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THE TREATMENT COMPLETION RATE IN TUBERCULOSIS CASES CONFIRMED BACTERIOLOGICALLY AND TREATED AT THE TUBERCULOSIS CENTRE, KABUL

Staily Asif Popal*

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SYNOPSIS

The 7-year programme of the National Tuberculosis Programme is progressing in Afghanistan since 1976, following the commencement of the present Japanese bilateral aid in 1975. Beside a still very low treatment coverage, a very high drop-out rate is a problem in the tuberculosis treatment programme. A cohort analysis was made on 580 cases, put on the treatment in one year from mid-March 1976 at the Tuberculosis Centre, Kabul, to reveal a drop-out rate over 80% a year. The rate was lower among cases from Kabul Province than those from the outside, suggesting the distance to be playing an important role. However, the rate was as high as 77.3% even among those residing within Kabul City. Recommendations were made for the improvement of the treatment programme.

1. INTRODUCTORY

Together with the BCG vaccination programme, the case-finding/treatment programme makes the essential base of the National Tuberculosis Programme, which should aim at a significant reduction of tuberculosis problem of the country by its epidemiological effect.

The case-finding programme is useful only when it serves for the cure (negative conversion) of cases, detected and put on the standard treatment. The case-finding can even be harmful if it be not followed by a regular treatment to be completed, since the detection of cases without a sufficiently regular treatment could cause not only a worry among cases, but also even an increase of the number of cases in the community, as will be explained later in the present paper (see Annex 1).

The present paper is a study made to assess the quality of the treatment programme by a cohort analysis on the treatment completion rate.

2. CASES SUBJECTED TO THE STUDY

A total of 580 tuberculosis cases, which were confirmed bacteriologically and put on the ambulatory treatment at the Tuberculosis Centre, Kabul, were subjected to the present cohort analysis. They consist of 212 males and 368 females, all from the same in-take year 1976 (1976 cohort), including all cases having completed the treatment, having been lost and being under the treatment at 12 treatment months. Age distribution of cases were presented in Figures 1 and 2 by sex.

3. THE RATE OF COMPLETION OF ONE-YEAR TREATMENT

Since the first one year of the treatment must be essential for curing the disease, the attendance rate at 12 months of the treatment was conventionally taken as the treatment completion rate, although that can include some cases which failed to take all of the 12-month treatment.

Table 1 gives the time trend of attending cases for every 3 treatment months by the residing area and sex, with the number of cases in the third column and with their percentage against the starting number at 0 month.

* From the National Tuberculosis Institute, Kabul, Afghanistan.

Annex 1. The Short-term Epidemiological Impact of Treatment Programme

One-year trend of the number of TB cases can be expressed as following.

$$TB_1 = TB_0 - NTD_0 - TBD_0 - HEAL_0 + INC_0.$$

Therefore the decrease of TB cases in one year is:—

$$\Delta TB = TB_0 - TB_1 = NTD_0 + TBD_0 + HEAL_0 - INC_0.$$

As $TBD_0 = (TB_0 - TR_0) \times T + TR_0 \times T'$ and

$$HEAL_0 = TR_0 \times REG_0 \times C/2,$$

$$\Delta TB = NTD_0 + (TB_0 - TR_0) \times T + TR_0 \times T' + TR_0 \times REG_0 \times C/2 - INC_0.$$

If no treatment programme were carried out, the decrease of TB cases in one year would be;

$$\Delta TB' = NTD_0 + TB_0 \times T - INC_0.$$

Therefore the impact by the treatment programme should be:—

$$\begin{aligned} IMPACT &= \Delta TB - \Delta TB' \\ &= -TR_0 \times T + TR_0 \times T' + TR_0 \times REG_0 \times C/2 \\ &= TR_0 \times \{REG_0 \times C/2 - (T - T')\}. \end{aligned}$$

Therefore, when $REG_0 = 2 \times \dfrac{(T - T')}{C}$

$$IMPACT = 0.$$

For instance, if $T = 0.19$, $T' = 0.06$ and $C = 0.85$,

$$2 \times \frac{(T - T')}{C} = 2 \times 0.13/0.85 = 0.30588 = 0.31.$$

Therefore, when $REG = 0.31$, $IMPACT = 0$, namely the number of TB cases will be larger by the treatment programme than by the natural course without giving any treatment.

Notes. TB_0 : Number of TB cases at the beginning.
TB_1 : Number of TB cases 1 year later.
NTD_0 : Non-TB deaths during the first year.
TBD_0 : TB deaths during the first year.
$HEAL_0$: Number of healed cases during the first year.
INC_0 : Number of new cases during the first year.
TR_0 : Number of cases treated.
T : Fatality among non-treated cases.
T′ : Fatality among treated cases.
REG_0 : Proportion of regularly treated cases.
C : Cure rate.

