Suspect Detection and Active Case Finding are Important in Increasing Case Detection Rate (CDR): a Comparison in High and Low Tuberculosis CDR areas

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Abstract— CDR is ratio of the number of notified tuberculosis cases to the number of incidence tuberculosis cases in a given year. If the CDR target (70%) is achieved, the effect on tuberculosis transmission will be considerable. However, CDR remains a major obstacle to tuberculosis control. In this study, we compare factors related to case detection in high and low CDR area in Central Java, Indonesia. This was an observational, analytic study with cross sectional design. The study was carried out during 2012 in Surakarta City (high CDR area) and District of Sukoharjo (low CDR). Study subject was 29 health officers of tuberculosis control program, consisted of 17 persons from health centers in Surakarta City and 12 persons from health centers in District of Sukoharjo. Primary data was collected through interview using structured questionnaire. The result showed characteristics of subject (age, sex, education) from high and low CDR areas did not differ significantly. However, tuberculosis officer in high CDR areas has longer length of work comparing those in low CDR areas. Tuberculosis training given to tuberculosis officer influencing the higher CDR. Suspect detection in high CDR area is carried out both in health and non-health sectors. Active case finding was more prominent in high CDR area.

Keywords— tuberculosis; case detection rate, suspect detection, active case finding

I. INTRODUCTION

Tuberculosis is one of the leading causes of morbidity and mortality worldwide, affecting one-third of world's population. Eighty percent of the total new tuberculosis cases in the world is found in 22 high burden countries. Geographically, the incidence is much higher in Southeast Asia (India and China together account for nearly 40% of the global tuberculosis cases) [1]. Tuberculosis has been recognized as a major public health problem of Indonesia [2]. The World Health Organization (WHO) estimated that Indonesia is the third high burden country in terms of incidence cases of tuberculosis [1].

The prevalence and transmission of tuberculosis and other mycobacterial infections may be considerably reduced by early detection of the disease [3]. This may achieve by high number of case detection rate (CDR) of tuberculosis. CDR is a ratio of the number of notified tuberculosis cases to the number of incidence tuberculosis cases in a given year. The World Health Organization (WHO) has formulated a case detection rate target of 70% [4]. CDR is one of the main indicators to assess the quality of a tuberculosis control program [1]. If the target is achieved, the effect on TB transmission will be considerable [5], [6].

In Indonesia, despite a decade of success in improving cure rates for tuberculosis, diagnosis and case detection remain a major obstacle to tuberculosis control [7]. Only five provinces in Indonesia achieved CDR target, while other 28 have not achieve it. Central Java is one of province remains under target [8]. According to Yar [9], the most important input to achieve a health program target is adequate health officers [9]. In this study, we compare factors in tuberculosis health officers that related to case detection in high and low CDR area in Central Java, Indonesia.

II. METHOD

This was an observational, analytic study with cross sectional design. The study was carried out during 2012 in Surakarta City (high CDR area) and Sukoharjo District (low CDR). In the last three years, CDR in Surakarta City has been increasing, while in Sukoharjo District the CDR (ranged 20-30%) remained below the standard of national target of tuberculosis control program.

The study subject was 29 health officers of tuberculosis control program, consisted of 17 health officers from 17 health centers in high CDR areas of Surakarta City and 12 health officers from 12 health centers in low CDR areas of Sukoharjo. Written informed consent was obtained from all study subjects. Ethical clearance for this study was given by Ethics Committee of Public Health Research, Faculty of Public Health Diponegoro University.

Primary data was collected through interview using structured questionnaire. Variables of this study were
characteristics of health officer of tuberculosis program and factors influencing them to achieve CDR target. Characteristics of study subject consisted of age (in year), sex (male, female), formal education levels (categorized as diploma and bachelor) and length of work as health officer of tuberculosis programs (in year), while factors influencing CDR consisted of basic salary, incentive as health officer of tuberculosis program, responsibility of tuberculosis officers in other programs, perception on whether tuberculosis program is a time consuming activities, workload, knowledge, training, coordination with other sectors and activities of tuberculosis officer (suspect detection, active case finding).

