (43)	1.5 (0.93–2.45)		
HIV status				
Positive	83/160 (52)	1		
Negative	31/81 (38)	1.74 (1.008–2.9)	0.58 (0.33–1.009)	0.054
Retreatment category				
Relapse, smear-positive				
Yes	50/85 (59)	1		
No	79/189 (42)	1.98 (1.18–3.3)	0.41 (0.23– 0.73)	0.002†
Treatment after failure				
Yes	10/15 (67)	1		
No	119/259 (46)	2.35 (0.78–7.1)	0.28 (0.08–0.93)	0.038†
Return after LTFU				
Yes	50/130 (39)	1		
No	79/144 (55)	0.5 (0.32–0.83)		
Relapse, smear-negative				
Yes	10/19 (53)	1		
No	119/255 (47)	1.27 (0.5–3.23)		
Relapse, no smear done				
Yes	9/25 (36)	1		
No	120/249 (48)	0.6 (0.26–1.42)		
TB treatment regimen				
Category II	48/92 (52)	1		
Category I	33/60 (55)	0.89 (0.46–1.71)		
ART				
Yes	34/62 (55)	1		
No	16/37 (43)	1.59 (0.7–3.62)		
CPT				
Yes	72/145 (50)	1		
No	16/37 (43)	1.29 (0.63–2.67)		

*Adjusted using multivariate logistic regression.
†Statistically significant.
OR = odds ratio; CI = confidence interval; HIV = human immunodeficiency virus; LTFU = lost to follow-up; TB = tuberculosis; ART = antiretroviral treatment; CPT = cotrimoxazole preventive therapy.

after failure cases were less likely to have a successful treatment outcome. Such cases were likely to develop MDR-TB following previous treatment,[20–22] and were therefore less likely to have a successful outcome. Treatment success did not differ by HIV status, a finding similar to a study from Zimbabwe.[18] However, contrary to findings from other studies,[23,24] treatment success among patients who received ART were not different from those who did not receive ART. The same was observed regarding the influence of CPT on treatment outcomes. This lack of differences could be explained by the small patient numbers, which did not give enough power to detect a statistically significant difference.

Treatment success rates were not different for groups that received the Category I or II regimens. This could be explained by the similarity of the two regimens, which consist of the same antituberculosis drugs except for the addition of streptomycin in the Category II regimen.

A strength of this study was that the three hospitals had a large number of retreatment cases and nearly all of the results were recorded. Another strength was that the study was carried out under routine programme conditions, increasing the likelihood that the NTP management will accept and utilise the findings to improve policy and practice with regard to management of retreatment cases.

Limitations of the study included the fact that only three hospitals were studied, and the results may not be generalisable to the whole country. Missing data in the TB health unit registers and the NTRL electronic database made it difficult to ensure completeness of data capture. No copies of the patient's TB treatment card were available at the health facilities to validate the information in the registers, making it difficult to ascertain the accuracy of information recorded in the register. Although the WHO classifies retreatment cases with smear-negative TB or no smear done cases under the category 'other', in this study these categories were analysed separately and included relapse smear-negative and relapse cases with no smear done. This is because they were recorded that way in the TB registers and it was felt important to analyse them separately to enable the NTP to respond appropriately to the problems affecting the different categories. However, a limitation is that these results may not be comparable with studies that used the WHO 'other' category. Very few retreatment cases had their sputum samples received at the NTRL for culture and DST. More retreatment cases than have been reported here could have received culture and DST as part of a national drug resistance survey that partly overlapped the study period. Unfortunately, culture and DST information collected for that survey could not be accessed by the NTRL, as the NTRL staff was blinded to this information. The findings of the number of cases that received culture and DST from the three hospitals may therefore have been underreported here. It will be important to perform a further analysis when the information on the survey is unblinded.

In conclusion, management of TB retreatment cases in three regional referral hospitals in Uganda was weak and treatment success rates for all categories of cases were low (below 55%). Relapse smear-positive and treatment after failure patients were less likely to have a successful treatment outcome. Decentralising culture and DST services, adherence to international and national TB guidelines and strengthening the follow-up system for TB patients are recommended to improve the management of TB retreatment cases in Uganda.

