Impact of Mobile Teams on Tuberculosis Treatment Outcomes, Ministry of Health, Riyadh Region, Kingdom of Saudi Arabia, 2013 – 2015

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Background

Tuberculosis (TB) remains a significant public health concern globally and it is considered a re-emerging infectious disease. The 2016 Global TB report showed that almost one-third of the world's population is infected with TB, with around 10.4 million new cases.

Saudi Arabia classified as a low-to-middle TB burden country. The total number of new cases of TB in 2015 was 3,346, with an incidence rate of 12 per 100,000 population. Ministry of Health implemented a National TB Control Program (NTCP) which worked for over 30 years in response to the world plan to eliminate TB.

Improved control efforts and widespread implementation of DOTs by NTCP has not led to the expected fall in TB trends. In response to this, NTCP has added mobile teams in Riyadh and Jizan cities aiming to decrease the default rates and improve patient outcomes through community outreach.

In Riyadh city, there are currently 20 mobile teams distributed according to population density. Every mobile team is fully equipped and consists of a physician, nurse, heath inspector, and driver. The mobile teams' main objective is to ensure adherence to all aspects of the DOTs therapy strategy when treating TB patients.

Purpose

To evaluate the impact of the TB Mobile Teams on treatment outcomes in Riyadh region by comparing patients who received treatment under mobile teams and those who did not, from 2013 to 2015.

Methods

This is a retrospective, descriptive study using NTCP data from 2013—2015 from Riyadh, Saudi Arabia.

Descriptive analyses were used to summarize characteristics of TB case-patients served by mobile teams and those not.

The chi-square test measured the significant differences between mobile served case-patients and those not.

Exposure was whether or not the TB case-patient was under the care of the mobile team; the outcome of interest was whether or not treatment was successful, defined as "treatment completed" and "cured".

Results

From 2013 to 2015, there were 1,600 TB patients in Riyadh region registered in the NTCP database with recorded treatment outcomes.

The ratio of treatment success among mobile team case-patients was 1.28 greater than among those not served by mobile teams.

Chi-square test showed a statistical significant finding (Probability Ratio= 1.28;95% CI= 1.21,1.35, P-value= <0.01).

Mobile teams increased the treatment success rate to 92%, compared to 71.77% among those not served by mobile teams.

Mobile teams reduced the mortality rate to 1.18%, compared to 9.31% among non-mobile teams case-patients.

Failure of treatment rates reached 17.19% among those not served by mobile teams but only 0.86% among mobile team case-patients.

Lost to follow-up rates reduced to 1.93% in mobile team patients, in comparison to 9.61% among non-mobile teams case- patients.

A statistically significant impact was observed in most levels after stratification by possible confounders with precise confidence intervals and p-values = <0.01.

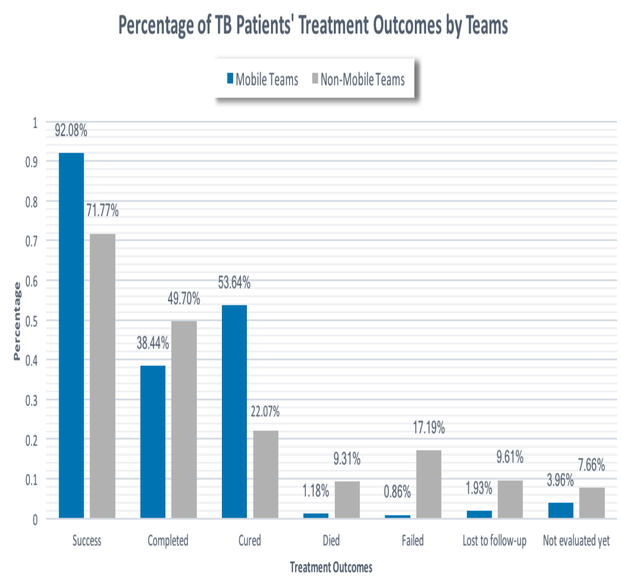

Table 1: Characteristics of TB Case-patients between Mobile Team Served versus Non-mobile Team Served Case-Patients, Riyadh Region, Kingdom of Saudi Arabia, 2013 – 2015