Salary was defined as perception of health officers of tuberculosis program on their basic salary, and categorized as high and low salaries. Likewise, incentive also defined as health officers’ perception on the amount of incentive (or honorarium) sufficiency obtained as tuberculosis health officer in addition to salary, and categorized as sufficient and less incentives. Responsibility in other programs was defines as number of programs in addition to tuberculosis program that are handled by tuberculosis officers. Training was defined as the history of tuberculosis-related training that have been followed by tuberculosis officers since dealing with tuberculosis program. The category of training was yes (for those who have undergone tuberculosis-related training) and no (for those who have not).

Knowledge was defined as tuberculosis-related knowledge (especially on suspect detection, contact tracing and case detection of tuberculosis), and categorized as good and lack of knowledge. Suspect detection was defined as encompassing activities of tuberculosis officer to detect tuberculosis suspect, and categorized as yes (for those who performed suspect detection and contact tracing in community) and no (for those who did not). Case finding was defined as the strategy used by tuberculosis health officer to find tuberculosis cases, which categorized as active and passive case finding.

Data were processed and analyzed in Epi-info version 7 and in SPSS version 19.0. The independent t-test and chi-square were used to assess the difference of subjects’ characteristics between health officers of tuberculosis program in high and low CDR areas. Chi-square was used to assess significant difference of factors influencing CDR in high and low CDR areas. Proportions were calculated with 95% confidence intervals where appropriate. An odds ratio was used to calculate risk factors that influencing CDR activities on both areas.

III. Results

Table 1 showed that characteristics of subject from high and low CDR areas did not differ significantly from each other. The age, sex, and education level were not different from each other (p=0.759, 0.158 and 0.331 respectively). However, we found health officers of tuberculosis program in high CDR areas had longer length of work comparing those in low CDR areas (p=0.004). Since the characteristics were similar, we assumed the characteristics, except length of study, would not confound the results.

Only few subjects revealed to get sufficient incentive as health officer of tuberculosis program, both in high and low CDR areas (35.5% and 8.3% respectively). This may need attention from District Health Offices from both areas. The workforce crisis, driven by low salaries, chronic underinvestment in production and training [10] has hampered tuberculosis control [11]. Low-income countries are still affected by deficits in the number, distribution, and capacity of health workers. To support the Stop TB Strategy, WHO has developed guidance for health workforce planning within overall plans for health systems [12], and to map roles and responsibilities for key contributors participating in tuberculosis control within the country [13].

Our study showed tuberculosis-related training for health officers of tuberculosis program was related to higher CDR (p=0.002). Training is needed to improve the skills of health officers of tuberculosis program, not only training for DOTS strategy, but also for new topics such as multidrug resistance [14]. Training for tuberculosis officers should at least carry out two times, one before employment (pre service training) and one after employment (in service training). pre service training to introduce DOTS strategy, while in service training to refresh and update the officers’ knowledge.

Suharjana [15] proved training can affect knowledge, skills and behavior in workplace. Appropriate knowledge and practice among health practitioners is crucial for early diagnosis, treatment and follow-up of TB cases. This is pivotal for a successful TB control program [16]. In view of reaching the Millennium Development Goals’ (MDG) targets for health, the demand for well trained and productive health staff in global health programmes is high [17]. Lack of training will affect the case detection of tuberculosis.

Workload of health officers of tuberculosis program should come into consideration. The application of new technologies and improvements in service delivery according to quality standards, create additional demands on health staff. Therefore, the global strategic plan for TB stresses the importance of careful planning for human resources for health, citing the insufficient quantity and quality and the mal-distribution of staff as the main barriers limiting effective TB control [4]. Field experience shows that there is significant variability in workload and productivity of staff within and between countries [18][19]. In this study, neither responsibility in other program along with tuberculosis nor workloads were related to CDR in high and low areas.

Suspect detection in high CDR area is carried out in many places (health centers, mobile health centers, health center branches, posyandu either elderly or underfive children, and private clinics. The detection involves not only health sectors but also other sectors, such as schools, workplaces and markets. While in low CDR areas, suspect detection remains focus on govermental health sectors. Private clinic and other sectors have no role in the detection. However, the difference of other sectors involvement was not significant (p=0.124). Each presented TB control program struggled due to
impediments to a well-functioning health care system. Mauch [20] study proved even in fragile states, TB control programs may still running well through the coordinated support of non-governmental providers.