References

1 World Health Organization. Global tuberculosis report 2012. WHO/HTM/TB/2012.6. Geneva, Switzerland: WHO, 2012.
2 World Health Organization. Global tuberculosis report 2009. WHO/HTM/TB/2009.411. Geneva, Switzerland: WHO, 2009.
3 World Health Organization. Global tuberculosis report 2010. WHO/HTM/TB/2010.7. Geneva, Switzerland: WHO, 2010.
4 World Health Organization. Global tuberculosis report 2011. WHO/HTM/TB/2011.16. Geneva, Switzerland: WHO, 2011.
5 World Health Organization. Treatment of tuberculosis: guidelines for national programmes. 4th ed. WHO/HTM/TB/2009.420. Geneva, Switzerland: WHO, 2009.
6 Mukherjee A, Sarkar A, Saha I, et al. Outcomes of different subgroups of smear-positive retreatment patients under RNTCP in rural West Bengal, India. Rural Remote Health 2009; 9: 926.
7 Ottmani S-E, Zignol M, Bencheikh N, et al. Results of cohort analysis by category of tuberculosis retreatment cases in Morocco from 1996 to 2003. Int J Tuberc Lung Dis 2006; 10: 1367–1372.
8 Tabarsi P, Chitsaz E, Tabatabaei V, et al. Revised Category II regimen as an alternative strategy for retreatment of Category I regimen failure and irregular treatment cases. Am J Ther 2011; 18: 343–349.
9 Tweya H, Kanyerere H, Ben-Smith A, et al. Retreatment tuberculosis cases categorised as 'Other': are they properly managed? PLoS ONE 2011; 6: e28034.
10 Dooley K E, Lahlou O, Ghali I, et al. Risk factors for tuberculosis treatment failure, default, or relapse and outcomes of retreatment in Morocco. BMC Public Health 2011; 11: 140.
11 Anyama N, Sseguya S, Okwera A, et al. The challenge of retreatment pulmonary tuberculosis at two teaching and referral hospitals in Uganda. Afr Health Sci 2007; 7: 136–142.
12 Gninafon M, Tawo L, Kassa F, et al. Outcome of tuberculosis retreatment in routine conditions in Cotonou, Benin. Int J Tuberc Lung Dis 2004; 8: 1242–1247.
13 Bhagat V M, Gattani P L. Factors affecting tuberculosis retreatment defaults in Nanded, India. Southeast Asian J Trop Med Public Health 2010; 41: 1153–1157.
14 Jha U M, Satyanarayana S, Dewan P K, et al. Risk factors for treatment default among retreatment tuberculosis patients in India, 2006. PLoS ONE 2010; 5: e8873.
15 Elbireer S, Guwatudde D, Mudiope P. Tuberculosis treatment default among HIV-TB co-infected patients in urban Uganda. Trop Med Int Health 2011; 16: 981–987.
16 Ministry of Health, Uganda. Uganda HIV/AIDS Sero-Behavioural Survey, 2004–05. Kampala, Uganda: MoH, 2006.
17 Ministry of Health, Uganda. Annual Tuberculosis Control Reports, 2009–2010. Kampala, Uganda: MoH, 2010.
18 Takarinda C K, Harries A D, Srinath S, et al. Treatment outcomes of adult patients with recurrent tuberculosis in relation to HIV status in Zimbabwe: a retrospective record review. BMC Public Health 2012; 12: 124.
19 Srinath S, Sharath B, Santosha K, et al. Tuberculosis 'retreatment others': profile and treatment outcomes in the state of Andhra Pradesh, India. Int J Tuberc Lung Dis 2011; 15: 105–109.
20 Saito W, Nagayama N, Miyamoto M, et al. Characteristics and treatment outcomes of INH-resistant or RFP-resistant tuberculosis. Kekkaku 2003; 78: 611–617.
21 Yoshiyama T, Yanai H, Rhiengtong D, et al. Development of acquired drug resistance in recurrent tuberculosis patients with various previous treatment outcomes. Int J Tuberc Lung Dis 2004; 8: 31–38.
22 Yoshiyama T, Shrestha B, Maharjan B. Risk of relapse and failure after retreatment with the Category II regimen in Nepal. Int J Tuberc Lung Dis 2010; 14: 1418–1423.
23 Jones-Lopez E C, Ayakaka I, Levin J, et al. Effectiveness of the standard WHO recommended retreatment regimen (Category II) for tuberculosis in Kampala, Uganda: a prospective cohort study. PLoS Med 2011; 8: e1000427.
24 Worodria W, Massinga-Loembe M, Mazakpwe D, et al. Incidence and predictors of mortality and the effect of tuberculosis immune reconstitution inflammatory syndrome in a cohort of TB/HIV patients commencing antiretroviral therapy. J Acquir Immune Defic Syndr 2011; 58: 32–37.