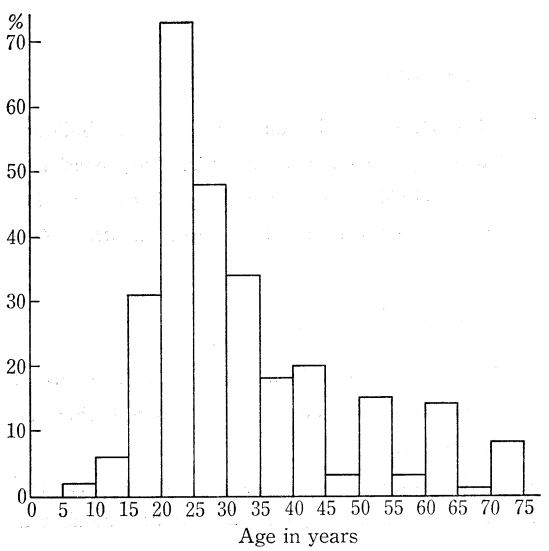

Fig. 1. The age distribution of the male patients subjected to the present study.

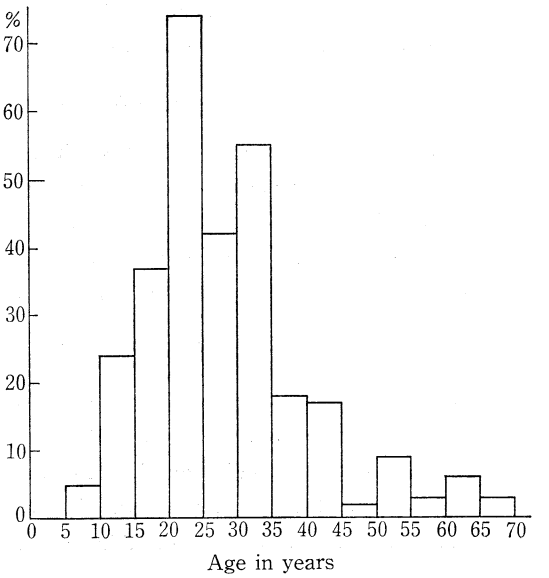

Fig. 2. The age distribution of the female patients subjected to the present study.

Table 1. The Number of Bacteriologically Confirmed Cases Attending the Tuberculosis Centre, Kabul, for the Treatment by Treatment Months in a Cohort Starting Treatment during 1976

		Treatment months					Treatment months			
		0	3	6	9	12	3	6	9	12
Kabul City	M	94	60	36	23	22	63.8%	38.3%	24.5%	23.4%
	F	166	92	63	46	37	55.4	38.0	27.7	22.3
	M+F	260	152	99	69	59	58.5	38.1	26.5	22.7
Kabul Prov. excluding the City	M	20	13	4	4	5	65.0	20.0	20.0	25.0
	F	27	13	12	10	7	48.1	44.4	37.0	25.9
	M+F	47	26	16	14	12	55.3	34.0	29.8	25.5
Other provinces	M	98	69	30	22	19	70.0	30.6	22.4	19.4
	F	175	102	46	23	22	58.2	26.3	13.1	12.6
	M+F	273	171	76	45	41	62.6	27.8	16.5	15.0
Total	M	212	142	70	49	46	66.9	33.0	23.1	21.7
	F	368	207	121	79	66	56.2	32.9	21.1	17.9
	M+F	580	349	191	128	112	60.2	32.9	22.1	19.3

Foot note : Within each group, no significant difference between males and females. Between the three different areas, no significant difference.

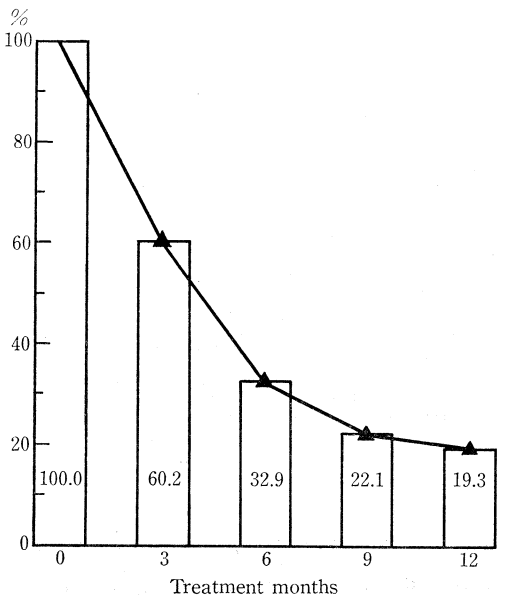

Fig.3. The quarterly trend of attendance rate (1976, cohort).

