A review of Outcomes of Treatment among 29 cases of Extensively Drug Resistant Tuberculosis in Johannesburg

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Abstract

The purpose of this study was to describe the outcomes of treatment in patients suffering from Extensively Drug Resistant Tuberculosis (XDR-TB) who had been admitted to a specialised resistant tuberculosis treatment health facility in Johannesburg from January to December 2010. A review of records was undertaken using a data extraction form designed specifically for this study. The data collected were socio-demographic such as age, sex and employment status; clinical data such as the duration of treatment, drugs used, adverse effects, co-morbidities and outcomes of treatment. It was found that, overall, treatment outcomes were poor as the treatment success (cured plus completed) was 20.7% while 27.6% had defaulted treatment and 20.7% had died. Of those who died, 50% had been HIV-positive, 33.3% had renal failure and 16.7% had hypertension. In conclusion, treatment outcomes in XDR-TB patients at the study site had been very poor. This situation calls for more efforts to be put into decreasing the proportion of patients who default treatment; introduce new effective drugs and manage well co-morbidities that affect these patients.

Key words: Resistant tuberculosis, outcomes of treatment, new drugs

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Introduction

Multi-drug resistant tuberculosis (MDR-TB) and extensively drug resistant tuberculosis (XDR-TB) are forms of tuberculosis that are a global concern. Worldwide, it is estimated that 3.3% of new and 20% of retreatment cases harbour MDR-TB resistant strains of Mycobacterium tuberculosis, of whom 9.7% have been proven to be XDR-TB (WHO, 2015). In South Africa, sadly, the number of MDR-TB cases have been increasing, nearly doubling from 7,350 cases in 2007 to 14,161 in 2012 (SANAC, 2016).

Moreover, the treatment of MDR-TB and XDR-TB is known to be lengthy and expensive. Among XDR-TB cases, treatment outcomes are poor with a case fatality and treatment failure rates of over 40%, default rates of about 30% and treatment success rate of less than 40% (SANAC, 2016; Migliori et al, 2013; Ahuja et al, 2012). With XDR-TB believed to result from poorly managed MDR-TB, the ranking of South Africa as the third highest country in terms of TB incidence and having the highest number of MDR-TB and XDR-TB in the African region, this situation is worrying and calls for more research into this topic (WHO, 2013; WHO, 2014; Shean et al, 2013). The above observations suggest that there is a need for interventions to improve this situation; this study endeavoured to contribute to build the evidence needed to establish the factors affecting treatment outcomes in patients suffering from XDR-TB.

Methods

A review of records was undertaken at a specialised resistant tuberculosis treatment health facility in Johannesburg, South Africa. A data extraction form designed specifically for this study was used to collect socio-demographic such as age, sex and employment status; clinical data such as the duration of treatment, drugs used, adverse effects, co-morbidities and outcomes of treatment. Records reviewed were for patients treated at the facility from January to December 2010. Data was captured into MS-Excel. The capturing was checked by means of reviewing the print-out. The print-out was cross-checked with the original data on the data collection forms to ensure that each variable was recorded properly.

Only descriptive statistics were calculated; no statistical testing was undertaken owing the design of the study and the small number of cases included in the analysis. A pre-testing of the data collection instrument was carried out at a nearby hospital in order to identify whether all data could be obtained from patients' files and if there was any problem in the structure of the

instrument, the wording of the questions and the coding of the responses. A total of 20 files were retrieved and used for pre-testing. From the observations, a response category ‘’not specified or other-please specify’’ was added accommodate a range of possible responses found or missing from the records.

Ethics approval was obtained from the University of South Africa Ethical Clearance Committee prior to the commencement of the study and permission to access patients’ records was obtained from the Gauteng Provincial Department of Health.

Results

Of the 29 cases analysed, the majority of them were males and unemployed. Their age ranged from 15 to 83 years. Although their median age was 37 (±12.48) years, the majority of these patients were less than 37 years old (Figure 1).

