Original Article

EFFECTIVENESS OF TB DOTS PROGRAM IN IBD HOSPITAL ATTOCK

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Abstract

Objective: To determine the effectiveness of TB DOTS program in Isfandyar Bukhari District (IBD) Hospital Attock

Study Design: Observational study

Duration of Study: January 2021 to July 2021

Place of Study: Isfandyar Bukhari District (IBD) Hospital Attock

Materials and Methods: A total of 678 TB patients, presenting to TB DOTS Centre through OPD or referred from health care centers, after confirmation of diagnosis were registered with DOTS program and enrolled in the study. Informed consents were taken after explaining study procedure to patients. A validated questionnaire was used to collect the information about patients like demography, clinical presentation, diagnosis, treatment compliance and outcome. All these information were entered in the TB card and handed over to patients for follow up. Data was entered in SPSS software for analysis.

Results: A total of 678 TB patients enrolled in the study, consisting of 294 (43%) males and 384 (67%) females were followed up for treatment outcomes. Treatment outcome is an indicator for the effectiveness of national TB control programs. Out of 678 patients, 259 (38%) were smear positive, 307 (45%) were sputum smear negative and 112 (17%) were extra pulmonary cases. After 6 months follow up of every patient, 163 patients were declared cured,409 completed treatment and seven died due to any reason during study. Two patients lost to follow up. Cure rate was 84.3%.

Conclusion: The overall treatment success rate was 84.3%, which was lower than the globally set target of 90% for 2025. The overall treatment success rate is satisfactory but still needs to be improved to achieve the international targeted treatment outcome.

Keywords: Tuberculosis, Mycobacteria, DOTS, DOT.

INTRODUCTION

Tuberculosis (TB) is one of the oldest infectious diseases, mainly caused by the Mycobacterium Tuberculosis (MTB). Despite the availability of effective drugs,TB is worldwide ninth leading cause of death, about one-third of the world's population is infected by M. tuberculosis. In 1997, there were about 8 million new cases of TB and 2 million deaths,

worldwide. The developing countries are bearing most of the disease burden. According to WHO GLOBAL TB report 2021
Pakistan ranked as the 5th highest TB burden country and annually contributes to nearly 5.8% of new cases of TB worldwide.

The developing world is the worst affected having 95 percent of all TB cases, 98 percent of TB deaths and 75% cases among 15 – 45 years age (the most economically productive years)[1,2]. TB is mostly spread by inhaling aerosol droplets expelled in air by pateints with active pulmonary TB. It usually affects the lungs (called Pulmonary TB)but can cause disease in any organ of the body called extra pulmonary TB(EPTB)[3].

Infected individuals who are asymptomatic having latent TB, have a 5–15% risk of becoming sick within 2–5 years[4]. However, individuals with Human Immunodeficiency Virus (HIV), Diabetes Mellitus, malnutrition, smoking, and patients on immunosuppressant drugs have higher chances of developing active disease[4-6]. Before the discovery of chemotherapy, 30–40% of TB patients died within a year, and 50–70% died within 5–7 years of getting TB infection. In this era treatment was intended to strengthen a patient's resistance to TB (for example through special diets and bed rest in sanatoria). In the 1950s, the development and use of drugs in combination with sanatoria admission, revolutionized TB treatment and led to a dramatic reduction in TB case fatality to 5 percent or less. It was called Long course treatment. In the 1970s, the introduction of rifampicin, as part of anti-TB drugs, reduced treatment to six to eight months—known as short-course drug treatment resulted in significant improvement in cure and mortality rate. However, non-adherence to treatment and drug resistance were reported shortly after the introduction of chemotherapy which again reduced the cure rate, increased spread of disease especially multi drug resistance TB.[7]

A proper treatment protocol was need of the day to address these issues. In Tanzania in the 1970s, Dr Karel Styblo pioneered the development of a model of TB control strategy based on a managerial approach to case-finding and treatment. It was the first ever National TB Control Program with successful nation-wide coverage[8]. In 1993, World Health Organization(WHO) Global Tuberculosis Program took an unprecedented step and declared TB a global emergency and began promoting Styblo's strategy in a technical and management package called by the name DOTS, directly observed treatment short course. In 2007 WHO in collaboration with World Bank expanded DOTS strategy and designed TB control project for China, achieving phenomenal results by more than doubling the cure rate[9]. According to WHO, the most cost-effective way to stop the spread of TB in communities with a high incidence is by curing it. World Bank report claimed that the DOTS strategy is one of the most cost effective public health investments[10,11].DOTS is a five-elements strategy for the control of tuberculosis that consists of political commitment, improved laboratory analysis, direct patient observation therapy (DOT) while swallowing each dose of medication, a drug supply that provides for the correct complete short course anti-tuberculosis drug combination for free, and a reporting system that documents the progress in curing the patient.[12]

DOTS programs focus on increasing patient adherence, the primary determinant in treatment success rates. DOTS consist of two phases, initial phase of 2months and continuation phase of 4months. Four drugs are given in initial phase consisting of Rifampicine, Isonizid, Parazinamide and Ethambutal.Continuation phase consist of two drugs Rifampicine and Isoniazid given for 4 months. DOTS quickly make the infectious cases non-infectious and breaks the cycle of transmission. Using DOTS also prevents the development of drug-resistant strains of TB that are often fatal and almost 100 times more expensive to cure.

