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Original Research Article

Impact of Nikshay Poshan Yojana on tuberculosis outcomes: preliminary evidence from eastern India

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ABSTRACT

Background: National TB programme of India implemented Nikshay Poshan Yojana (NPY) through direct benefit transfer (DBT) in April 2018. This is to address the dual evils of under nutrition and unfavourable outcomes among tuberculosis patients in the country. This study aimed to understand the impact of Nikshay Poshan Yojana (NPY) through direct benefit transfer (DBT) on the outcomes of notified TB patients from the Indian state of Jharkhand for the year 2019.
Methods: This was a retrospective cross sectional descriptive study using secondary data obtained from Nikshay web portal for the Indian state of Jharkhand for the year 2019. State level data on TB notification and NPY DBT scheme was downloaded in excel format and analysed using Excel 2016 version.
Results: The study found higher odds (odds ratio 3.14, 95% CI: 2.97, 3.33; p value <0.00001) of having successful outcomes, among those who received at least one instalment of NPY. The risk of lost to follow up (LTFU) was 2.44 times (95% CI: 2.2-2.8, p value: 3.9×10^{-43}) higher among those who did not receive any DBT payments as compared to those who received at least one DBT instalment.
Conclusions: The 'individual and health system enablers' have a crucial role to play in successful TB treatment outcomes than NPY. However, LTFU rate reduces significantly with timely payment of NPY. This would facilitate improved treatment adherence and thus a favourable outcome.

Keywords: Direct benefit transfer, Lost to follow up, National TB elimination programme, Nikshay Poshan Yojana, Tuberculosis outcomes

INTRODUCTION

In March 2018, Government of India (GoI) declared to the global community, the country's commitment to achieve tuberculosis (TB) related sustainable development goals (SDGs) by 2025, five years ahead of the global target.[1] To accelerate the efforts towards this, GoI has come up with four direct benefit transfer (DBT) schemes under revised National TB control programme (RNCTP) in 2018.[2] RNTCP was renamed as National TB elimination (NTEP) in 2020.[3] The four DBT schemes to incentivise key programme priorities are Nikshay Poshan Yojana (NPY), transport support to TB patients in notified tribal areas, treatment supporter honorarium and incentives for private providers and informants.

As per World Health Organisation (WHO) estimates population attributable fraction (PAF) of undernourishment in TB is 19 per cent in 2020.[4] Undernourishment has the highest PAF as compared to

other global TB determinants like alcohol use disorders (8.1 per cent), HIV infection (7.6 per cent), smoking (7.1 per cent) and diabetes (3.1 per cent).[5] As per GoI, undernutrition contributes to 55 per cent of the TB incidence in the country and results in poor TB treatment outcomes including death.[6] As an effort to improve TB patient outcomes through nutrition, the GoI introduced NPY as a DBT scheme with effect from April 2018.

All notified TB patients who were on treatment as on 1st of April 2018 are eligible for availing the benefits of the scheme. The scheme aims to provide an incentive of five hundred Indian rupees per month to all notified TB patients for the entire duration of treatment. This benefit is given to meet the additional nutritional requirements of TB patients during treatment. Patients, irrespective of taking treatment from public sector or private sector are eligible for NPY. Also, NTEP has different regimens with treatment duration varying from six months to 20-24 months based on drug sensitivity patterns. Patients under every regimen is eligible for NPY until the treatment completion.[2]

Incentive generation and processing of NPY are carried out through the national web portal www.nikshay.in, which handles all NTEP recording and reporting activities on a real time basis. Further financial check and verification happens at the public financial management system (PFMS). Once duly verified, the incentive is directly credited to the patient's bank account. The first two months incentive of one thousand Indian rupees is generated as soon as the patient is notified in the Nikshay web portal. The advance incentive is designed such that the patient will have supplementary nutrition right from the beginning of treatment. It is the responsibility of NTEP to ensure and support every notified TB patient to have a bank account to avail NPY benefit. Patients have the right to forego NPY benefit if they prefer to do so.[2] According to India TB Report 2021, the country has given NPY benefits to 10,34,221 notified TB patients in the year 2020. This amounts to 2,308 million Indian rupees.[7]

Objectives

To study the impact of Nikshay Poshan Yojana (NPY) through direct benefit transfer (DBT) on the outcomes of notified TB patients from the Indian state of Jharkhand in the year 2019.

