Introduction

After the initiation of RNTCP in India, its primary objective of achieving 85% cure rate and 70% case finding rate has been met. But to maintain success, the program needs continuous critical reviews to find out where things might have gone astray. For that purpose, intricate managerial RNTCP indicators have been developed, which should be given their due in analysis, to identify the inappropriate which might culminate into something more disastrous. Seldom we find some literature suggesting such introspection which makes rectification imperative.

The technical manuals of the program provide some clue regarding the expected values of indicators as well as probable reasons for deviations. But considering geographical, sociocultural, and demographic heterogeneity, it can never be prudent to generalize that such reasons be similar all over India. So these indicators need to be checked at different settings to find out the probable magnitudes. This could be an important step toward setting varied standards in the program and to explain the variance.

So this study was envisaged with the objective of comparative analysis of RNTCP indicators in one rural and one urban tuberculosis unit (TU) of Burdwan district in West Bengal and finding out the possible factors that might have influenced the differences, if any.
Materials and Methods

The study, conducted between February 2009 and May 2009, was a record analysis of tuberculosis registers of the tuberculosis units (TUs) at Bhatar and Burdwan Sadar in Burdwan district, West Bengal. Being Rural Health Unit of the Department of Community Medicine, Burdwan Medical College, the former is located in a rural area with a substantial tribal population and the latter in the district headquarter. Data were collected from the said registers pertaining to four quarters of 2007. RNTCP indicators were comparatively analyzed between the TUs primarily. More in-depth analysis of the outcomes was done to find out possible contributory factors. Data were analyzed in a standard statistical norm using the software package of the Epi Info version 6.

Results

In 2007, 555 patients were registered in the Bhatar TU and 343 in the Burdwan TU. There was a significant difference in age at registration, as more young and less old were treated in urban areas compared to rural. There was no significant gender difference, though male preponderance was found in either area. Bhatar TU had significantly more tribal patients, in conformity with the ethnic distribution there.

While registering, only proportion of retreatment cases in urban and extra-pulmonary cases in rural areas was close to RNTCP anticipation. The new sputum negative (NSN) cases were less and new sputum positive (NSP) and extra-pulmonary (EP) cases were more than anticipation in the urban area. NSP cases were more and retreatment and NSN cases were less than the norm in the rural area. The urban–rural comparisons among NSP and retreatment cases differed significantly. The contribution of retreatment smear positive cases out of total smear positive cases was less in either area, significantly more in the rural area. NSP cases out of all new cases were more than anticipation with no significant difference. The proportion of smear negative patients receiving Cat I regimen was significantly more in the urban area. Sputum conversions for new and retreatment cases were significantly different in two areas, rural area exceeding the anticipated value. Cure rate, treatment completion rate, default rate, death rate, and proportion of transferred out were close to norms with no significant difference in two areas. The failure rate was significantly more in the urban area, but much lower than norms in the rural area [Table 1].

Outcomes like cured, treatment completed, and default were significantly different in two areas according to age. No such difference was observed for failure and death. The outcome of treatment completed was different according to gender between two areas. Outcomes of NSN and EP cases differed significantly in two areas. More often treatment after default cases were cured in the urban areas, while they defaulted again in rural areas. All other differences were insignificant [Table 2]. It was revealed that in about one-third of the sputum negative cases, end-treatment sputum examination was not performed; the proportion varied from 23.81% to 38.09% in the different groups in rural areas and 14.14% to 32.35% in urban areas.

Table 1: Comparison of RNTCP indicators among urban and rural patients

| RNTCP target | Urban (n = 343) (%) | Rural (n = 555) (%) | Significance (%) |
|--------------|--------------------|--------------------|-----------------|
| Cases        |                    |                    |                 |
| NSP          | ≈37                | 142 (41.40)        | 284 (50.63)     | 2.623 < 0.01 |
| NSN          | ≈37                | 99 (28.86)         | 155 (28.47)     | 0.054 > 0.05 |
| Retreatment  | ≈19                | 68 (19.82)         | 74 (13.33)      | 2.500 < 0.01 |
| Extra-pulmonary | ≈7               | 34 (9.91)          | 42 (7.57)       | 1.101 > 0.05 |
| Smear positive Re-treatment cases out of total sm. pos. cases | <30 | 26.42 | 15.87 | 2.818 < 0.01 |
| New smear positive cases out of all new cases | ≈50 | 52.21 | 58.66 | 1.636 > 0.05 |
| Smear negative and new EP case in Cat I out of total patients in Cat I | <20 | 23.12 | 15.68 | 1.989 < 0.05 |
| Percentage of smear pos. cases showing smear negativity at the end of respective I P | | 78.02 | 90.80 | 3.96 < 0.01 |
| Percentage of new smear pos. cases showing smear negativity at the end of 3 months | >90 | 87.32 | 95.02 | 2.633 < 0.01 |
| Cure rate | >85 | 85.21 | 83.63 | 0.279 > 0.05 |
| Completion rate | <3 | 1.38 | 4.63 | 1.413 > 0.05 |
| Default rate | <5 | 4.23 | 7.47 | 1.077 > 0.05 |
| Failure rate | <4 | 4.93 | 0.71 | 2.484 < 0.01 |
| Death rate | <4 | 4.23 | 4.61 | 0.061 > 0.05 |
| Transferred out | <3 | 0.31 | 0.18 | 0.389 > 0.05 |

*= stands for ‘almost equal to’
Less proportion among smear positive cases. EP cases were more in the urban areas, for the reason given above; NSN cases were put into Cat I, regardless of the RNTCP guideline about the adequateness of treatment.

