IN INVOLVEMENT OF COMMUNITY HEALTH WORKERS IN TUBERCULOSIS CONTROL IN BANGLADESH

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Abstract: Tuberculosis is a major public health problem in Bangladesh. It is estimated that about 52,000 deaths due to tuberculosis and 300,000 new tuberculosis cases occurred in 1997 in Bangladesh. Bangladesh Rural Advancement Committee (BRAC), a Bangladeshi non-government organization is implementing a community based program for tuberculosis since 1984 in collaboration with the national tuberculosis program. Community health workers are the nucleus of this initiative. All of them are female and selected from rural community. They identify suspected persons for sputum test and provide treatment to the patients in their own community. In the middle of 1998 this program was reviewed, and the achievements in 1996 and 1997 were analyzed. Treatment outcomes were evaluated through cohort analysis according to WHO/International Union Against Tuberculosis and Lung Disease (IUATLD) guidelines. Outcome indicators defined by WHO/IUATLD were used. A total of 7,946 patients were detected in 34 thanas in 1996 and 1997. Out of them, 6,163 (77.6%) were new sputum positive patients. Their sputum conversion and cure rates were about 90% and 86.7% respectively. This program has achieved the WHO target of 85% cure rate. Community health workers are playing a key role to control tuberculosis in this approach. Thus this model could reduce burden on health facilities, reduce patient’s costs and increase case detection and cure rate.

Key Words: Community Health Workers, Tuberculosis Control, Directly Observed Treatment, Bangladesh, Bangladesh Rural Advancement Committee (BRAC)

INTRODUCTION

Tuberculosis is one of leading causes of adult deaths in the world. According to World Health Organization (WHO), more than 3 million people die of tuberculosis in the world every year. It is also estimated that approximately 30 million people will die from tuberculosis in the next ten years if the disease continues to spread at the current rate (WHO, 1996). One third of the world’s population are already infected with tuberculosis bacillus. Twenty million people are currently suffering from tuberculosis, and 8 million people get tuberculosis disease every year. More than 50 million people may have been infected with drug resistant strains of tuberculosis (WHO, 1995). Tuberculosis is the only disease that the WHO has ever classified as a global emergency declared in 1993 (WHO, 1994).

Tuberculosis has been a major public health threat in Bangladesh. According to the recent review by the government of Bangladesh and WHO, about 52,000 deaths and 300,000 new cases were estimated in 1997 (Government of Bangladesh, 1997). There were only 13 hospitals totally with 1,076 beds and 44 clinics available for tuberculosis services in Bangladesh until 1980s (Chowdhury et al., 1991). The national tuberculosis program had been integrated with general health services basically at thana health complexes as a policy in early 1980s. Thana health complex is a primary health care center of thana (sub-district) covering about 250,000 population. However in 1985, only 124 among 460 thana health complexes provided services for tuberculosis. Only 560 sputum positive patients were identified in those thana health complexes in 1987 (Government of Bangladesh, 1988). Moreover their
treatment completion rate was as below as 25% (Islam, 1987). The World Bank review in 1990 estimated that the overall case detection rate was less than 20% and treatment completion rate was below 50% (Veen and Beex-Bleumink, 1990). In response to these findings, the national tuberculosis program revised its strategy with the guidance from WHO and received the financial assistance from the World Bank and the Government of Netherlands. Since 1993, the revised program has been implemented in order to strengthen the integration of tuberculosis control into the existing primary health care system. It focuses largely on collaboration with non-government organizations (NGOs) as they have already developed primary health care program. Until mid 1997, the national tuberculosis program covered 324 thanas which was about 70% of the whole country. Of these thanas, the government covered 214 thanas and NGOs covered 110 thanas (Ali and Colombani, 1997). The cure rate in thana health complexes under direct government supervision was about 71.1%, while that in the areas supported by NGOs was about 81.5% (Ali and Colombani, 1997). The recent review shows that the overall case detection rate is about 25% and treatment success rate is about 80% (Government of Bangladesh, 1997).