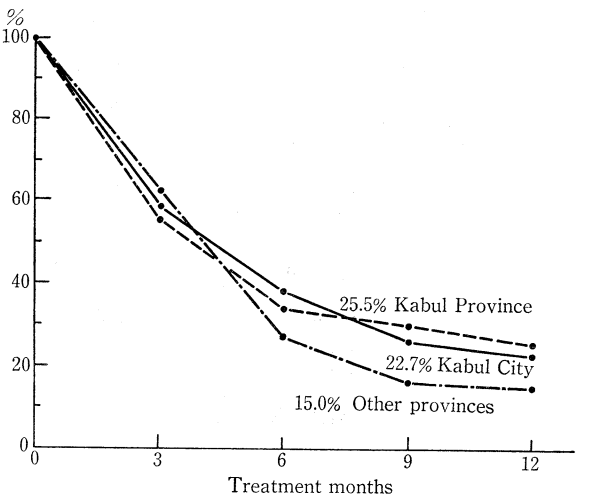

Fig.4. The quarterly trend of attendance rate by three different residing areas.

The quarterly trend of attendance rate was shown in Fig.3. Approximately 40% of cases dropped out in each quarter up to 9th month.

The treatment completion rate, defined conventionally by the percentage of cases attending at 12 treatment months, is given in Table 2 for males and females coming from three different areas, namely Kabul City, Kabul Province excluding the City and other provinces. Fig. 4 showed the quarterly trend of attendance rate in 3 different areas.

The overall treatment completion rate was 19.3%. There was no statistically significant difference between the two sexes and also among the three different areas. However, when the rate was compared

Table 2. The Completion Rate of One-year Treatment

	Males	Females	M+F
Kabul City	23.4%	22.3%	22.7%
Kabul Prov. excluding the City	25.0	25.9	25.5
Sub-tot. Kabul City +Prov.	23.7	22.8	23.1
Other provinces	19.4	12.6	15.0
Overall	21.7	17.9	19.3

Table 3. Comparison of the One-year Treatment Completion Rate between Two Areas of Cases' Residence

Residence	Completed	Not completed	Total
Kabul Prov. +City	71 (23.1%)	236 (76.9%)	307 (100%)
Other provinces	41 (15.0%)	232 (85.0%)	273 (100%)
Total	112	468	580

$\chi^2 = 5.588$, significant.

Table 4. The One-year Treatment Completion Rate by Regimen and Sex

Regimen	Males	Females	M+F
"Intensive"	20.6%	28.4%	25.2%
"Daily"	22.5	11.1	15.0

Regimen	Completed	Not completed	Total
"Intensive"	57	169	226
"Daily"	53	301	354
Total	110	470	580

$\chi^2 = 8.7736$, significant.

between Kabul Province including the City and other provinces, as given in Table 3, a significant difference was found. Namely, the treatment completion rate was significantly higher in cases residing within Kabul Province than in those coming from outside of the Province.

All those cases were given either "intensive" or "daily" treatment, the former by (SM 1g+INH 300mg +Tb_1 150mg) daily for 1~3 months to be followed either by (SM 1g+INH 600mg) 2/week or in most cases by (INH 300mg+Tb_1 150mg) daily for the remaining months, and the latter by (INH 300mg+Tb_1 150mg) daily. Table 4 gives the treatment completion rate by regimen and sex. As given in the lower half of the Table, there was a significant difference in the rate between the two regimens, namely the completion rate was significantly higher with the "intensive" treatment.

4. Discussions

The regularity of the treatment is often discussed with over-all informations obtained from a number of cases under the present treatment, or from cases discharged from the treatment registration during a certain

time period. However, those cases are a mixture of several cohorts, starting the treatment at various months and years. In case of discharged cases, those still remaining under the treatment are excluded. Therefore, the regularity tends to be biased towards better side, poorer regularity of older cohorts being diluted by better regularity of younger cohorts, or failure cases of one-year treatment being excluded from discharged cases. Hence, the cohort analysis is needed to reveal the real trend of the treatment regularity.

The bacteriological follow-up of treated cases was often not regularly made, which makes the bacteriological evaluation of the treatment effect difficult. Furthermore, as informations were available only on the attendance of cases to the Centre to receive either injection or drugs, the regularity of the medication had to be estimated indirectly by the attendance or not of the cases.

Thus, the treatment completion rate in real meaning, namely the rate of cases completing one-year treatment and converting negative, must be lower than the "completion rate" revealed in the present study with the already mentioned conventional definition. The "treatment completion rate" (or the rate of cases attending at 12 treatment months) was found to be very poor: only 19.3% of cases succeeded to attend at 12 treatment months, over 80% having dropped out from the treatment in one year of the treatment.

