VILLAGE HEALTH VOLUNTEER PARTICIPATION IN TUBERCULOSIS CONTROL IN SOUTHERN THAILAND

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Abstract. The study objectives were to compare the proportions of tuberculosis (TB) cases detected under a project launched in lower part of southern Thailand 1) by screener type [village health volunteer (VHV), health center staff, and hospital staff]; and 2) by region. Among 688 people with suspected TB symptoms referred to have sputum examination with or without chest radiograph, 55 (8%) were diagnosed of TB, including 44 (6%) smear-positive cases. The proportions of smear-positive cases among those screened by VHV, health center and hospital staff were 6.7%, 3.4% and 12.9%; respectively. The corresponding proportions for TB cases were 8.4%, 5.1%, and 12.9%. The proportions of smear-positive cases were 2.5%, 21.7%, and 14.6% for those from the Region A, B and C, respectively. The corresponding proportions of TB cases were 3.5%, 26.5%, and 16.7%. The differences by screener type were not statistically significant. VHV performances in TB case detection were comparable to health center and hospital staff, even under conditions of unrest in one province in Region B and three provinces in Region C.

INTRODUCTION

In 2007, Thailand ranked seventeenth among twenty-two high burden countries, with an estimated 91,374 tuberculosis (TB) cases (WHO, 2007). According to the recommendation from the first Review of the National Tuberculosis Program (NTP) by the World Health Organization (WHO) expert team, DOTS strategy (five-element TB control strategy consisted of political commitment, case finding, short-course chemotherapy, uninterrupted drug supply, and a recording and reporting system) has been implemented in Thailand since 1996, with nation-wide coverage in 2001 (Sriyabhaya, 2005, unpublished document). The case detection rates during 2003-2005 ranged between 71-73% and were slightly higher than the WHO target of 70%; whereas, the treatment success rates were between 73-74%, which were below the WHO target of 85% and were less than those of near-by countries, such as China, India, Bangladesh Myanmar, Vietnam, Cambodia, Indonesia, and Philippines (WHO, 2005, 2006, 2007).

TB services, including case finding, diagnosis, and treatment have been integrated into the national health care system, particularly in the public hospitals, under the Permanent Secretary Office of the Ministry of Public Health (MoPH) since 1977 (Sriyabhaya, 2005, Unpublished document). Passive case finding by microscopic examination of specifically stained sputum (AFB smear) among those who visited hospitals with suspected symptoms and ambulatory treatment with standardized short-course chemotherapy were among the prioritized TB control activities in Thailand (TB Cluster, 2005). These conformed to the principle of achievement of high success rate before expansion of case finding activities (TB Cluster, 2007). Recognized as effective patient

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supervision method, Directly Observed Treatment (DOT) has been recommended for smear-positive TB cases, with the most-to-least preferred order of DOT observer as follows: health personnel, village health volunteer (VHV) or community leader, and family member (TB Cluster, 2007).

Many special projects were launched in Thailand during 2007 to celebrate the 80th Birthday Anniversary of His Majesty the King Bhumibol Adulyadej. The one related to TB, the National Project abiding the Royal Charity for TB control in Thailand (The 80th Royal Birthday project), had as its goal to develop a network to promote knowledge-based behaviors that were needed for TB control. One of the main project activities was the training of community core-groups, including VHVs, at the sub-district level to identify people with suspected symptoms and refer them for sputum examination (MoPH, 2007).

The participation of VHVs in primary health cares (PHC) has been introduced in Thailand since the 4th Public Health Development Plan (1977-1981) under the responsibility of the Office of PHC Committee, MoPH. VHV capabilities, in terms of health care, community management, and networking, have been continuously developed by the ASEAN Institute for Health Development and five Regional Training Centers for PHC (Wongkomthong *et al*, no date). At time of the study, there were more than 818,000 VHVs throughout the country, taking care of 12 million households (Department of Health Service Support, 2007). However, the standard training curriculum did not include TB issues (Division of Public Health Promotion, 2007).

The lower part of southern Thailand consists of 74 districts and 3 branch-districts in 7 provinces, with population of about 4.5 millions in 2007. Seventy-three public hospitals under the Permanent Secretary Office of the Ministry of Public Health (MoPH) were the main facilities for public health services. Public health administration in the area was divided into three Regions: Region A, with nine hospitals in two upper most provinces; Region B, with 23 hospitals in two provinces in the middle; and Region C, with 31 hospitals in three southern most provinces. TB center 12 Yala is responsible for technical support for all health facilities, including provincial and district health offices. The numbers of new TB cases (cases per 100,000 population) registered for treatment in the 73 hospitals and one TB center were 3,725 (84), 3,905 (87), 3,833 (86.5), 3,825 (85.3), and 3,530 (78.1) in 2003, 2004, 2005, 2006, and 2007, respectively. The corresponding numbers for new smear-positive pulmonary cases were 2,359 (53.2), 2,310 (51.5), 2,288 (51.6), 2,210 (49.3), and 2,110 (46.7), respectively (Office 12 Disease Prevention and Control, 2008). The success rates were 74.1% in 2003, 74.5% in 2004, 74.4% in 2005, and 73.0% in 2006 (Office 12 Disease Prevention and Control, 2008).

