

Results Sample 2

Tupasi TE, Gupta R, Quelapio MID, Orillaza RB, Mira NR, et al. (2006) Feasibility and Cost-Effectiveness of Treating Multidrug-Resistant Tuberculosis: A Cohort Study in the Philippines. PLoS Med 3(9): e352

Problem: multidrug-resistant TB.

Purpose: In April 1999, a DOTS-Plus pilot project was initiated at the Makati Medical Center (MMC) in Manila, Philippines [25]. This article assesses the project's ^Afeasibility, ^Beffectiveness, ^Ccost, and ^Dcost-effectiveness.

Results

^APatient Enrollment and Characteristics

Between April 1999 and March 2002, 219 cases were evaluated. Among these cases, 171 were confirmed to have MDR-TB. Of these 171 cases that were eligible for MDR-TB treatment, 118 were enrolled in the DOTS-Plus project, and 117 were considered in the analysis (Figure 1). A comparison of the 118 enrolled patients with the 53 considered eligible but who were not enrolled showed no significant difference in key characteristics such as age, sex, and number of previous treatments (Protocol S2). There was a significant difference in the percentage that were resistant to five or more drugs ($p < 0.001$), with more of those enrolled being resistant to five or more drugs, and in place of residence with more of those enrolled residing in Makati ($p = 0.05$).

The characteristics of the cohort are summarized in Table 1. Ninety were chronic cases, and 27 were new or retreatment cases. The average age was 38 years; 86 (74%) were male. The average income was US\$31 per month (range US\$0–US\$625), and the average number of treatment courses before enrollment on DOTS-Plus was 2.8. Many patients (62%) were resistant to five or more drugs. Lack of testing services meant that the HIV status of patients was unknown, but 27 patients had diseases other than TB: diabetes ($n = 17$), chronic obstructive pulmonary disease ($n = 3$), peptic ulcer ($n = 2$), and heart disease ($n = 2$). Of the 102 patients with X-ray results, 66 had cavitory disease. Of the 117 patients, 106 had pulmonary TB and 11 had extrapulmonary TB. The characteristics of chronic cases on the one hand, and new and retreatment cases on the other, were generally similar. The main statistically significant differences ($p \leq 0.05$) were that a much higher proportion of chronic cases had previously been treated with second-line drugs ($p < 0.001$), while a relatively high proportion of new and retreatment cases lived locally, in Makati ($p < 0.001$).

^BTreatment Outcomes and Adverse Events

Treatment outcomes are shown in Table 2. For the entire cohort, the cure rate was 61% (71/117), including 70 patients for whom cure was confirmed

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by bacteriological examination and one patient who was considered to have been cured but for whom bacteriological tests to confirm this were not available). Of the 71 patients cured, 90% had converted to sputum culture–negative status after three months of treatment. Of the 18 patients who died, nine of 14 (64%) investigated were bacteriologically negative at the time of death. Among the 16 patients who defaulted, eight of 15 (53%) investigated were bacteriologically negative when they defaulted. Default rates were lower among chronic cases compared with new and retreatment cases ($p = 0.01$).

Adverse events were the main reason for default (11/16). Two patients cited financial difficulties; the remaining three causes were family problems, a decision to return to a home located in another province, and a hospital discharge that was made without the endorsement of MMC staff. We could not identify any clinical variable that was a positive predictor of cure, though women appeared more likely to be cured than men.

During treatment, almost all (112/117, or 96%) patients experienced adverse events (Table 3). Most side-effects were minor, but serious side-effects such as hearing loss and depression were also observed. Side-effects were managed through treatment with ancillary drugs, through temporary interruption of the drug suspected to be the cause of the adverse event, or (among 49% of patients) through removing the suspected drug from the treatment regimen and replacing it with a suitable alternative. The name, class, and frequency with which drugs were used to treat patients, and their relationship with adverse events, is shown in Table 4.

^CCost and ^DCost-Effectiveness

The average cost per patient treated in the DOTS-Plus project was US\$4,192, of which US\$3,355 was health system costs and US\$837 costs incurred by patients and their families (Table 5). Drugs, at US\$1,557 per patient, were the most important cost item. At market rather than GLC prices, the average cost of drugs per patient would have been US\$1,343 higher. For patients and their families, costs were mostly for clinic visits for DOT, and board and lodging. In the absence of a DOTS-Plus project, the average cost per MDR case was US\$116. The average cost per chronic case was US\$100, all out-of-pocket expenditures by patients. It was US\$317 for retreatment cases and US\$235 for new cases, with both costs roughly split between patients and the health system. Out-of-pocket expenditures by chronic cases in the private sector were mostly for prescriptions restricted to first-line drugs. Only six of the 46 chronic cases that were identified had prescriptions for second-line drugs, usually a fluoroquinolone.

The total costs for each strategy, including both the costs of the cohort of 117 patients and costs associated with secondary cases generated through

transmission of TB by this cohort, are shown in [Table 6](#). The net increase in total costs associated with the DOTS-Plus strategy was about US\$0.4 million, additional costs that resulted in a large number of averted deaths and DALYs gained ([Table 6](#)). The mean cost per DALY gained by DOTS-Plus from the health system's perspective was US\$179, and US\$242 when all costs were considered.