Bangladesh Rural Advancement Committee (BRAC), one of the largest NGOs in Bangladesh has been involved in the activities for poverty alleviation and empowerment of the poor since 1972. Along with the various community development activities i.e. adult and child education, health, income generation, credit and women development, BRAC initiated a pilot community based tuberculosis control project in 1984 in Manikganj thana. It covered a population of 220,000 through more than 200 community health workers in collaboration with national anti tuberculosis association of Bangladesh and government of Bangladesh (Ishikawa, 1985; Chowdhury et al., 1991). The project area was approximately 50 km north west to Dhaka. The aim was to make tuberculosis diagnosis and treatment services available and accessible to the community people through community health workers, who already existed in BRAC initiated community program. In this tuberculosis program, the community health workers were community level service providers in rural villages for educating the community, identifying of symptomatic persons, providing treatment to patients, and following them up to ensure their compliance. Twelve months treatment regimen was then used for treating tuberculosis patients. The treatment completion rate was about 79% (Chowdhury et al., 1991).

With the successful outcome in Manikganj thana, this approach was extended to 10 more thanas in 1992 covering a population of approximately 1.8 million to examine the scope of scaling up. It also showed the treatment completion rate as high as 80% (Chowdhury et al., 1997). Following these encouraging results, BRAC signed a memorandum of understanding with the government of Bangladesh in 1994 to extend tuberculosis control activities to 120 additional thanas. In 1995 BRAC introduced 8 months short course regimen in collaboration with new national program. The program achieved the WHO target of 85% cure rate (Chowdhury et al., 1997). A study showed that the tuberculosis prevalence rate was reduced in BRAC areas nearly by half within four years in compare to non program areas (Chowdhury et al., 1997). This model is currently being applied in 60 thanas covering a population of approximately 13 million. The experience and results of the project after introducing and extending short course treatment are summarized in this paper. The detail strategy and evolution of the program has been published elsewhere (Ishikawa, 1985; Chowdhury et al., 1991; Chowdhury et al., 1997).

MATERIALS AND METHODS

Manpower development

Community health workers, women of 25–35 years of age, play a key role in tuberculosis control program by BRAC. Each community health worker covers 150 to 200 households. They are mostly illiterate and members of village organizations. Community health workers are selected by the members of village organizations. Village organizations were formed by women of the poorest section in the community. Community health workers were trained by BRAC staff about tuberculosis control for 5 days along with other components of health such as nutrition, reproductive health, safe water supply and sanitation, acute respiratory infection, expanded program on immunization and so on. One day refresher training is also conducted every month to share the information and discuss their performance and problems which they encountered during the last month.

In the beginning of this program a basic training was given to the staff of all levels both in government and BRAC, including medical doctors, field level managers and supervisors following the national tuberculosis program training curriculum. Training materials and logistics were mostly supplied by the national tuberculosis program. WHO training modules for district level managers were used to train medical doctors and
Identification of patients

The community is informed about the danger of tuberculosis, signs and symptoms, diagnosis and treatment facilities, treatment schedule and prevention of tuberculosis through female forums held by community health workers. In addition, the male seminars, mosque forums, doctors seminars, teachers and elite seminars and Bazaar forums are organized by BRAC staff to disseminate the information. Cured patients also play an important role in disseminating information, identifying and motivating symptomatic persons for sputum examination and motivating the patients to continue treatment until they are cured.

Persons with cough for more than three weeks are mostly identified by community health workers and then referred for sputum examination. Each suspected person is given two sputum containers for collecting sputum samples one at night and the other at early morning, and also given instruction on how to collect sputum. Each suspected person is asked to bring two sputum specimens to the smearing center. Another spot sputum specimen is collected from each suspected person at the center. Sputum collection centers are set up at BRAC field offices and at village levels in remote areas to increase the accessibility of community to the diagnostic facility. Both centers are managed by BRAC staff and community health workers. Sputum smears are prepared and the slides are sent to the thana level laboratory for staining and microscopic examination. The results of the sputum examination are sent back to the symptomatic persons through the community health workers. Fifty percent of positive, 5% negative and 5% follow-up sputum slides are cross checked by another laboratory technician every month. To ensure quality control, randomly selected slides are also re-checked periodically by the national tuberculosis program staff.