Follow-up sputum examination was not given due importance in patients other than NSP, as in rural areas, significantly lower proportion of NSN patients were tested compared to urban. This might have brought down the high sputum conversion rate of 95.02% to 83.03% cure rate in rural areas inflating the treatment completion rate (4.63%). Though the sputum conversion rates in both areas were close to the expected range of RNTCP, but they themselves differed significantly. In a study at a rural TU of Howrah district,

Table 2: Comparison of treatment outcomes between urban and rural patients

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|---------------------------------------------------------------|
| **Cured** | **Treat completed** | **Default** | **Failure** | **Death** |
|-----------|---------------------|-------------|-------------|-----------|
| U         | R                   | U           | R           | U         | R         | U           | R         |
| Age (years) |                     |             |             |           |           |             |           |
| ≤19        | 18                  | 15          | 32          | 19        | 3         | 0           | 1          | 0         | 0         | 0         |
| 20–60      | 130                 | 234         | 58          | 115       | 26        | 46          | 9          | 3         | 10        | 12        |
| > 60       | 6                   | 18          | 5           | 8         | 0         | 5           | 2          | 0         | 1         | 5         |
| Significance | χ² = 6.1, df = 2, | χ² = 14.02, df = 2, | χ² = 49.67, df = 1, | F = 0.62, | F = 0.21, |
|            | P < 0.05            | P < 0.001   | P < 0.001   | P > 0.05  | P > 0.05  |
| Gender     |                     |             |             |           |           |             |           |
| Male       | 119                 | 199         | 74          | 99        | 27        | 42          | 9          | 3         | 9         | 16        |
| Female     | 35                  | 68          | 61          | 43        | 2         | 9           | 3          | 0         | 2         | 2         |
| Significance | χ² = 0.4, df = 1, | χ² = 6.56, df = 1, | F = 0.60, | F = 0.48, | F = 0.49, |
|            | P < 0.06            | P < 0.01    | P > 0.05    | P > 0.05  | P > 0.05  |
| NSN cases  | –                   | –           | 90          | (90.9)    | 142       | 7           | 12         | 0         | 2         | 1         |
| Significance |                     |             |             |           |           | (7.07)      | (7.74)     |           |           |           |
|            | –                   | –           | (91.6)      | (91.6)    |           | (2.03)      | (0.66)     |           |           |           |
| EP cases   | –                   | –           | 30          | (88.2)    | 41        | 4           | 1          | 0         | 0         | 0         |
| Significance |                     |             |             |           |           | (11.8)      | (2.4)      |           |           |           |
|            | –                   | –           | (97.6)      | (97.6)    |           | (1.056)     |           |           |           |           |
| Retreatment |                     |             |             |           |           |             |           |           |           |
| TAD        | 13*                 | 3*          | 0           | (0.0)     | 1 (7.7)   | 1* (5.88)   | 6* (46.2)  | 1 (5.88)   | 0 (0.0)   | 2 (11.7)  | 3 (23.1)  |
| Failure    | (44.4)              | (66.7)     | 0           | (0.0)     | 0         | 2           | 0          | 3         | 1         | 0         | 0         |
| Relapse    | (64.0)              | (69.4)     | 0           | (0.0)     | 2         | 7           | 6          | 1         | 1         | 2         |
| Others     | –                   | –           | 15          | (93.7)    | 16        | 1           | 4          | 0         | 0         | 0         | 1         |
|            |                     |             | (76.2)      | (76.2)    |           | (19.0)      |           |           |           |           |           |

1Significant difference at least at 95% level by the Z-test. Figures in parentheses indicate percentages.

Discussions

Male preponderance found in this study was similar to other studies, the supposed reason being greater exposure. The finding of younger patients in urban areas can be attributed to greater health awareness. There is a possibility of wrong classification due to faulty elicitation of history in rural areas as there is a trade-off between NSP and retreatment cases. Lesser proportion of NSN cases both in urban and rural areas could be due to overreliance on sputum results denouncing the CXR report despite that NSN cases be as frequent. More EP cases in urban areas could be due to better diagnostic facilities. Re-treatment cases were less anyway in rural areas resulting in their

At Howrah, the cure rate for NSP cases (53.8%) and for
all smear positive cases (56.5%) was lower with a high defaulter rate (24.7%). At Chandigarh, the defaulter rate was much less (1.1%). RNTCP intended to find out the erring TU/DMCs with such trend and take corrective measures. In rural areas, 13% of primarily converted patients either did not show sputum negativity or no sputum examination was done at end of treatment. Default in rural areas is attributable to folkways and vocational migration.

The finding of more failure in urban areas is echoed elsewhere and is possibly due to the exposure to varied treatment modalities before opting for RNTCP. The failure rate in urban areas (4.93%) is more than what was found in Chandigarh (2.6%). The failure rate among retreated cases (7.32%) was higher than what had been found there (5.8%). The urban failure rate is precariously close to RNTCP consideration that primary drug resistance exists in community if the failure rate exceeds 5%. However, the failure rate in rural areas was 0.71%.

The outcomes “Cured,” “Treatment completed,” and “Default” were obtained in significantly different proportions in the two areas according to age, reason being different age at treatment onset. In urban areas, 57.58% of NSN cases were males compared to 72.09% in rural areas. Hence “treatment completed” differed significantly between genders. Treatment after default (TAD) cases, more at risk of developing failure, were more in urban areas compared to rural, which might have reflected care seeking behaviour or proper elicitation of history. The cause of the commonest outcome of TAD, “cured” in the urban area and “default” in rural area, is as explained above.

The outcome “default” was analyzed further in our study. But no factor other than age at the onset of treatment was found to be significantly different. More in-depth, community-based analysis is necessary to find out its contributory factors.

So the study revealed that the practice of conforming to the expected values of the broad and often-used indicators may be misleading. The managers of RNTCP should put adequate effort to find the status of other indicators as well.

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