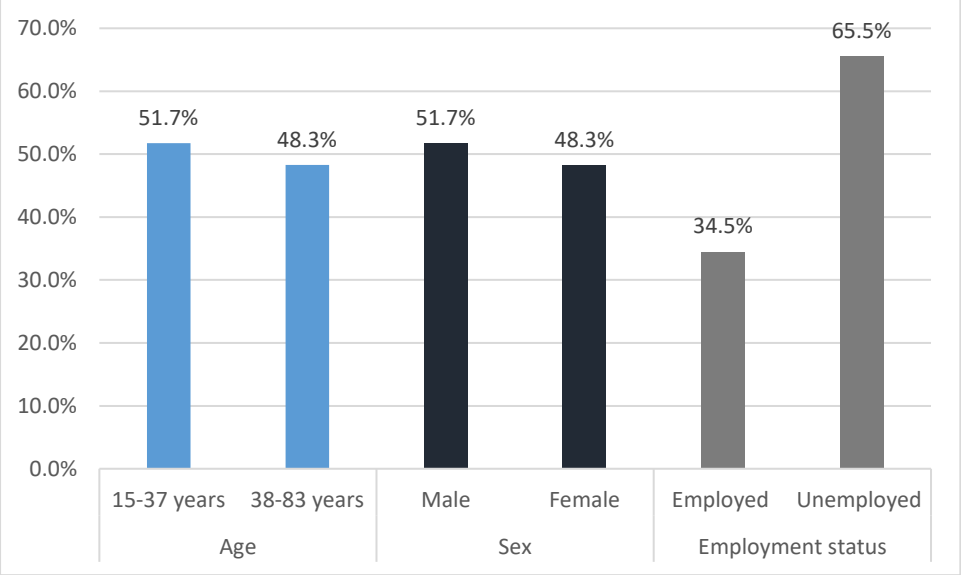

Figure 1: Socio-demographic characteristics of XDR-TB patients at the study site

Since treatment of XDR-TB requires a long treatment period, the mean duration of treatment was 9.1 (±8.6) months; ranging from 1 to 24 months (Figure 2).

Figure 2: Length of tuberculosis treatment (in months) among XDR-TB patients

Over 80% of patients were prescribed a regimen containing para-aminoacid (PAS), pyrazinamide, terizidone, capreomycin and moxifloxacin (Table 1).

Table 1: Medicines prescribed to XDR-TB patients at study site (n=29)

Medicines Prescribed	Frequency	Percent
PAS	29	100,0
Pyrazinamide	26	89,7
Terizidone	26	89,7
Capreomycin	25	86,2
Moxifloxacin	23	79,3
Ethambutol	7	24,1
Ethionamide	7	24,1
Kanamycin	2	6,9
Ofloxacin	1	3,4

As expected, most patients suffered from some adverse effects. The most common adverse effects that occurred in at least 20% of patients were anaemia, thrombocytopenia, nausea and vomiting, peripheral neuropathy, renal failure and skin rashes (Table 2).

Table 2: Adverse effects experienced by XDR-TB patients (n=29)

Adverse effects	Frequency	Percent
Anaemia	15	51.7
Thrombocytopenia	15	51.7
Nausea and vomiting	12	41.4
Peripheral neuropathy	8	27.6
Renal failure	8	27.6
Skin rashes	6	20.7
Ototoxicity	5	17.2
Leukopenia	5	17.2
Jaundice	4	13.8
Palpitations	3	10.3
Headaches	2	6.9
Muscles cramps	1	3.4

In addition, these patients suffered from co-morbidities. The most common co-morbid condition was HIV as it affected over 60% of people suffering from XDR-TB in this study (Table 3).

Table 3: Co-morbidities suffered by XDR-TB patients (n=29)

Co-morbid condition	Frequency	Percent
HIV	19	65.5
Psychiatric conditions	5	17.2
Hypertension	3	10.3
Diabetes	3	10.3
Obesity	2	6.9
Syphilis	1	3.4

It is worth noting that the outcomes of treatment were poor. Only 20.7% had a successful treatment outcome (Cured plus completed the treatment course).

Sadly, a similar number of patients died (Figure 3). Of those who died, 50% (3) had been HIV-positive, 33.3% (2) had renal failure and 16.7% (1) had hypertension.