Treatment

When two sputum specimens are positive, treatment for tuberculosis is initiated by community health workers under the guidance of BRAC field level staff. If symptoms persist but the sputum is negative, the patients are referred to the government health facility i.e. thana health complex or district tuberculosis clinic. Sputum negative patients as well as extra pulmonary patients are given treatment after consultation with the district tuberculosis clinic consultant.

Patients are asked to deposit Taka 200 (about US $4) and to sign a bond with two witnesses as a guarantee of treatment completion. If the patient is too poor to pay, he/she receives waiver of bond money. In some cases, community people also pay the bond money for patients. From the bond money, Taka 25 is given to the community health worker for each patient identification and Taka 100 is given on completion of the treatment. The remaining Taka 75 is refunded to the patient after completion of treatment. If the patient defaulted from the treatment, community health worker is paid proportionally and the remaining is kept by the organization. However if the patient dies, community health worker is paid proportionally and the remaining is returned to the authorized family member mentioned in the bond.

The eight months short course treatment regimen (i.e. isoniazid, pyrazinamide, ethambutol and rifampicin daily for two months followed by isoniazid and thiacetazone daily for six months) is given for new smear positive pulmonary tuberculosis patients as well as for seriously ill smear negative and extra pulmonary patients. Follow up sputum examination is made at 2nd, 5th and 8th months of the treatment to monitor the progress of treatment for sputum positive cases.

Drug taking of the patient is directly observed by community health workers. They collect the drugs from the BRAC field office monthly during refreshers training and store then in their homes. Patients come to the community health worker's home for drug taking during the intensive phase of the new treatment and for the entire period in case of retreatment. If the patient fails to come, the community health worker visits the patient's home and observe the drug taking. In the case of seriously ill patient, the community health worker visits the patient's home and observe him/her swallow the drugs until the patient becomes able to come to the community health worker's house. The streptomycin injections are also administered by community health workers for retreatment (failure and relapse) patients. Patients also collect drugs during ambulatory phase of treatment once a week from the community health workers home. Patients with drug reactions and complications are managed at the community level or sent to the thana health complex or district tuberculosis clinic.

Supervision and monitoring

The program is supervised and monitored by BRAC field and regional level staff. A tuberculosis specialist from central level monitors the activities and provides technical support to the program. Monitoring from the head office is also done by the top managers through management information system. The research and
evaluation division of BRAC also evaluate the program independently. The government staff at thana, district and central level and WHO staff members also assess the quality of the program through periodic field visits and quarterly progress reports.

To monitor the regular treatment in the community, patients are visited by BRAC staff once a week during the intensive phase and twice a month during the continuation phase. Community health workers also visit patients at home once a week during the ambulatory phase of treatment. Community health workers are visited by BRAC staff periodically to monitor their activities, records and provide necessary support.

Record keeping for laboratory register, thana tuberculosis register, along with sputum request forms, treatment cards and referral forms is maintained at the BRAC field office. A copy of the treatment card along with the home visit card is kept at the patient’s home. Monthly performance reports, quarterly reports on case finding, sputum conversion and treatment outcome are prepared at thana level by BRAC field level staff to evaluate the outcomes.

Collaboration and Coordination with Government and other NGOs

Drugs, equipment, reagents and other logistics are mostly supplied by the government to BRAC through the district civil surgeon on a quarterly basis. Coordination meetings with the thana health and family planning officer, district civil surgeon and project director of the national tuberculosis program are held monthly in collaboration with WHO. Meetings with other NGOs involved in tuberculosis control are held quarterly to share ideas and experience and to improve the quality of ongoing activities in collaboration with WHO. A referral system with the thana health complexes, district tuberculosis clinics and NGOs have been set up to avoid duplication of patient registration. Monthly and quarterly reports are given to the thana health and family planning officer, district civil surgeon and project director of the national tuberculosis program.