Active case finding is actively carried out in high CDR area, but not in the low one. This strategy mostly relied on tuberculosis cadre to actively detect suspect in community and give immediate report to nearest health center. Besides, the active case finding strategy also involving many other participants such as private practice doctors, midwives, practice students, environmental health officers etc. Partnerships with non-governmental providers are vital for continuous service delivery [20]. Active case finding implementation resulted in additional tuberculosis cases detected in in year and reduced death over a 5-year period. The 25–34 year age group received most health benefits and the programme was most cost-effective in the 45–54 year age group [21].

IV. CONCLUSION

This study concluded active case finding and suspect detection are necessary in order to increase case detection rate. Therefore, both active case finding and suspect detection should be done adequately. To further increase the CDR, strong partnership and coordination are needed. Active case finding and suspect detection should carried out not only in health sector (health centers, mobile health centers, health center branches, posyandu either elderly or underfive children, private clinics etc) but also non-health sectors (schools, workplaces, markets etc). Tuberculosis-related training may also gives benefits for increasing case detection rate in tuberculosis endemic areas.

REFERENCES


### TABLE I. CHARACTERISTICS OF STUDY SUBJECT

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>High CDR</th>
<th>Low CDR</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>37.3±7.8</td>
<td>38.6±7.1</td>
<td>0.759</td>
</tr>
<tr>
<td>Sex: female</td>
<td>66.7</td>
<td>88.2</td>
<td>0.158</td>
</tr>
<tr>
<td>Education: diploma</td>
<td>66.7</td>
<td>82.4</td>
<td>0.331</td>
</tr>
<tr>
<td>Length of work</td>
<td>9±6</td>
<td>3±2</td>
<td>0.004</td>
</tr>
</tbody>
</table>

### TABLE II. FACTORS RELATED TO CASE DETECTION RATE IN HIGH AND LOW CDR AREAS

<table>
<thead>
<tr>
<th>Variables</th>
<th>High CDR (n=17)</th>
<th>Low CDR (n=12)</th>
<th>p value</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary: high</td>
<td>12 (70.6%)</td>
<td>6 (50.0%)</td>
<td>0.260</td>
<td>0.4 (0.1-1.9)</td>
</tr>
<tr>
<td>Incentive: sufficient</td>
<td>6 (35.3%)</td>
<td>1 (8.3%)</td>
<td>0.095</td>
<td>6 (0.6-58.4)</td>
</tr>
<tr>
<td>Responsibility: &gt;1 program</td>
<td>17 (100.0%)</td>
<td>10 (83.3%)</td>
<td>0.081</td>
<td>2.7 (1.6-4.4)</td>
</tr>
<tr>
<td>TB program: time consuming</td>
<td>14 (82.4%)</td>
<td>9 (75.0%)</td>
<td>0.630</td>
<td>1.5 (0.2-9.4)</td>
</tr>
<tr>
<td>Workload: overload</td>
<td>11 (64.7%)</td>
<td>8 (66.7%)</td>
<td>0.913</td>
<td>1 (0.2-5.2)</td>
</tr>
<tr>
<td>Training: yes</td>
<td>9 (52.9%)</td>
<td>0 (0.0%)</td>
<td>0.002</td>
<td>13.5 (1.5-28.3)</td>
</tr>
<tr>
<td>Knowledge: good</td>
<td>12 (70.6%)</td>
<td>5 (41.7%)</td>
<td>0.119</td>
<td>3.4 (0.7-15.8)</td>
</tr>
<tr>
<td>Suspect detection in community: yes</td>
<td>1 (8.3%)</td>
<td>11 (64.7%)</td>
<td>0.003</td>
<td>20.1 (2.1-96.8)</td>
</tr>
<tr>
<td>Case finding: active</td>
<td>13 (76.5%)</td>
<td>3 (25.0%)</td>
<td>0.006</td>
<td>9.7 (1.7-54.2)</td>
</tr>
<tr>
<td>Coordination with other sectors</td>
<td>3 (17.6)</td>
<td>0 (0.0%)</td>
<td>0.124</td>
<td>2.5 (0.2-28.1)</td>
</tr>
</tbody>
</table>