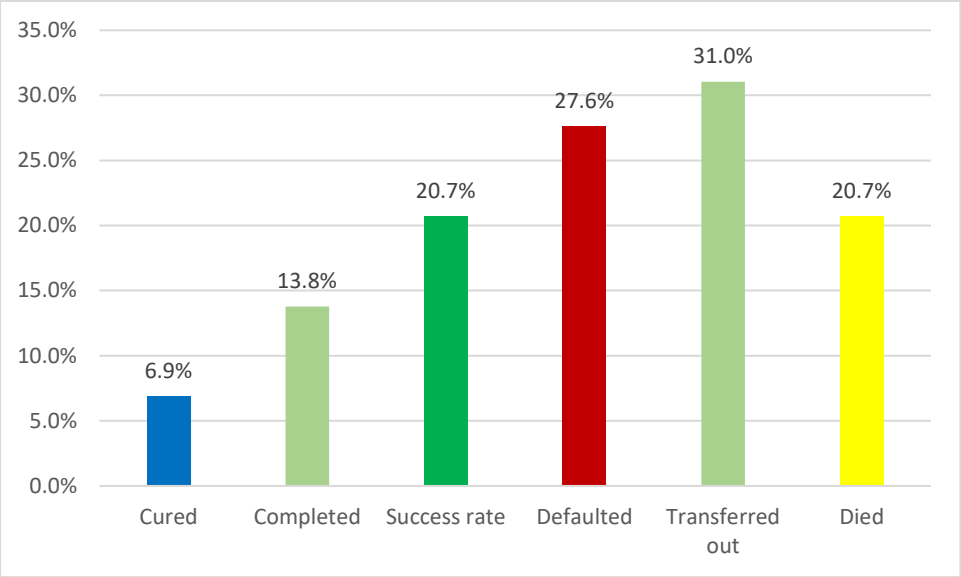

Figure 3: Outcomes of TB treatment among XDR-TB patients at the study site (n=29)

Discussion

This review of XDR-TB patients shows a distribution of XDR-TB among female and male cases to be similar to the distribution of this condition as reported by other investigators; and confirms that unemployment and other factors affect the acquisition of this condition and the treatment seeking behaviour. Indeed, in this study the majority of patients were unemployed (Johansson et al, 2000; Smith et al, 2016; Otwombe et al, 2013).

The regimen prescribed to patients in this study is in line with the national and international guidelines for the treatment of XDR-TB. The drugs prescribed were selected based on the stepwise use of second-line TB drugs whose choice is guided by drug susceptibility testing (Pontali et al, 2016; Falzon et al, 2011; WHO, 2014). As documented in other settings, patients in this study exhibited similar profiles of adverse effects experienced and co-morbidities (Mohammed et al, 2015). This finding concurs with the view that existing TB drugs exhibit higher levels of toxicities and that newer and safer medicines are urgently required to treat extremely resistant tuberculosis (Sotgiu et al, 2015; Caminero et al, 2010; Salfinger et al, 2015). For this reason, South Africa, should consider registering and using newer drugs that appear to

be a little more effective and well tolerated. These drugs include bedaquiline, delamanid and others (Matteeli et al, 2015; Pym et al, 2016; Pontali et al, 2013).

Moreover, the treatment success in this group of patients is actually similar to reports from the national TB program and from other settings (Migliori et al, 2013; Ahuja et al, 2012). Of great concern is the high default rate of over 25% in XDR-TB patients at the study site. Given the fact that the study site is a specialised facility for XDR-TB treatment one would have expected a lower default rate. This finding suggests that innovative ways should be found to ensure that XDR-TB patients do not default so that they can at least complete their treatment (Raviglione et al, 2012; SenGupta et al, 2015; Zumla et al, 2016).

Since the number of cases was small to warrant extensive analysis, the findings of this study suggest that further studies involving greater number of cases and counterfactual cases are needed in order to conduct meaningful comparisons that would help identify factors significantly associated with outcomes of treatment.

Conclusions

In conclusion, treatment outcomes in XDR-TB patients at the study site had been very poor. This situation calls for more efforts to be put into decreasing the proportion of patients who default treatment; introduce new effective drugs and manage well co-morbidities that affect these patients.

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