TB Case-patient Profile		All Case-patients (n=1600) n	(%)	Mobile-team Served (n=934) n	(%)	Non-mobile Team Served (n=666) N	(%)
Gender	*Male*	1145	(71.56)	674	(72.16)	471	(70.72)
	Female	455	(28.44)	260	(27.84)	195	(29.28)
Age	*Mean*	36.4		33.9		39.9	
	Median	31		30		34	
	Mode	25		25		28	
	Range	0.7-101		3-83		0.7-101	
Nationality	*Saudi*	651	(40.69)	268	(28.69)	383	(57.51)
	Non-Saudi	949	(59.31)	666	(71.31)	283	(42.49)
Case-patient type	*New*	1533	(95.81)	897	(96.04)	636	(95.5)
	Relapse	67	(4.91)	37	(3.96)	30	(4.5)
TB site	*Pulmonary*	1113	(69.56)	673	(72.06)	440	(66.07)
	Extra-pulmonary	447	(27.94)	237	(25.37)	210	(31.53)
	Both	40	(2.50)	24	(2.57)	16	(2.40)
AFB[a] result	*Positive*	938	(58.63)	609	(65.20)	329	(49.4)
	Negative	478	(29.88)	295	(31.58)	183	(27.48)
	Not done	184	(11.50)	30	(3.21)	154	(23.12)
HIV[b] status	*Positive*	20	(1.25)	9	(0.96)	11	(1.65)
	Negative	1058	(66.13)	755	(80.84)	303	(45.50)
	Not done	519	(32.44)	167	(17.88)	352	(52.85)
Treatment outcome	*Success[c]*	1338	(83.62)	860	(92.08)	478	(71.77)
	Completed	690	(43.13)	359	(38.44)	331	(49.7)
	Cured	648	(40.5)	501	(53.64)	147	(22.07)
	Died	73	(4.56)	11	(1.18)	62	(9.31)
	Failed	19	(1.19)	8	(0.86)	11	(17.19)
	Lost to follow up	82	(5.13)	18	(1.93)	64	(9.61)
	Not Evaluated yet	88	(5.50)	37	(3.96)	51	(7.66)

[a] Acid Fact Bacilli sputum smear test.
[b] Human Immunodeficiency Virus.
[c] Treatment Success= Completed + Cured.

Table 2: Probability ratio of Treatment Success between Mobile-team Served Tuberculosis Case-patients compared to Non-mobile Team Served Case-patients, Riyadh region, Kingdom of Saudi Arabia, 2013 – 2015

	Mobile Teams Vs. Non-mobile Teams		
	Ratio	95% CI	P-value
Treatment Success	1.28	(1.21 , 1.35)	<0.001

Table 3: Probability ratio of treatment success among mobile team patients compared to non-mobile team patients, stratified by possible confounders.

Variable		Mobile-team Served versus Non-mobile Team Served Tuberculosis Case-patients		
		Ratio	95% CI	P-value
Nationality	*Saudi*	1.27	(1.18 , 1.36)	<0.001
	Non-Saudi	1.29	(1.19 , 1.39)	<0.001
Patient type	*New*	1.29	(1.22 , 1.36)	<0.001
	Relapse	1.08	(0.86 , 1.34)	0.6995
TB site	*Pulmonary*	1.36	(1.27 , 1.46)	<0.001
	Extra-pulmonary	1.17	(1.08 , 1.25)	<0.001
	Both	1.03	(0.67 , 1.56)	>0.999
AFB result	*Positive*	1.35	(1.25 , 1.46)	<0.001
	Negative	1.29	(1.17 , 1.42)	<0.001
	Not done	1.12	(0.96 , 1.28)	0.2160
HIV status	*Positive*	1.43	(0.74 , 2.71)	0.5449
	Negative	1.25	(1.16 , 1.34)	<0.001
	Not done	1.24	(1.13 , 1.36)	<0.001

Discussion

It is clear from the findings of this study that mobile team service of TB case-patients had a positive and significant impact on TB treatment outcomes and increased treatment success to 92%.

This success in treatment of the mobile TB teams can be explained by their goal which is to guarantee the implementation of one of DOTs recommendations: to ensure that case-patients take the prescribed drugs under direct supervision of a healthcare professional.

This statistically significant impact of mobile teams was noticed in both Saudis and non-Saudi case-patients, new TB case-patients, case-patients with different sites of TB infection (pulmonary, extra-pulmonary), case-patients with different AFB smear test results (positive and negative), case-patients with negative HIV status and those who did not do the HIV test.

Results showed that relapsed case-patients, case-patients with infection in both TB sites, case-patients who did not have AFB sputum smear test results, and case-patients with a positive HIV test results experienced positive impact; however, results did not reach statistical significance.

Conclusion

This study provides important information on the efficacy of using mobile teams to improve TB outcomes in Riyadh region, Saudi Arabia to achieve greater program outcomes.

Data showed that community mobilization of mobile teams is an effective strategy to enhance TB treatment, reduced mortality and lost-to-follow-up and improve TB treatment outcomes.

We recommend implementing a full-scale rollout of TB mobile team system all over the KSA, along with ongoing monitoring and evaluation of the mobile team's effectiveness by the NTCP.

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