A serious concideration should be given to the revealed high drop-out rate. Should the rate remain at the same order of high level, the treatment programme would be functioning in increasing, but not decreasing, the number of tuberculosis cases in the community by decreasing mainly the number of tuberculosis deaths, but not curing a sufficient number of cases. As explained in Annex 1, assuming the tuberculosis fatality to be 19% in the non-treated and 6% in the treated, and the cure rate in the treated to be 85%, 31% is the minimal requirement for the treatment completion rate for achieving a positive impact by the treatment programme; namely, if the completion rate is below 31%, the number of cases after one year would be more than that under no treatment programme, the number of cured cases to be smaller than the number of tuberculosis deaths prevented.

The drop-out rate was higher among cases coming from outside of Kabul Province than among those from within the Province. This suggests that the distance or accessibility to the treatment centre is playing an important role in the drop-out of cases.

The drop-out rate was lower in cases given the "intensive treatment" than in those with "daily treatment". This does not necessarily mean that the former is better in obtaining a higher completion rate, since there must be a strong bias in the allocation of those regimens, cases from far places being unable to receive daily, or even twice weekly, injections.

So far as the present data concerned, the programme looks as if to be just keen to detect cases to put them on the treatment, without covering their majority with even a one-year regular treatment. Should this trend be unchanged, the programme could not serve in the reduction of tuberculosis problem, but might serve even in the production of drug resistance by the repetition of very short-term incomplete treatment. The problem of drug resistance cannot be solved by the application of second line drugs, and the essential solution is to prevent the resistance by regular treatment for a sufficient period of duration.

There may be patients' ignorance on the necessity of full-term regular treatment. This could be improved by motivation of patients towards regular treatment by an intensification of health education of patients and defaulter actions. However, this would not solve the problem of inaccessibility of the treatment service for patients. This can be solved by an extention of tuberculosis programme so as to cover more populations with accessible services.

5. Conclusion

It was revealed, by a cohort analysis on the monthly attendance rate of bacteriologically confirmed cases of 1976 year cohort, that the one-year treatment completion rate was as poor as 19.3%. The rate was 15% in cases coming from other provinces, while 23.1% in those from Kabul Province, indicating an important role of the distance between the treatment centre and the residence of patients. The accessibility of the service to patients is considered to be the most essential factor determining the treatment completion rate, although

motivation of patients, health education and defaulter actions must be also important for maintaining a good treatment regularity.

The following are recommended for the improvement of the treatment regularity.

(1) Feasibly fast extention of treatment service by strengthening the National Tuberculosis Institute and its Regional Centres in their treatment programmes and their training and supervision facilities for the extention of treatment service into basic health centres and other available health services;

(2) As many health centres and stations as possible in rural area should be mobilized into tuberculosis treatment service as to make the service accessible for more populations;

(3) The cohort analysis should be regularly made to check the quality of the treatment programme; for facilitating that, a transcription of some part of records on the individual treatment card to a list book of cases might be useful;

(4) Regular bacteriological examination should be motivated in the treatment programme so as to facilitate the evaluation of the programme by the cure rate;

(5) The treatment priority should be given to bacteriologically confirmed cases and their proportion in the total treated cases should be maintained at a certain high level so as to facilitate defaulter actions to be focused on bacteriologically confirmed cases, which are often hindered by workload inflated by bacteriologically unconfirmed X-ray suspects;

(6) A well-functioning referral system should be established between various health institutions so as to facilitate tuberculosis cases to receive regular standard treatment from centres in easy reach, and to facilitate the National Tuberculosis Institute to follow up all referred cases;

(7) A study is desirable to find out real reasons of the dropping out by follow-up surveys of "lost cases", although it may not be easy; (by this, the tuberculosis fatality in treated cases, which is not yet known, can also be revealed);

(8) The treatment recording should be improved so as to facilitate the regularity check and cohort analysis;

(9) The role of X-ray should be re-concidered: it should be mainly for the screening of attendants for sputum examination and for differential diagnosis, since the final diagnosis of tuberculosis should be by bacteriology;

(10) All the above-mentioned activities should aim at, and be assessed by, the treatment completion rate to be at least over 31%.

6. SUMMARY

A high drop-out rate (over 80% in one year) was revealed by an analysis made on the treatment cohort of the year 1976, with a total of 580 bacteriologically confirmed cases treated at the Tuberculosis Centre, Kabul. The rate was significantly higher among cases from outside of Kabul Province, suggesting an important role of the distance between the centre and the residence. The minimal requirement for the one-year treatment completion rate for achieving a positive impact of the programme on the tuberculosis problem was discussed, and recommendations were made for the improvement of the treatment regularity.