pinpoint tenderness on the appendix under ultrasonography is useful to confirm acute appendicitis. Arch Surg 2001; 136: 1136-40.


communities where tuberculosis is highly prevalent especially under poor housing conditions.17,18

For the reasons cited above we designed an intervention study to determine the effectiveness of involving private practitioners in improving the CDR in district Thatta. To best of our knowledge this is first of its kind of collaborative work in Pakistan to control TB.

**Methodology**

The study was done in district Thatta which is one of the coastal areas of Sindh province. It is located in the east of the Karachi and has a population of about 1.1 million; majority of which are rural.

The total number of cases in Thatta in each quarter (district results by the national TB control program) is usually below 200. It was 202 in the first quarter of the year 2007 which went down to 186 in the 2nd quarter of the same year. The intervention started after the second quarter. The results of the intervention can be perceived from the results of the third quarter of the year 2007.

The implementation of this six months duration intervention project was started in May 2007 and it ended in October of the same year. The scale of the project was of a pilot nature and the expected outcomes of the study were to see how the private physicians behaved in collaborating with the government and how do they practice the standard guidelines for the management of tuberculosis.

There were about 200 private physicians working in the Thatta city who treated all kinds of patients coming from the city and rural periphery of the district. Only those PPs who were treating TB patients at their private practice (around 50) were given invitations to attend training workshop on the Tuberculosis-Directly Observed Short course (DOTS) based on the guidelines of World Health Organization. Approximately half of them (23 practitioners) agreed to participate in the training.

Private practitioners (PPs) were given 3-day standard training on the TB-DOTS based on the TB module from national Tuberculosis Control Program (NTP) in January 2007 by the master trainer of the NTP. PPs were also given incentive of Pak Rupees 1500 and a copy of TB module, refreshments and certificates at the end of the workshop. Their knowledge of the TB-DOTS prior to and after the training was assessed through a questionnaire which addressed the key issues in the management of TB.

At the end of the training a written consent of voluntary participation in the study was taken from all the participants and an introduction about the project was provided. The PPs were also informed that they should refer suspected TB cases for sputum microscopy and register the patients with the NTP.

The PPs were given an incentive of Pak Rupees 50 for every adult TB diagnosed sputum smear positive patient and PPs were sent these TB patients to NTP office for registration. PPs were told that they may charge these patients routinely as standard practice. The cost of the sputum smears was borne by the project and the anti-TB drugs were provided by the NTP office at Thatta. A field coordinator monitored and facilitated the whole process. The PPs were also visited regularly by the CHS team as well as by the district NTP coordinator.

TB patients' data was collected from all participating PPs during the study period of six month regarding number of suspected TB cases, new sputum smear positive cases, and patients' demographic and socioeconomic data. On the other side for the comparison, NTP data of the study area regarding number of new sputum smear positive TB cases was collected from NTP office.

The project coordinator of the field took the TB1 forms from the physicians where patients were registered with the district TB Coordinator office of Thatta. The Anti Tuberculosis Treatment (ATT) was originally given to the physicians by the district TB coordinator office upon submitting the profile of the patients. These drugs were given for a period of two months initially for the intensive phase of the treatment and latter for six months for continuation phase. The laboratory charges for three sputum AFB smear testing were paid on a two monthly basis by the project.

The physicians were seen by the coordinator every week and data was taken from them and shared with the NTP coordinator who then visited the physicians accordingly. The role of the team of the Community Health Sciences of the Aga Khan University was to moderate this partnership between the NTP office and the physicians of Thatta.

This study was a pilot study to determine the increase in the case detection rate through implementing PPM model in Pakistan. The enhancement of new TB SS+ve cases in terms of number and percentage in the study area was compared with the previous numbers.

**Results**

The results of the training in terms of gain in knowledge of DOTS is shown in Table 1. It can be seen that the mean score of physician participation before the training was 13.05 ± 4.79 out of a total score of 30 based on some 30 variables/questions. The mean score in the post-test increased to almost 19 ± 4.4. Keeping this in view it can be said that a moderate improvement in the knowledge of physicians was observed after the training.

The physicians referred a total of 55 adult suspected cases of tuberculosis. All of these patients were tested for sputum smear for AFB at an assigned laboratory. The patients had agreed to go for three consecutive samples of sputum AFB. Out of the 55 suspected cases of TB, 23 cases were
positive for the sputum smear.

The total SS+ve TB cases, in the third quarter notified to the NTP office of the district Thatta, were 188 or 55/100,000 population and CDR was 69% which showed that the case detection in this district still needed improvement. On the other hand, by adding the 23 SS+ve TB cases, detected by the physicians who participated in our study, the number of SS+ve TB cases in the third quarter increased from 188 to 211 or 62/100,000 population with a CDR of 77% (Fig 1). The CDR increase would be better when extrapolated on all the 55 physicians who saw TB cases in their clinics.

