Impact of Physician’s Education on Adherence to Tuberculosis Treatment for Patients of Low Socioeconomic Status in Bangladesh

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Successful tuberculosis control depends on good adherence to treatment. Yet, limited data are available on the efficacy of methods for improving the adherence of patients of low socioeconomic status. We evaluated the impact of physician-provided patient education on adherence to anti-tuberculosis medication in a low socioeconomic status and resource-limited setting. A pre-/post-intervention study was conducted at a suburban primary health care clinic in Bangladesh where an intensive education strategy was established in May 2006. Treatment outcomes of tuberculosis patients from March 2005 to April 2006 (pre-intervention) and from May 2006 to December 2007 (post-intervention) were compared. Among 354 patients, 198 (56%) were treated before intervention and 156 (44%) were treated after intervention. Cumulative adherence to anti-tuberculosis medication was significantly greater in the intervention group than in the control group in univariate and multivariate analyses. Physician’s education can contribute to increasing the adherence of patients in resource-limited settings.

Key Words: Tuberculosis; Education; Socioeconomic factors

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INTRODUCTION

The public-private mix (PPM) approach is an effective way to improve detection rates of the directly observed treatment, short course (DOTS) approach with comparative treatment success rate in tuberculosis.\(^1\)\(^2\) However, the PPM approach has a lower rate of success than expected in some situations.\(^3\) For the PPM strategy to be successful, it is important to find ways to improve the adherence of patients in clinics, especially those patients of low socioeconomic status (SES). However, few studies have investigated the impact of education on adherence, and existing findings are inconsistent.\(^4\)\(^5\) We evaluated the impact of physician-provided education on adherence to treatment in patients of low SES in a primary health care clinic.

MATERIALS AND METHODS

The current study was designed as a pre-/post-intervention study. The control group consisted of tuberculosis patients treated from March 2005 to April 2006, and the intervention group consisted of patients treated from May 2006 to December 2007 at Bangladesh-Korea Friendship Hospital. The facility is a primary health care clinic located in Savar, a suburban industrial complex area adjacent to Dhaka, the capital of Bangladesh. We followed the standard short course treatment regimen recommended by the World Health Organization and used a fixed-dose formula provided free of charge by the national tuberculosis control program in Bangladesh. This study was approved by the institutional review board of Daegu Fatima Hospital (No. DFH100T088).

From May 2006, we changed the irregular visiting schedules of the patients into regular ones as follows: every week during the initial month of treatment, every other week during the next month, and then every month until the end of treatment. We scheduled the next visit 3 days before drug exhaustion and directed each patient to bring the remaining pills at every visit. Education was performed directly by the physicians on every visit. The contents of our educa-
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Table 1. Baseline characteristics and outcomes of 354 patients with tuberculosis

| Variable                        | Pre-intervention group (N=198) | Post-intervention group (N=156) | p value |
|---------------------------------|---------------------------------|---------------------------------|---------|
| Age (years)                     | 35 (±15)                        | 35 (±16)                        | 0.90    |
| Male sex                        | 126 (64)                        | 85 (55)                         | 0.08    |
| Pulmonary tuberculosis          | 142 (72)                        | 130 (83)                        | 0.01    |
| Extrapulmonary tuberculosis     | 56 (28)                         | 26 (17)                         |         |
| AFB results                     |                                 |                                 | 0.24    |
| AFB-positive                    | 79 (56)                         | 63 (49)                         |         |
| AFB-negative                    | 63 (44)                         | 67 (52)                         |         |
| Treatment experience            |                                 |                                 | 0.64    |
| New cases                       | 180 (91)                        | 144 (92)                        |         |
| Relapsed or defaulted cases     | 18 (9)                          | 12 (8)                          |         |
| Body weight (kg)                | 42 (±9)                         | 42 (±7)                         | 0.46    |
| Distance from home to clinic    | 145 (73)                        | 118 (76)                        | 0.43    |
| Family income per month (USD)   | 62 (±22)                        | 63 (±30)                        | 0.89    |
| Duration of education in school | 3.6 (±3.5)                      | 3.5 (±3.8)                      | 0.78    |
| Illiterate                      | 112 (57)                        | 84 (54)                         | 0.67    |
| Outcome                         |                                 |                                 |         |
| Remain adherent at day 168      | 139 (70)                        | 125 (80)                        | 0.03    |
| Treatment success               | 138 (70)                        | 122 (78)                        | 0.07    |

AFB: acid-fast bacilli staining, USD: united states dollar.
TABLE 2. Independent risk factors for nonadherence in 354 patients with tuberculosis

| Variable | Univariate analysis | Multivariate analysis |
|----------|---------------------|-----------------------|
|          | Number (%) of patients | p value | HR | 95% C.I. | p value |
|         | Adherent (N= 264) | Non-adherent (N=90) |          |            |          |
| Age*    | 33 (±15) | 41 (±16) | < 0.01 | 1.02 | 1.01-1.04 | 0.002 |
| Male sex| 148 (56) | 63 (70) | 0.02 | 1.81 | 1.12-2.92 | 0.015 |
| AFB-negative | 85 (32) | 45 (50) | < 0.01 | 0.58 | 0.36-0.93 | 0.024 |
| Intervention group | 125 (47) | 31 (34) | 0.03 | 0.36-0.93 | 0.024 |

The multivariate analysis included the following variables: age, male sex, AFB-negative, intervention group, and tuberculosis type. HR: hazard ratio, CI: confidence interval, AFB: acid-fast bacilli staining. *Continuous variables are expressed as means (±SD).
improved adherence of the educated patients. Third, this study was not designed as randomized controlled trial but was designed as a before and after study.

In conclusion, our data demonstrate that direct education from physicians can improve the adherence of patients to tuberculosis treatment even when the patients are poorly educated and of low SES. Physician’s education is also important and can contribute to increasing the adherence of patients in resource-limited settings, as can the education of other health care workers.

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