Contexte : Trois hôpitaux régionaux de référence en Ouganda où le fardeau de la tuberculose (TB) et du virus de l'immunodéficience humaine (VIH) est élevé.
Objectif : Déterminer les résultats du traitement de cas de retraitement de la TB et les caractéristiques qui ont une influence sur ces résultats.
Schéma : Etude rétrospective de cohorte des données colligées en routine par le Programme National de Tuberculose entre le 1er janvier 2009 et le 31 décembre 2010.
Résultats : On a étudié au total 331 patients en retraitement (68% d'hommes) d'un âge moyen de 36 ans. Il s'agissait chez 93 (28%) de rechutes à bacilloscopie positive, chez 21 (6%) d'un traitement après échec, chez 159 (48%) d'un retour après perte de vue, chez 26 (8%) d'une rechute à bacilloscopie négative et chez 32 (10%) d'une rechute sans contrôle du frottis. Les taux de succès du traitement pour toutes ces catégories de cas de retraitement ont varié entre 28% et 54%. Les cas de rechute à bacilloscopie positive ($P = 0,002$) et les traitements après échec ($P = 0,038$) ont été moins susceptibles de connaître un résultat de traitement couronné de succès. Le régime de traitement de Catégorie II n'a été administré qu'à 32% des cas de retraitement. On n'a pas noté de différences de succès du traitement entre les patients qui ont reçu les régimes de Catégorie II ou de Catégorie I ($P = 0,73$).
Conclusion : La prise en charge des cas de retraitement de TB et les succès du traitement pour toutes les catégories ont été médiocres dans les trois hôpitaux de référence en Ouganda. Les cas les moins susceptibles de connaître un résultat de traitement couronné de succès sont les rechutes à bacilloscopie positive ou les cas de traitement après échec.

Marco de referencia: Tres hospitales regionales de referencia en Uganda, un país donde existe una alta carga de morbilidad por tuberculosis (TB) e infección por el virus de la inmunodeficiencia humana (VIH).
Objetivo: Analizar los desenlaces terapéuticos en los casos de retratamiento de la TB y determinar las características que influyen en estos desenlaces.
Métodos: Se llevó a cabo un estudio retrospectivo de cohortes a partir de los datos recogidos de manera sistemática en el Programa Nacional contra la Tuberculosis entre el 1° de enero del 2009 y el 31 de diciembre del 2010.
Resultados: Se incluyeron en el estudio 331 pacientes en retratamiento (68% de sexo masculino) cuya mediana de la edad fue 36 años. Noventa y tres casos (28%) correspondieron a recaídas con baciloscopia positiva, 21 casos (6%) a fracaso terapéutico, 159 (48%) a recuperación tras pérdida durante el seguimiento, 26 (8%) a recaídas con baciloscopia negativa y 32 casos (10%) fueron recaídas sin estudio microscópico. Las tasas de éxito terapéutico en todas las categorías de casos de retratamiento oscilaron entre 28% y 54%. Los casos de recaída con baciloscopia positiva ($P = 0,002$) y de retratamiento posterior a fracaso terapéutico ($P = 0,038$) exhibieron una menor probabilidad de lograr un tratamiento eficaz. Solo el 32% de los

casos de retratamiento recibieron un régimen terapéutico de Categoría II; no se observó ninguna diferencia en la tasa de éxito del tratamiento entre los pacientes que recibían regímenes de Categoría I o II ($P = 0,73$).

Conclusión: El manejo de los casos de retratamiento de la TB y el desenlace terapéutico obtenido en todos los grupos de pacientes fue deficiente en los tres hospitales de referencia de Uganda. Los casos que exhibieron una menor probabilidad de obtener un desenlace terapéutico favorable fueron los casos de recaída con baciloscopia positiva y los de retratamiento posterior a un fracaso terapéutico.

Public Health Action (PHA) The voice for operational research.
Published by The Union (www.theunion.org), PHA provides a platform to fulfil its mission, 'Health solutions for the poor'. PHA publishes high-quality scientific research that provides new knowledge to improve the accessibility, equity, quality and efficiency of health systems and services.

e-ISSN 2220-8372
Editor-in-Chief: Donald A Enarson, MD, Canada
Contact: pha@theunion.org
PHA website: http://www.theunion.org/index.php/en/journals/pha
Article submission: http://mc.manuscriptcentral.com/pha