Data collection and analysis

Analysis of program performance was done by the authors in the middle of 1998. Quarterly case finding reports, sputum conversion reports, and treatment outcomes from January 1996 to December 1997 were collected from BRAC head office. The national reporting formats recommended by WHO/International Union Against Tuberculosis and Lung Disease (IUATLD) were used for data collection (International Union, 1994). Treatment cohort analysis was done according to WHO/IUATLD guidelines. WHO/IUATLD defined indicators (cured, treatment completed, defaulter, death, failure, transferred/referred) were used for evaluation of clinical outcomes (WHO, 1997b). Patients who complete the treatment full course and become sputum negative at 5th and 8th months are defined as cured. Patients who complete the treatment course but sputum results at 5th and/or 8th months are not available are defined as treatment completed. Patients who stop treatment for 2 or more months at any time during treatment are defined as defaulter. Patients who died during treatment in any cause are defined as death. Patients who become sputum positive at 5th months or later during treatment are designated as failure. Patients who are referred or transferred to another district or institute and treatment outcomes are not known are defined as referred/transferred.

RESULTS

Total number of patients by category in 1996 and 1997 is shown in Table 1. In the two years, a total of 7,946 patients were identified in 34 thanas. Of them, 7,023 (88.4%) were sputum positive, 749 (9.4%) were sputum negative and 174 (2.2%) were extra-pulmonary tuberculosis patients. Among sputum positive patients, a total of 6,163 (87.7%) were new sputum positive patients.

Age and sex distribution of new sputum positive patients is shown in Table 2. Of a total of 6,163 new sputum positive patients, 4,473 (72.6%) were male and 1,690 (27.4%) were female. About two third of new sputum positive patients were between 25-54 years old. Highest number of patients were between 35-44 years old for male and between 25-34 years old for female. Proportionally, there were more patients below 35 years of age in female than in male.

<table>
<thead>
<tr>
<th>Category</th>
<th>1996</th>
<th>1997</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sputum Positive Patients</td>
<td>3,158</td>
<td>3,865</td>
<td>7,023 (88.4%)</td>
</tr>
<tr>
<td>- New</td>
<td>2,729</td>
<td>3,434</td>
<td>6,163 (77.7%)</td>
</tr>
<tr>
<td>- Relapse</td>
<td>89</td>
<td>106</td>
<td>195 (2.8%)</td>
</tr>
<tr>
<td>- Previously Incompletely treated</td>
<td>340</td>
<td>325</td>
<td>665 (9.5%)</td>
</tr>
<tr>
<td>Sputum Negative</td>
<td>217</td>
<td>532</td>
<td>749 (9.4%)</td>
</tr>
<tr>
<td>Extra-pulmonary</td>
<td>53</td>
<td>121</td>
<td>174 (2.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>3,428</td>
<td>4,518</td>
<td>7,946 (100%)</td>
</tr>
</tbody>
</table>

Table 1 Tuberculosis patients identified during 1996 and 1997
Sputum conversion results of new sputum positive patients at 2nd month are shown in Table 3. Of a total of 6,163 new sputum positive patients, 5,548 (90.0%) became sputum negative after initial intensive phase of the treatment. Deaths during the first two months were 254 (4.1%) among new patients.

Treatment outcome after 12-15 months of diagnosis of new sputum positive tuberculosis patients is shown in Table 4. Among 4,357 new sputum positive patients, 3,775 (86.7%) were cured; 332 (7.6%) died; 74 (1.7%) failed in treatment and 83 (1.9%) patients defaulted.

DISCUSSIONS

The concept of using directly observed treatment for tuberculosis emerged more than three decades ago as a result of work in Madras and Hong Kong (Bayer and Wilkinson, 1995). WHO recently claimed that directly observed treatment with short course regimen (DOTS) is the most cost effective strategy for tuberculosis control (WHO, 1997a). However, according to the recent WHO review, only 23% of the worldwide population has an access to the DOTS strategy (Raviglione et al., 1997). And only about 10% of the world's tuberculosis patients are under this strategy (WHO, 1997a).