The sociodemographic and socioeconomic characteristics of the sputum smear positive cases revealed that out of 23 diagnosed TB cases, 12 (52%) were males and 11 (48%) were females. Mean age of the patients was 34 ± 11.0 years. Most of these patients, 91%, were illiterate. A large number of patients, 43.5%, were unemployed. Just less than a half, (43.5%) of the patients were manual workers or labourers.

Those who belonged to urban areas were in majority (47.8%), with the semi urban being (34.8%) and the rural 17.2%. Only 26.1% of the patients had a family contact of tuberculosis whereas a great majority, (73.9%) had no family contact of tuberculosis. The monthly income of all of the patients was below 3000 Rupees (US$ 50) (Table 2).

### Discussion

The public private mix model was a relatively newer concept in case of Pakistan so we faced initial difficulty in involving all the stakeholders but the response received was very encouraging. There was an increase in case detection rate of tuberculosis by involving private physicians in the TB control programme of District Thatta during the intervention period. This promising results is a helps in better understanding of concept of public private mix model in context to an important public health issue in Pakistan. This phenomenon was also reported from India in terms of case detection rate.1

Although a moderate increment in the CDR was observed but when seen from the physicians participation perspective, it was enormous as the total figure reported by the NTP office for the whole district including the rural as well as urban areas was 188 in the third quarter of 2007. The impact of adding 23 cases was only in one area of an urban locality, that, when extrapolated through a larger study on whole district can be considered statistically significant.

All the patients were spared from the unnecessary prescriptions of the chest x rays as the physicians were very much convinced by new TB-DOTS guidelines. They also realized that the TB burden needs to be brought down only through their cooperation with the government. The physicians were allowed to charge their patients as per their routine; above all they were given an incentive. Additionally neither they nor

### Table 1: Mean scores of the physicians participating in the training workshop.

<table>
<thead>
<tr>
<th>DOTS Training</th>
<th>Mean Score (Out of 30)</th>
<th>Number of Participants</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Test</td>
<td>13.05</td>
<td>22</td>
<td>4.796</td>
</tr>
<tr>
<td>Post-Test</td>
<td>18.59</td>
<td>22</td>
<td>4.490</td>
</tr>
</tbody>
</table>

### Table 2: Sociodemographic variables of the Sputum Smear TB cases (n=23) detected by the private physicians.

<table>
<thead>
<tr>
<th>Sociodemographic Factors</th>
<th>(%) (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>52% (12)</td>
</tr>
<tr>
<td>Female</td>
<td>48% (11)</td>
</tr>
<tr>
<td>Mean Age</td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>91.3% (21)</td>
</tr>
<tr>
<td>Primary</td>
<td>8.7% (2)</td>
</tr>
<tr>
<td>Secondary</td>
<td>0%</td>
</tr>
<tr>
<td>High</td>
<td>0%</td>
</tr>
<tr>
<td>University</td>
<td>0%</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
</tr>
<tr>
<td>Salesman</td>
<td>0%</td>
</tr>
<tr>
<td>Blue collar worker</td>
<td>43.5% (10)</td>
</tr>
<tr>
<td>White collar worker</td>
<td>0%</td>
</tr>
<tr>
<td>Farmer</td>
<td>8.7% (2)</td>
</tr>
<tr>
<td>Retired</td>
<td>4.7% (1)</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>47.8% (11)</td>
</tr>
<tr>
<td>Rural</td>
<td>17.4% (4)</td>
</tr>
<tr>
<td>Semi-urban</td>
<td>34.8% (8)</td>
</tr>
<tr>
<td>Family History of TB</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>26.1% (6)</td>
</tr>
<tr>
<td>No</td>
<td>73.9% (17)</td>
</tr>
<tr>
<td>Household Income</td>
<td></td>
</tr>
<tr>
<td>&lt; 3000 RS (&lt;US$ 50)</td>
<td>100% (23)</td>
</tr>
</tbody>
</table>

![Fig 1: New Sputum Smear cases in Thatta during three Quarters of 2007 (Data Source: NTP Pakistan 2007).](image)
their patients bore the cost. This gave the physicians a temptation to enter in the programme.

The case detection rate improved during the period of implementation of the study though the total number of the cases detected in the entire six months period was small but it was considered a great achievement.

Firstly, the 23 partner physicians were selected conveniently in the project from the city of Thatta. It was a mixture of physicians as some had low and whereas others had higher turn over of patients. This observation is important because a full scale project needs to incorporate those physicians who have a high turn over of patients.

Secondly, the intensification of NTP program in the project through its government locations has already made some improvements so the small improvement in it through our study is diluted if it is analyzed in the context of the government figures.