METHODS

This was a retrospective cross sectional descriptive study using secondary data obtained from Nikshay web portal for the state of Jharkhand in the year 2019. The year 2019 is selected to circumvent the impact of COVID-19 pandemic on the study. With the permission of the medical officer, State TB training and demonstration cell (STDC), Jharkhand, state level data on TB notification and NPY DBT scheme is downloaded from the Nikshay web portal in excel format. TB Notification data included all the TB patients who were notified in Nikshay web portal and took treatment from within the state of Jharkhand during the study period. NPY DBT scheme data was collected from Nikshay web portal for all TB patients who were given at least one payment under the scheme. The data was analysed using Excel 2016. The study did not collect primary data from any patients and it does not reveal any personal identifiers of patients notified from Jharkhand state during the study period. So, individual patient consent deemed unnecessary for the study. All the parameters and their definitions were taken as per the NTEP programme definitions according to the technical and operational guidelines for TB control in India 2016.

RESULTS

Jharkhand holds 57,504 notified TB cases for the year 2019 in Nikshay web portal.

General profile of notified TB cases of Jharkhand in 2019

Demographic profile.

Table 1a shows that paediatric age group constitute 5.6 per cent (n=3225) of the total notification in Jharkhand for the year 2019. Patients belonging to productive age group of 15 to 64 years constitute 80.5 per cent (n=50288) of the notification. Patients aged of 65 years and above constitute 6.9 per cent (n=3958) of the total notification. Age information was not available for 0.1 per cent (n=33) TB cases.

Table 1a: Demographic profile of notified TB cases of Jharkhand in 2019.

Age group	Sex- frequency (percentage)			Grand total-frequency (%)
	Male (%)	Female (%)	Transgender (%)	
0-14	1757 (54.5)	1463 (45.4)	5 (0.2)	3225 (100.0)
15-64	34709 (69.0)	15533 (30.8)	46 (0.0)	50288 (100.0)
>65	3165 (80.0)	788 (19.9)	5 (0.1)	3958 (100.0)
(blank)	24 (72.7)	9 (27.3)	0 (0.0)	33 (100.0)
Grand Total	39655 (69.0)	17793 (30.9)	56 (0.1)	57504 (100.0)
Median age (IQR)	38 (25-51) years	30 (21-45) years	32.5 (21.25-48) years	35 (24-50) years

Males constitute 69.0 per cent (n=39655) and females constitute 30.9 per cent (n=17793) of the total notification in Jharkhand for the year 2019. There were 56 (0.1 per cent) transgender TB cases notified in the same year. Median age among males was 38 years and inter quartile range (IQR) was 26 (25 to 51) years. Among female, median age was 30 years with IQR 24 (21 to 45) years. Median age among transgender was 32.5 years with IQR 26.75 (21.25 to 48) years. Among all notified TB cases, the median age was 35 years and inter quartile range (IQR) was 26 (24 to 50) years.

Clinical profile

Table 1b shows the clinical profile of notified cases of Jharkhand in 2019. Pulmonary TB (PTB) contributed to 86.4 per cent (n=49676) and extra pulmonary TB (EP TB) contributed to 11.8 per cent (n=6779) of the notification of Jharkhand. The site of disease remains blank for 1.8 per cent (n=1049) cases. The state has notified 98.2 per cent (n=56488) DS TB episodes and 1.8 per cent (n=1016) DRTB episodes in Nikshay web portal in 2019. For the year 2019 in Jharkhand, 51.1 per cent (n=29411) of the notified TB cases had bacteriological confirmation of TB whereas 48.9 per cent (n=28093) of cases did not have a bacteriological confirmation of the disease.

Table 1b: Health sector and clinical profile of notified TB cases of Jharkhand in 2019.