One of the crucial elements of DOTS strategy is that the health provider watches the patient swallow every single dose of tuberculosis drugs. It can be done in hospitalized condition, but the long period of hospital stay for DOTS increases the burden of hospitals in high epidemic developing countries as seen in Africa (Okot-Nwang et al., 1993). It is also very disruptive and costly for the families of patients (Foster, 1990; Saunderson, 1995). In many developing countries hospital beds are not adequate to admit all infectious tuberculosis patients and therefore it is not feasible such as in Bangladesh and China (Chowdhury et al., 1991; China, 1996).

There are also problems in promoting DOTS at out patient clinics, since health services are not easily accessible to most of the community people particularly in rural areas in developing countries (Maher et al., 1997). Patients either has to come to clinic every day or health worker has to go to patient's house.

To ensure DOTS approach, an alternative model of providing care for tuberculosis patients needs to be explored at community level based on community participation. The BRAC initiative for tuberculosis control through utilization of community based voluntary health workers (i.e. community health workers) has proved to be an example of the alternative approach, achieving WHO target of curing 85% of diagnosed cases consistently over few years (Chowdhury et al., 1997; Kochi, 1997). Supervised chemotherapy on out door basis by village doctors in China also contributed to achieve one of the highest cure rate in the world (China, 1996; WHO, 1997a). Involvement of community health workers in the philippines has also increased the cure rate (Mantala, 1997).
The important features of the BRAC TB program are 1) the community based approach; where community health workers are selected from the poorest section of the community; diagnostic and treatment facilities are available at the door step of people and services are organized by them, 2) financial bond for treatment completion and incentive scheme for community health workers to supervise treatment, 3) training and supervision of community health workers by motivated BRAC staff, 4) effective short course drug regimen, and 5) collaboration and support from the government.

Community health workers are more trusted by the community because they are selected by them. They are respected by the villagers in the program and thus they feel prestige to serve the people (Ishikawa, 1985). They could easily find symptomatic patients as they are from same community and know each other. Patients basically get free treatment in their community except the bond money. Therefore, they can continue their economic activities and take care of their families, as majority (77.9%) patients are from economically productive age group between 15-54 years old (Table 2). The system of bond money builds a mutual understanding between patients and community health workers, which makes each accountable to the other for better quality of care and makes treatment less expensive (Ishikawa, 1985). The amount of bond money is also affordable by majority patients, as it was found that 83% patients paid full amount of bond money (Osaki, 1995).

This study shows that the death rate is about 7.6% by the end of treatment (Table 4). More than half (41.1%) of them died within the first two months of treatment initiation (Table 3). On the other hand, there is a big gap between the male-female ratio (73:27), even though BRAC program utilizes female community health workers (Table 2). These indicate that diagnosis is still delayed and strong stigma and fear to tuberculosis exist in the community (Fair et al., 1997). This gap between male and female ratio may be caused by poor women’s access to health services due to heavy workload, as well as lack of mobility, independence and access to cash (Hudelson, 1996). However, proportionally more females (49.5%) were diagnosed than males (30.3%) below 35 years of age (Table 2). This may due to females have higher risk to develop disease than males in reproductive age (Dolin, 1998). It was also observed in India that females have 130% higher risk to develop disease than males between the age of 10 and 44 years (Olakowski, 1973).

Furthermore, a cost-effectiveness analysis of this model may determine whether the involvement of community health workers in national tuberculosis program can be a more cost-effective approach. In the global expansion of DOTS strategy, each government needs to develop a sustainable program. This model of involving community health workers in tuberculosis control program can be an alternative approach to strengthen the national tuberculosis program by increasing the accessibility of tuberculosis services, particularly in a remote areas, where services are inadequate. The partnership among government, NGOs and community is essential for sustainable implementation of DOTS strategy to control tuberculosis.

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REFERENCES


10) Government of Bangladesh and WHO (1997): Review of the National Tuberculosis Program of Bangladesh. Dhaka


