

Increasing TB case detection through intensive referral of TB suspects by village doctors to county TB dispensaries

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SUMMARY

OBJECTIVE: To explore new approaches to increase the detection of tuberculosis cases (TB).

DESIGN: Thirty counties participated in the study. Patients with TB symptoms were surveyed and referred by trained village doctors to county dispensaries, designated township health centres or general hospitals for free sputum examination. TB patients and suspects notified by general hospitals were traced by TB staff if they defaulted during the transfer.

RESULTS: A total of 12 091 new smear-positive TB cases were detected. The registration rate of new smear-positives increased from 36.2 per 100 000 population before the project to 49.9/100 000 after the project, and the case detection rate under the DOTS strategy reached 86%. Of 43 464 registered TB suspects, 15 363 (35.3%)

were referred by village and hospital doctors. The referral rate increased significantly ($P < 0.01$). Of the 15 363 referred patients, 3870 were diagnosed as new smear-positive TB cases. Among three different microscopy centres, there was a statistically significant difference in the sputum examination rates of TB suspects and in the smear-positive rates among the suspects examined. The follow-up rate was 70.9%, but the follow-up success rate was only 33.1%.

CONCLUSIONS: Intensive referral of patients with TB symptoms by village doctors to TB dispensaries is an effective way of increasing detection. At the same time, incentives are necessary for patients and village doctors.

KEY WORDS: pulmonary tuberculosis; case detection; prevention; control

THE HUBEI PROVINCE of China has been expanding the DOTS strategy by using World Bank and local governmental counterpart funds since 1992. However, at the end of 2003, the case detection rate for new smear-positive patients was only 63.8% (43% at national level reported by the World Health Organization [WHO]¹). To further increase tuberculosis (TB) case detection and reach the global target of 70% by the end of 2005,² Hubei Province successfully applied for and implemented a FIDELIS project (Fund for Innovative DOTS Expansion through Local Initiatives to Stop TB) Round IV entitled 'Increase case detection of TB through intensive referral of TB suspects by village doctors to county TB dispensary' in 30 counties from November 2004 to October 2005. The results are presented here.

DATA AND METHODS

Source of data

Thirty counties whose 2003 case registration rates were lower than average in Hubei Province participated in the project. All data have been taken from the FIDELIS

project monthly and quarterly reports for the period November 2004–October 2005, and from the Hubei provincial statistical yearly books. The project was approved by the ethics committee of the Institute of Tuberculosis Control and Prevention of Hubei, and the participants in the study gave informed consent.

Technical training

The provincial workgroup drew up a strategic plan and trained TB staff from 30 county TB dispensaries. The county TB staff trained doctors from general hospitals, township health centres and villages, and municipal TB staff were responsible for training technicians from general hospitals and microscopy centres at the township level.

Health education and promotion

A total of 35 000 desk calendars with information about TB and control policy were printed and delivered to village doctors, patients and village leaders. Information on TB and free TB treatment policies were also broadcast with scrolling on local TV channels for one week once a month.

Referral of TB suspects

Patients with cough, sputum production >3 weeks or haemoptysis were registered and intensively referred by village doctors to county TB dispensaries or nearby sputum smear examination centres for free check ups. Incentives were provided as follows: USD \$1.0 was provided to each diagnosed pulmonary TB case as travel subsidy and USD \$3.0 was given to village doctors who referred suspects diagnosed as smear-positive.

Establishment of additional sputum microscopy centres

An additional 43 sputum microscopy centres were established at the township level and 14 in county general hospitals. Binocular microscopes, reagents, sputum containers and slides were provided to each centre by the provincial working group.

Tracing TB suspects

County TB staff browsed the official disease control information website every day and printed out the detailed addresses and names of TB suspects reported by the general hospitals. TB staff engaged in supervision informed township and village doctors about suspects who were not registered in diagnostic or sputum examination centres via phone calls and letters. Township health centre and village doctors then traced the suspects and transferred them to county TB dispensaries or other designated sputum examination centres. County TB staff traced defaulters if they did not attend the county TB dispensary within a week.

Quality control of sputum examination

Technicians in county TB dispensaries supervised other sputum examination centres every month and rechecked all slides once a week.

Statistical analysis

The χ^2 test was used to analyse the data with SPSS software version 13.0 (SPSS Inc., Chicago, IL, USA). The test criterion was 0.05.

RESULTS

General case detection

A total of 12 091 new smear-positive cases were detected in 30 counties between November 2004 and October 2005. The registration rate for new smear-positive cases increased from 36.2/100 000 pre-project

Table 1 Comparison of registration of new smear-positive cases before and after the project in 30 counties

Duration	Population, 10 000s	New smear-positive cases <i>n</i>	New smear-positive case registration rate /100 000
Pre-project	2426.8	8 788	36.2
Post-project	2420.9*	12 091	49.9
		χ^2 530.8, $P < 0.01$	

* Population at the end of 2004.

(January–December 2003) to 49.9/100 000 post-project (November 2004–October 2005). The difference in the registration rate for new smear-positives was significant (χ^2 530.8, $P < 0.01$) (Table 1). The case detection rate under the DOTS strategy reached 86.0% based on the smear-positive incidence of 58/100 000 in Hubei province estimated by the WHO.