Variable	Category	Frequency	Percentage
Site of disease	Extra pulmonary	6779	11.8
	Pulmonary	49676	86.4
Type of case	Drug sensitive TB (DSTB)	56488	98.2
	Drug resistant TB (DRTB)	1016	1.8
Bacteriological confirmation (yes/no)	No	28093	48.9
	Yes	29411	51.1

Status of receipt of NPY through direct benefit transfer (DBT)

Status of receipt of DBT among all notified TB cases of Jharkhand in 2019

As shown in Table 2a, out of the total notified TB cases, 33.6 per cent (n=19335, 95% CI=33.2 per cent, 34.0 per cent) received at least one instalment of DBT. Remaining 66.4 per cent (n=38169, 95% CI=66.0 per cent, 66.8 per cent) of the TB patients did not receive any payment under NPY.

Table 2a: Status of receipt of NPY through DBT among all notified cases of Jharkhand in 2019.

Received at least one DBT instalment (yes/no)	Frequency	Percentage (95% CI)
Yes	19335	33.6 (33.2, 34.0)
No	38169	66.4 (66.0, 66.8)
Grand total	57504	100.0

Status of receipt of DBT based on clinical categories

Table 2b shows the status of receipt of DBT based on clinical categories. Among pulmonary TB cases, 34.0 per cent (n=16906), extra pulmonary TB cases, 35.7 per cent (n=2422) and those with site of disease not reported, 0.7 per cent (n=7) received at least one DBT instalment. Among DSTB cases, 33.7 per cent (n=19062) and DRTB cases, 26.9 per cent (n=273) received at least one instalment of NPY. Among 29411 bacteriologically confirmed cases, 35.8 per cent (n=10523) received at least one instalment under NPY.

Table 2b: Status of receipt of DBT based on clinical categories.

Categories	Sub categories	Status of receipt of DBT- frequency (%)	
		Yes	**No**
Site of disease	Pulmonary	16906 (34.0)	32770 (66.0)
	Extra pulmonary	2422 (35.7)	4357 (64.3)
	Blank	7 (0.7)	1042 (99.3)
Type of TB	DSTB	19062 (33.7)	37426 (66.3)
	DRTB	273 (26.9)	743 (73.1)
Bacteriological confirmation (yes/no)	Yes	10523 (35.8)	18888 (64.2)
	No	8812 (31.4)	19281 (68.6)

Nikshay Poshan Yojana (NPY) and tuberculosis outcomes

Outcomes of all notified TB cases of Jharkhand in 2019

Table 3a shows the outcomes of TB cases notified in Jharkhand for the year 2019. The state has reported a treatment success of 82.6 per cent (n=47515), TB deaths of 2.6 per cent (n=1521) and LTFU of 3.6 per cent (n=2061) among notified TB cases in 2019. Outcomes were not evaluated for 9.3 per cent (n=5368) of the total notified TB cases in 2019. The treatment regimen was changed for 0.6 per cent (n=349) cases and treatment failure was reported for 0.6 per cent (n=326) of the total notified TB cases. Of the total notified cases, 0.2 per cent (n=104) remained untraceable due to incorrect address or migration. No information on outcome was available for 0.3 per cent (n=151) of the total notified TB cases in 2019.

Table 3a: Outcomes of TB cases notified from Jharkhand in 2019 (frequency and percentage).

Treatment Success	Died	Lost to follow up (LTFU)	Treatment failure	Regimen changed	Untraceable	Other outcomes	Not evaluated	Blank	Grand total
47515 (82.6%)	1521 (2.6%)	2061 (3.6%)	326 (0.6%)	349 (0.6%)	109 (0.2%)	104 (0.2%)	5368 (9.3%)	151 (0.3%)	57504 (100.0%)

Table 3b: Comparison of outcomes among notified TB cases of Jharkhand based on DBT receipt status.

Outcomes	Status of receipt of DBT- frequency (percentage)		
	Yes	No	Grand Total
Treatment success	17743 (91.8)	29772 (78.0)	47515 (82.6)
Died	383 (2.0)	1138 (3.0)	1521 (2.6)
Lost to follow up (LTFU)	352 (1.8)	1709 (4.5)	2061 (3.6)
Other outcomes	255 (1.3)	784 (2.1)	1039 (1.8)
Outcome not evaluated	602 (3.1)	4766 (12.5)	5368 (9.3)
Grand Total	19335 (100.0)	38169 (100.0)	57504 (100.0)

Table 3c: Comparison of outcomes among DSTB cases based on DBT turnaround time.