Training courses about TB control organized yearly by the TB center 12 Yala involved health personnel in hospitals, that is, doctors, TB clinic staff, and laboratory technicians. However, training of health center staff or VHVs were infrequently arranged by some provincial or district health offices. There were specific training modules for all kinds of health personnel, but not for VHVs. Involvement of VHVs in TB control was limited. The proportion of new TB cases with assigned community members as DOT observers was only 5.5% (Pungrassami *et al*, 2002).

Since January 2003, 7,823 violence-related events occurred in the four southern provinces (one province in Region B, three provinces in Region C) that caused 2,786 deaths and 4,476 injuries, with increasing trends (Jitpiromsri, 2008). Health personnel were among the victims as 21 were injured, 10 were killed, and 12 health centers were fired or bombed (Narathiwat PHO, 2007). Situation

analysis of public health human resources indicated that the proportions of doctors, dentists, pharmacists, nurses, and others actually working in the three southern provinces in Region C were 55%, 41%, 83%, 97%, and 90% of the GIS-based standard, respectively (Wiriyapongsukit, 2005). The figures were considered worse after the attacks on the public health facilities. VHVs were expected to be the best available health care worker assistants, but they were also the victims with 9 injured and 29 killed (Narathiwat PHO, 2007). The combined factors of the low involvement of VHV in TB control in the area and the direct threat in the unrest provinces strongly challenged the implementation of the project aimed for TB case detection by VHVs.

This study aimed to compare the proportions of TB cases detected among the three different types of screeners and among the three regions with different violence attack rates.

MATERIALS AND METHODS

Two thousand, five hundred and thirty VHVs and 779 health center staff participated in a one-day course about TB and suspected symptoms of pulmonary TB (cough more than two weeks or hemoptysis). The training courses were arranged separately by each province with local trainers that were Provincial Tuberculosis Coordinators (PTCs) and hospital TB clinic staff. The training topics included general knowledge about TB (cause, infectivity, symptoms, transmission, treatment, and prevention), roles of DOT observer, anti-TB drugs, and methods of self-protection. Each participant received a copy of the "Manual for TB core-group in the community" produced by the NTP (TB Cluster, 2007). The participants were expected to be able to screen people in their responsible areas and refer those with suspected TB symptoms to the near-by hospital for sputum examination and/or chest radiograph. The screeners, who could be trained VHVs or health center and hospital staff, were instructed to fill the first part of the data collection form that included data on screeners and people with suspected symptoms. TB clinic staff were requested to complete the second part of the data collection form including results of the sputum examination and the final diagnosis.

Based on the hospital TB registers, the Regional TB coordinators (RTC) checked whether the TB cases detected by the project were the new cases. Double data entry with validation was done by EPIDATA 3.02, then transferred by StatTransfer 8 and analyzed using STATA 9. Percentages, means, standard deviations, and medians were used for descriptive data analysis, and chi-square tests were used for bivariate analysis, with a significance level (α) of 0.05.

RESULTS

Six hundred and eighty-eight people with TB suspected symptoms were referred to local public hospitals for sputum examination. Most of them were male (57%), aged 66 years-old or less (52%), with presented symptom of chronic cough more than two weeks (98%). They were from all but one of the seven provinces; 75%, 12%, and 13% of them were from Region A, Region B, and Region C of lower southern Thailand, respectively. Most of the suspected (78%) were screened by the trained VHVs, 17% by health center staff, and only 5% by hospital staff. The distributions of gender, age group, and presenting symptoms by region and screener type are shown in Table 1.

Of the 603 persons with available sputum results, 208, 102, and 293 were examined with 1, 2, and 3 specimens, respectively. Out of 688 persons with suspected symptoms, 44 (6.4%) were smear-positive, 55 (8%) were diagnosed of tuberculosis, and all 55 were newly detected by the project. Thirty-

Table 1
People with tuberculosis suspected symptoms: selected characteristics, results of sputum examination, and final diagnosis by region and screener type.

Variable	Comparison	Gender Male: Female	Age group ≥66 : >66	Symptom Cough: Hemoptysis: Both	AFB Neg/NA : Pos	Diagnosis Not TB : TB
Region	A	282 : 232	226 : 263	311 : 3 : 19	502 : 13	497 : 18
	B	58 : 25	53 : 28	65 : 4 : 0	65 : 18	61 : 22
	C	50 : 40	62 : 26	77 : 0 : 4	76 : 13	75 : 15
Screener	VHV	319 : 219	256 : 254	360 : 3 : 18	502 : 36	494 : 45
	HC	53 : 65	61 : 56	69 : 0 : 5	114 : 4	112 : 6
	Hospital	18 : 13	24 : 7	24 : 4 : 0	27 : 4	27 : 4
	Total	390 : 297	341 : 317	453 : 7 : 23	643 : 44	633 : 55

VHV = Village health volunteer, HC = Health center staff

eight and 46 males with suspected symptoms were smear positive and diagnosed of TB, respectively. The corresponding numbers were 6 and 9 for females, 32 and 40 for younger people (≤66 years old), and 10 and 13 for older people (>66 years old). The differences of smear-positive and TB diagnosis were statistically significant by gender and by age group (Table 2).