Thirdly the criteria for the inclusion of patient in our study were strict. Only those patients were registered in the study who were adults and were newly diagnosed on the basis of sputum smear for AFB. The physicians had diagnosed a number of patients who were smear negative for the AFB, some of them were defaulters or failure cases. These were not included in the study

Elsewhere even in neighbouring countries the partnership in DOTS implementation has proved to be very cost effective, 4 affordable and has also helped to reduce the economic burden of the disease. 19, 20

This kind of partnership needs strong governmental support, in terms of supply of consumables and liaison with the private health care providers. The ultimate goal of improvement in TB control therefore is achieved through the sincere contribution and mutual trust within the partners. 21

Although a lot of difficulties were faced in running the project but the achievement of 23 patients sent for DOTS will help to develop a bigger collaboration in the context of the control of the TB in this country.

In this project the government and the private physicians, the first line of contact for majority of the population, benefited from each other. However the main advantage was for the patients who utilized the systematic and easy method of treatment. They utilized the quality treatment provided to them through this collaboration. Finally the partnership not only improved the functioning of the system but also in an informal way controlled the practice of the private practitioners.

Limitations: This study had several limitations. First, they were not able to involve all of the private physicians working in the area because some of the physicians were reluctant to join the partnership due to the fact that they may lose their patients. Secondly, the CDR was relatively low because we only included the sputum smear (SS) positive adult cases hence the outcome would have been greater if we had included the SS negative cases as well. Thirdly, the study team was based in Karachi and it could only visit the project monthly although regularly. Therefore the importance of onsite more frequent project monitoring would have given more positive results.

Based on the study findings it is recommended that public private mix model in case of tuberculosis needs to be adopted on a wider scale with the involvement of all stakeholders including the physicians, private hospitals, patients and government as well as other Non - profit organizations.

For any public private mix model it is required that the governmental should play its due role of stewardship fulfilled with sincerity and responsibility. This enables the trust building among the partners. It was observed in the study that any shortcomings in the liaison between the partners lead to many misunderstandings among them. Finally it needs to be ensured that the patients, who are the prime beneficiaries of this partnership, are not marginalized.

Acknowledgements

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Ethical Approval: Ethical approval for the study was taken from the Ethical Review Committee (ERC) of the Aga Khan University.

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Low haemoglobin levels, its determinants and associated features among pregnant women in Islamabad and surrounding region

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Abstract

Objective: To estimate the haemoglobin levels in pregnant women and to determine the socio-demographic factors associated with anaemia in pregnancy.

Patients and Methods: In this cross-sectional survey, a total of 200 patients visiting prenatal clinic of Shifa International Hospital/Shifa Foundation Community Health Centres, Islamabad over the period of six months, both booked and non-booked were included. A detailed questionnaire was filled and complete blood count, peripheral smear and absolute values were performed in all cases. Haemoglobin levels (Hb) of women below 10.5g/dl were considered to be low (anaemia) and were further subjected to urine/stool routine examination. Cases of thalasaemia trait were excluded from the study. All the data was entered in SPSS v 10.0. Descriptive analysis was done obtaining frequencies for socio-demographic factors. Mean haemoglobin levels along with standard deviation and confidence interval were reported. Frequency of helminthic infestation of suspected cases was also reported. Analysis included any significant differences in mean haemoglobin levels of booked versus non-booked cases.

Results: Mean haemoglobin of our study population was 11.0±1.64 g/dl. Frequency of decreased haemoglobin was found to be in 42.5%. Mean haemoglobin of patients having income less than Rs5000 was 10.5±1.24 g/dl and those with income more than Rs5000/month had a mean Haemoglobin of 11.5±1.44g/dl. Mean haemoglobin of patients with history with or without pica eating was 10.1±1.31g/dl and 11.9±1.56g/dl respectively.

Conclusion: Low haemoglobin was commonly seen in our population among pregnant women irrespective of their socioeconomic status. The severity of anaemia was significantly associated with lower socioeconomic status and odd eating habits (JPMA 59:86; 2009).

Introduction

The importance of anaemia as a major public health problem throughout the world is widely recognized.1 Anaemia in pregnancy is multi-factorial in aetiology and according to the 2005 WHO field report the prevalence of anaemia among pregnant women in Asia averages 41.6%.2,3 However, most studies that have looked into these conditions confirm that more than 80% of cases of anaemia in women especially during pregnancy, are associated with or have an important iron deficiency component.4 Various studies conducted in Pakistan documented prevalence of anaemia between 43 to 76%.5-7 Factors leading to anaemia in obstetric cases are multiparity and blood loss in ante-partum, intra partum and postpartum period. Lactation, malnutrition and mal-absorption are the additional factors.8