Outcome	Turnaround time of DBT- frequency (percentage)			NPY not received- frequency (%)
	In IP	In CP	After the completion of treatment	
Treatment success	9617 (93.3)	6656 (91.4)	1360 (92.3)	29361 (78.5)
Died	194 (1.9)	122 (1.7)	26 (1.8)	1057 (2.8)
LTFU	143 (1.4)	149 (2.0)	35 (2.4)	1564 (4.2)
Other outcomes	116 (1.1)	96 (1.3)	13 (0.9)	687 (1.8)
Outcome not evaluated	238 (2.3)	257 (3.5)	40 (2.7)	4757 (12.7)
Grand total	10308 (100.0)	7280 (100.0)	1474 (100.0)	37426 (100.0)

Table 3d: Association of LTFU with DBT receipt status and turnaround time.

Category	Outcome		Relative risk (95% CI)	P value
	LTFU	Other outcomes		
DBT Received in CP	149	7131	1.5 (1.2-1.9)	0.001
DBT received in IP	143	10165		
DBT received after the completion of treatment	35	1439	1.43 (1.0-2.04)	0.047
DBT received during treatment	292	17296		
DBT not received	1564	35862	2.44 (2.2-2.8)	<0.00001
DBT received	327	18735		

Comparison of tuberculosis outcomes based on DBT receipt status

Table 3b shows the comparison of outcomes among notified TB cases of Jharkhand based on DBT receipt status. Among those who received at least one NPY instalment, treatment success was 91.8 per cent (n=17743), death was reported as an outcome 2 per cent (n=383) cases, LTFU was reported for 1.8 per cent (n=352) cases, other outcomes were reported for 1.3 per cent (n=255) cases and outcome was not evaluated for 3.1 per cent (n=602) cases. Among those who did not receive any DBT payments, treatment success was 78 per cent (n=29772), death was reported as outcome for and 3 per cent (n=1138) cases, LTFU in 4.5 per cent (n=1709) cases, other outcomes in 2.1 per cent (n=784) cases and outcome was not evaluated in 12.5 per cent (n=4766) cases.

Comparison of outcomes among DS TB cases in Jharkhand based on DBT turnaround time

Table 3c shows the comparison of outcomes among DSTB cases based on the turnaround time of DBT 1st instalment. DRTB cases were omitted here as only 0.47 per cent (n=273) patients have received at least one instalment of NPY. Treatment success among those who received the first instalment of DBT in intensive phase (IP) was 93.3 per cent (n=9617), in continuation phase (CP) was 91.4 per cent (n=6656) and after the treatment was 92.3 per cent (n=1360). Treatment success among those who did not receive DBT was 78.5 per cent

(n=29361). Died as outcome was reported among those who received the first instalment of DBT in IP was 1.9 per cent (n=194), in CP was 1.7 per cent (n=122) and after the treatment was 1.8 per cent (n=26). The same among those who did not receive DBT was 2.8 per cent (n=1057). Lost to follow up among those who received the first instalment of DBT in IP was 1.4 per cent (n=143), in CP was 2.0 per cent (n=149) and after the treatment was 2.4 per cent (n=35). The same outcome among those who did not receive DBT was 4.2 per cent (n=1564). Other outcomes were reported among those who received the first instalment of DBT in IP was 1.1 per cent (n=116), in CP was 1.3 per cent (n=96) and after the treatment was 0.9 per cent (n=13). Other outcomes among those who did not receive DBT were 1.8 per cent (n=687). Outcome not evaluated among those who received the first instalment of DBT in IP was 2.3 per cent (n=238), in CP was 3.5 per cent (n=6656) and after the treatment was 2.7 per cent (n=40). Among those who did not receive DBT, outcome was not evaluated for 12.7 per cent (n=4757) cases.

Association of LTFU with DBT receipt status and turnaround time

Table 3d shows the association of LTFU with DBT receipt status and turnaround time. The risk of LTFU was 1.5 times (95% CI: 1.2-1.9, p value: 0.001) higher among those who received DBT in CP than those who received the payment in IP. Lost to follow up risk was 1.43 times (95% CI: 1.0-2.04, p value: 0.047) higher among those who received DBT after the completion of treatment as compared to those who received the payment during treatment. The risk of LTFU was 2.44 times (95% CI: 2.2-2.8, p value: 3.9×10^{-43}) higher among those who did not receive any DBT payments as compared to those who received at least one DBT instalment.