Thirty-six and 45 people screened by VHVs were smear positive and diagnosed with TB, respectively. The corresponding numbers for screening as smear positive and diagnosed with TB were 4 and 6 people screened by health center staff, and 4 and 4 people screened by hospital staff, respectively. Thirteen and 18 people from Region A, 18 and 22 people from Region B, and 13 and 15 people from Region C were smear-positive and diagnosed of TB, respectively. The differences of smear-positive and the differences of TB diagnosis by region were statistically significant (Table 2).

Out of 688 people with suspected symptoms, 293 (42.6%) were examined with three sputum specimens, and 603 (87.6%) were reported with complete AFB and diagnosis results. People screened by hospital staff and people from Region B had the highest proportions of being examined with three specimens, and highest proportions of good records of AFB and diagnosis result. The differences of being examined with three specimens and good records by screener type and by region were statistically significant (Table 3).

DISCUSSION

The 55 TB cases, including 44 infectious cases, were newly diagnosed by this project. The positive rate of 6.4% in this study was lower than the rate of 15% among adult clinic attendees with cough (Santha *et al*, 2005); however, this was higher than the rate of

Table 2
Factors associated with AFB-positive smear and tuberculosis diagnosis.

Variable	Comparison	%AFB positive	p-valve	%TB diagnosis	p-value
Gender	Male : Female	9.8 : 2.0	0.000	11.8 : 3.0	0.000
Age group	66 or less : >66	9.4 : 3.2	0.001	11.7 : 4.1	0.000
Cough	Yes : No	9.3 : 0	0.398	11.1 : 0	0.349
Hemoptysis	Yes : No	6.7 : 9.3	0.629	10.0 : 11.3	0.860
Screener	VHV : HC : Hospital	6.7 : 3.4 : 12.9	0.132	8.4 : 5.1 : 12.9	0.291
Region	A : B : C	2.5 : 21.7: 14.6	0.000	3.5 : 26.5 : 16.7	0.000

Table 3
Screening performances by region and screener type.

Variable	Comparison	% 3 specimens examined	% Good record (AFB, diagnosis)
Screener	VHV : HC : Hospital	44.8 : 24.6 : 74.2	85.0 : 96.6 : 100
Region	A : B : C	33.8 : 73.5 : 65.2	84.5 : 100 : 94.4

0.95% among household contacts screened by the previous National project in Thailand (MoPH, 2006) and the 0.5% among contacts screened by community leaders in Kenya (Golub *et al*, 2005). This indicated a considerable number of undiagnosed cases in the community detected by active screening under the project and supported the observation that in areas with high TB incidence, the principal source of infection may be contacts outside of the household (Verver *et al*, 2004).

Case detection by the trained VHV were comparable to the trained health center and hospital staff, even when combined trained health center and hospital staff as one group or when stratified analysis by region (data not shown). For unstable provinces where VHV were also the victims, how they coped with the situation and continued their services should be further explored to portray the existing powerful models in the midst of unrest conditions.

The number of people with suspected TB symptoms reported to the project was not large. They were from 32 of 74 districts in the lower part of southern Thailand. The probable explanation was that the duration of field activities including training was limited to three months due to the late budget distribution and the request of activity report by in the 3rd trimester of the fiscal year. The incentives used to promote the screening activity in the project may bias the positive rate to be an over-estimated, but this is probably acceptable one as 17 districts without positive cases still reported their performances. One province with 12 districts in the unstable area did not submit a report to the project. This deficiency was due to limited time and a communication gap rather than the unsafe condition as the other two unrest provinces with 11 districts were able to launch the activities in the community.

With the project budget of US$ 23,525 (THB 941,000), the estimated cost was US$ 535 per smear positive case detected and US$ 428 per case diagnosed. Improving the

project effectiveness could be accomplished by enhancing project management with clear communication and extending the VHV roles including promoting treatment adherence. The experience of other programs suggested potential for an expansion of both formal and informal involvement in TB control (Hadley and Maher, 2000). Regarding many best practices of community participation in emergency settings (Emergency Nutrition Network, 2005), including intra-rectal quinine administration (Ndiaye *et al*, 2007) and directly administered antiretroviral therapy (Wohl *et al*, 2004), there would be good opportunities and challenges for Thailand to enhance the VHV participation for TB or integrated disease control.

VHV performances in TB case detection in the community were comparable to health center and hospital staff, even in the midst of unrest conditions. To increase the effectiveness of the VHV participation in TB control, expansion of VHV roles to enhance treatment success should be considered.

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