Source of initial consulting

TB suspects registered with the TB dispensary mainly presented spontaneously and were referred by village and hospital doctors. The number of TB suspects registered during the project (43 464) was much higher than that registered before the project (33 816) (χ^2 1230.1, $P < 0.01$). In particular, the referral rate of TB suspects increased from 21.7% before the project to 35.3% after the project (χ^2 1718.3, $P < 0.01$). Moreover, 3870 new smear-positive cases were confirmed among 15 363 TB suspects referred by village and general hospital doctors, accounting for 32% (3870/12 091) of the total number of TB patients detected during the period of the project (Table 2).

Case finding at different microscopy centres

There were 87 microscopy centres in the 30 counties, of which 30 were located in TB dispensaries, 14 in hospitals and 43 in township health centres. The results showed that the sputum examination rates of TB suspects at different microscopy centres were quite different (χ^2 145.9, $P < 0.01$): they were 71.2% and 72.6% in TB dispensaries and in hospitals, respectively, which were significantly higher than at township health centres (χ^2 , 145.5, $P < 0.01$) using the χ^2 cut-off method (Table 3). Moreover, there was a significant difference in smear-positive rates among TB suspects examined (χ^2 367.3, $P < 0.01$). Furthermore, there were statistically significant differences in smear-positive rates between TB dispensaries and hospitals

Table 2 Comparison of registered tuberculosis suspects and referral rates

Duration	Population, 10 000s	Referral rate <i>n</i> (%)	Total registered <i>n</i>	Rate/1000
Pre-project	2426.8	7 324 (21.7)	33 816	1.39
Post-project	2420.9	15 363 (35.3)	43 464	1.80
Total	4847.7	22 687 (29.4)	77 280	1.60
		χ^2 1718.3, $P < 0.01$	χ^2 1230.1, $P < 0.01$	

Table 3 Comparison of sputum examination at different microscopy centres

Settings	Microscopy centres <i>n</i>	Registered TB suspects <i>n</i>	TB suspects examined <i>n</i>	Sputum examination rate %	Sputum-positive <i>n</i>	Positivity rate %
TB dispensaries	30	41 612	29 617	71.2	14 342	48.4*
General hospitals	14	351	255	72.6	23	9.0*
Township health centres	43	1 501	852	56.8*	222	26.1*
Total	87	43 464	30 724	70.7 $\chi^2_{145.9}^{\dagger}$ $\chi^2_{145.5}^{\ddagger}$	14 587	47.5 $\chi^2_{367.3}^{\dagger}$ $\chi^2_{120.5}^{\S}$ $\chi^2_{250.7}^{\parallel}$ $\chi^2_{16.8}^{\#}$

* $P < 0.01$. \dagger Comparison of the three sputum examination rates among the three centres. \ddagger Statistical value using the χ^2 cut-off method, which compared the sputum examination rates between the centre (TB dispensary + hospital) and the township centre. \S Comparison of smear positivity rate between TB dispensary and hospital. \parallel Comparison of smear positivity rate between TB dispensary and township. $\#$ Comparison of smear positivity rate between hospital and township.

($\chi^2_{120.5}$, $P < 0.01$), TB dispensaries and township health centres ($\chi^2_{250.7}$, $P < 0.01$), and general hospitals and township ($\chi^2_{16.8}$, $P < 0.01$). The highest rate was 48.4% in TB dispensaries, followed by 26.1% in township health centres, and the lowest was 9.0% in hospitals (Table 3). The proportions of smear-positives detected at TB dispensaries, township health centres and general hospitals were 98.3%, 1.5% and 0.2%, respectively.

Tracing TB suspects

During the project, a total of 11 648 TB suspects were notified by hospitals, of whom 7768 did not present for treatment and needed to be traced; 5509 (70.9%) TB suspects were found, 1821 of whom (33.1%) attended a TB dispensary for further examination, and 614 suspects were confirmed as smear-positive.

DISCUSSION

The most effective intervention measure to stop TB is to detect and cure the infectious source. At present, the cure rate of new smear-positive cases is above 90% in most provinces in China.³ However, the total detection rate is not high. According to the 2004 WHO report, the new smear-positive detection rate in 2003 was only 43% in China.¹ New approaches therefore need to be explored to increase case detection rate to control TB. This is also the objective of the FIDELIS project.

With intensive referral of patients with TB symptoms by village and hospital doctors to TB dispensaries during the year of project implementation, case detection has improved greatly in the project counties. The registration rate of new smear-positive cases in the 30 project counties increased from 36.2 to 49.9/100 000, and the case detection rate of new smear-positives met the WHO target of 86%.

It has been proved that passive case finding, i.e., screening individuals who consult with symptoms, is

a practical and economical way of detecting TB cases. With the development of TB control and increased investment from all government levels, more TB cases have been detected actively. The study showed that the number of TB suspects registered significantly increased due to project implementation. This was mainly attributed to the intensive referral by village and hospital doctors. The number of new smear-positive cases detected also increased, of which those referred accounted for 32%. This proportion will increase with more investment, which shows that intensive referral of TB suspects, using incentives, is one of the most effective ways of increasing case detection.