DISCUSSION

The study presents findings of analysis of TB patient's profile, Nikshay Poshan Yojana scheme uptake and its impact on TB treatment outcomes in Jharkhand for the year 2019.

Nikshay Poshan Yojana (NPY) through DBT scheme in Jharkhand

The proportion of notified TB cases of Jharkhand who received at least one instalment of Nikshay Poshan Yojana (NPY) was 33.6 per cent (n=19335, 95% CI=33.2 per cent, 34.0 per cent) in 2019. This shows the poor uptake of NPY scheme in the state. As successful DBT provision involves complex individual and health system enablers, further studies need to be conducted to understand the bottle necks in achieving a wider coverage of NPY in Jharkhand.[8] The state needs to accelerate its efforts in facilitation NPY to TB patients seeking care in private sector as well as DRTB cases as the status of receipt of DBT in these two categories are alarmingly low -13.8 per cent and 26.9 per cent respectively.

Impact of Nikshay Poshan Yojana (NPY) on tuberculosis outcomes

Jharkhand reports 82.6 per cent treatment success in 2019. This is at par with the national TB treatment success rate.[7] The state reports death as an outcome for 2.6 per cent of the total notified cases in 2019. This is below the national TB death rate of 4 per cent.[7] The study found that among those who received at least one DBT instalment, treatment success was 91.8 per cent, outcome as died was 1.98 per cent and lost to follow up (LTFU) was 1.8 per cent and the same among those who did not receive any payments under NPY was 72.2 per cent, 2.98 per cent and 4.5 per cent respectively. The study found higher odds (3.14, 95% CI: 2.97, 3.33; p value <0.00001) of having successful outcomes, among those who received at least one instalment of DBT. These findings are consistent with similar study conducted in Brazil.[9]

The study observed that treatment success among those who received the first instalment of DBT in IP was 93.3 per cent, in CP was 91.4 per cent and after the treatment was 92.3 per cent. Treatment success among those who did not receive DBT was 78.5 per cent. As the treatment success among those who received 1st instalment of DBT after the completion of treatment is comparable with those patients who received DBT during treatment, it may be inferred that 'other individual and health system enablers' have attributed to successful outcome than DBT. So, more studies need to be conducted to understand these and 'causality assessment of NPY on Tuberculosis outcomes' may be carried out after adjusting for such confounding factors to understand the definite impact of NPY over TB treatment outcomes.

The study found that the lost to follow up among those who received the first instalment of DBT in IP was 1.4 per cent, in CP was 2.0 per cent and after the treatment was 2.4 per cent. Lost to follow up among those who did not receive DBT was 4.2 per cent. The risk of LTFU was 2.44 times (95% CI: 2.2-2.8, p value: 3.9×10^{-43}) higher among those who did not receive any DBT payments as compared to those who received at least one DBT instalment. Among those who received at least one DBT instalment, the risk of LTFU increased with increase in turnaround time in receiving the DBT payments. This is consistent with the finding of a similar study conducted in Ecuador.[10] Timely provision of NPY decreases the lost to follow up rates and thus improves treatment adherence and favourable outcomes.

The study is limited to the effect of Nikshay Poshan Yojana on TB outcomes and does not take into consideration other DBT schemes which are provided through NTEP such as tribal honorarium for travel support to patients residing in designated tribal areas. The

study does not consider 'other individual and health system enablers' on TB outcomes other than NPY.

CONCLUSION

The general and clinical profile of TB patients who took treatment in Jharkhand for the year 2019 is comparable with other studies from eastern India. Coverage of NPY in the state was not satisfactory, especially among DRTB. Turnaround time of NPY was markedly longer than what was envisaged under NTEP of India. The 'individual and health system enablers' have a crucial role to play in successful tuberculosis outcomes than NPY. This needs to be further explored in Jharkhand. Lost to follow up rate reduces significantly with timely payment of NPY. This would facilitate improved treatment adherence and thus a favourable outcome.

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