The study also showed that the sputum microscopy centre needed further improvement. Although the sputum examination rate in general hospitals reached 72.6%, much higher than that of the previous year (51.0%),⁴ the smear-positive rate was still very low (9.0%). One of the main causes was insufficient sputum samples in general hospitals. Only one on-the-spot sputum specimen was examined in hospitals, while three sputum specimens (night sputum [collected by the patient before going to bed], morning and on-the-spot sputum) were required for examination by TB dispensaries. According to some reports,^{5,6} the case detection rate can increase by 0.7–6.6% with the examination of an additional sputum sample. On the other hand, the lack of training and practice of technicians in hospitals could be another cause of the lack of sputum examinations. In addition, the external quality assurance (EQA) of TB laboratories has not covered general hospitals until now. It is therefore necessary to strengthen training for technicians and EQA to improve the microscopy centres in general hospitals and at the township level.

The cases notified by general hospitals via the Internet were traced by TB staff, but the follow-up rate and follow-up success rate were only 70.9% and 33.1%, respectively. Shortages of funds and human resources

were the main reasons for the low follow-up rate, while a mobile population and inaccurate information such as incorrect names or addresses were the main causes of the low follow-up success rate.

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R É S U M É

OBJECTIF : Explorer de nouvelles approches permettant d'augmenter la détection des cas de tuberculose (TB).

SCHÉMA : Ce projet a impliqué 30 comtés. Les patients ayant des symptômes de TB ont fait l'objet d'une enquête et ont été référés par les médecins de village formés vers les dispensaires du comté, vers des centres de santé urbains désignés ou encore vers les hôpitaux généraux pour un examen gratuit des crachats. Les patients tuberculeux et les suspects déclarés par les hôpitaux généraux ont été recherchés par le personnel des centres TB en cas de perte de vue au cours du transfert.

RÉSULTATS : On a détecté 12 091 nouveaux cas de TB à bacilloscopie positive. Le taux d'enregistrement des nouveaux cas à bacilloscopie positive est passé de 36,2 pour 100 000 dans la période précédant le projet à 49,9/100 000 dans la période suivant le projet ($P < 0,01$), et le taux de détection des cas sous DOTS a atteint 86%. Parmi les 43 464 suspects enregistrés, 15 363 (35,3%)

ont été référés par les médecins des villages et des hôpitaux. Le taux de transfert a augmenté significativement ($P < 0,01$). Parmi les 15 363 suspects, 3870 ont été diagnostiqués comme nouveaux cas de TB à bacilloscopie positive. Au sein de trois centres différents de microscopie, on a observé des différences statistiquement significatives dans les taux d'examen des crachats chez les patients suspects de TB et dans les taux de positivité des frottis chez les suspects de TB examinés. Le taux de suivi a été de 70,9%, mais le succès au suivi n'a atteint que 33,1%.

CONCLUSIONS : Un transfert intensif des patients atteints de symptômes de TB par les médecins de village vers les dispensaires TB constitue une façon efficace d'augmenter la détection des cas. Certains incitants doivent être simultanément prévus pour les patients et les médecins des villages.

R E S U M E N

OBJETIVO : Explorar nuevas estrategias destinadas a aumentar la detección de casos de tuberculosis (TB).

MÉTODO : Se vincularon a este proyecto 30 países. Médicos capacitados de la aldea interrogaron a los pacientes que presentaban síntomas de TB y los remitieron a dispensarios de la circunscripción, a centros de salud designados o a hospitales generales con el fin de practicar el examen del esputo, sin costo alguno. El personal de salud dedicado a la TB contactó a los pacientes con presunción diagnóstica o con TB confirmada, cuando estos se perdieron de vista durante la remisión.

RESULTADOS : Se detectaron 12 091 casos nuevos de TB con baciloscopia positiva. La tasa de registro de casos nuevos con baciloscopia positiva aumentó de 36,2 por 100 000 habitantes antes del proyecto a 49,9/100 000 después del proyecto ($P < 0,01$) y la tasa de detección de casos dentro de la estrategia DOTS alcanzó 86%. De los

43 464 casos registrados con presunción clínica de TB, 15 363 (35,3%) habían sido remitidos por médicos de la aldea y médicos hospitalarios. La tasa de remisión aumentó en forma significativa ($P < 0,01$). En estos 15 363 casos se diagnosticó TB con baciloscopia positiva a 3870 pacientes. En tres centros de microscopía, se observaron diferencias estadísticamente significativas de la proporción de baciloscopias del esputo y de resultados de baciloscopia positivos en los pacientes con presunción diagnóstica de TB. El índice de seguimiento fue de 70,9% y el seguimiento exitoso de solo 33,1%.

CONCLUSIONES : La remisión intensiva de los pacientes con síntomas de TB por parte de los médicos de la aldea a los dispensarios de TB constituye un método eficaz para aumentar la detección de casos. Asimismo, sería importante establecer algún tipo de incentivo destinado a los pacientes y a estos médicos.