WHO End TB Strategy has set global targets and milestones for significant worldwide reductions in incidence and deaths between 2015 and 2035[8]. WHO End TB Strategy 2020 milestones indicated that the TB incidence reduction rate from 2015 to 2020 was 11%, the number of TB deaths were 9.2%[13].Adherence to TB treatment is the most important requirement for efficient TB control[14].TB treatment presents challenges for adherence because a standard treatment lasts 6 or 8 months and involves taking a number of medications, and side-effects are common during the treatment. Poor adherence to TB therapy is regarded as the most common cause of treatment failure and disease relapse, which contributes to patient morbidity, mortality, transmission and drug resistance[15,15.]A number of studies provided evidence to support the effectiveness of the overall DOTS strategy and DOT[17.18.]

This study is done to find out effectiveness of DOTS strategy in IBD hospital Attock, if effective will support the effectiveness of DOTS strategy in previous studies.

MATERIALS AND METHODS

This prospective cohort study was conducted in DOTS Centre of IBD hospital Attock from Jan 2021 to july 2021. Ethical approval was obtained from the institutional review board of the IBD hospital Attock. After approval of the study protocol, Suspected TB patients, referred by physicians from health care facilities, medical OPD and directly attending the DOTS center, were diagnosed on the basis of clinical presentations like cough, fever, weight loss, house hold contacts history and investigations like sputum microscopy, radiological findings. Two consecutive days sputum microscopy was done for acid fact bacilli (AFB) by Ziehl Neelsen staining for pulmonary TB. Extra pulmonary cases were diagnosed on the basis of specific site fluid cytology, culture, biopsy and histopathological examination. After confirmation of TB , MDR TB cases were sent to concerned MDR TB Centre. From non MDR TB cases, informed consent was taken from each patient. A questionnaire was designed to get information about participants, type of TB and treatment outcome. Variables included in the questionnaire were gender, age, lab result, TB status, treatment compliance and treatment outcome. Patient cards were used to determine and record their progress. One day training was provided to the nurses involved in the data collection process. Treatment outcomes were recorded as cured; treatment completed, loss to follow up, transferred out. Treatment was given according to WHO current guideline for six months consisting of two months initial phase and four months continuation phase. Statistical analysis was done using two proportions z test.

RESULT

In this study 678 TB patients consisting of 294(43.4%) males, 384(56.6%) females were enrolled and followed up for TB treatment under WHO treatment strategy DOTS. Patients were divided into six age groups. Majority(30%, N=256) of the patients were in age group more than 55years and minority of the patients(8.5%, N=58) were in age group less than 14 years (Table I).Among these patients 259 (38%) were sputum smear positive, 307(45%) were sputum smear negative and 112(16.5%) were Extra Pulmonary TB cases (Table II).Effectiveness of the DOTS strategy was assessed by treatment outcome.163 patients(24%) were declared cured, 409 (60%) were treatment completed, two patients lost to follow up and 7 patients (1%) were died during study due to any reason (Table III).

Table-I: Age and Gender Distribution of Patients Registered in DOTS Program

Gender	Age in Years						Total (%)
	<14	15-24	25-34	35-44	45-55	>55	
Females	38	60	56	43	61	120	378 (56%)
Males	20	71	57	39	28	85	300 (44%)
Total (%)	58 (8.5%)	131 (19.3%)	113 (16.7%)	82 (12%)	89 (13%)	205 (30%)	678

Table-ll: Types of Tuberculous Patients Registered in DOTS Program

Gender	Types of TB			Total (%)
	Smear +ive PTB	Smear –ive PTB	EPTB	
Female	158	160	60	378 (56%)
Male	101	147	52	300 (44%)
Total (%)	259 (38%)	307 (45%)	112 (17%)	678

Table-lll: Treatment Outcome TB Patients after Completion of Continuation Phase

Outcome	Cured (%)	Completed (%)	Lost to follow up (%)	Not evaluated (%)	Died (%)	P-value
Smear +PTB	163 (24%)	52 (8%)	0 (0%)	2 (0.3%)	4 (0.6%)	o.ooo
Smear –ive PTB	0 (0%)	262 (39%)	0 (0%)	2 (0.3%)	3 (0.4%)	
EPTB	0 (0%)	95 (14%)	2 (0.3%)	0 (0%)	0 (0%)	
Total	163 (24%)	409 (60%)	2 ((0.3%)	4 (0.6%)	7 (1%)	

Using two proportions z- test, the p-value was approximately0.000, indicating that the proportion of cured patients is significantly high among smear positive TB patients. Total proportion of patients cured is 24% and those who completed treatment is 60%. Overall success rate of DOTS Program at IDB hospital Attock is 84.4%.

DISCUSSION

DOTS was launched by WHO in 1992[19], and has long been accepted as an effective strategy to promote patient adherence to anti-TB treatment, thus helping to cure most TB cases, to prevent the transmission of TB in the community and to prevent drug-resistant. Poor implementation of DOT leads to noncompliance, poor control, spread of infection and emergence of drug resistance in community.[20]

In this study 678 patients were enrolled and followed up for treatment in which the proportion female patients was more than males (56% Vs 44%), which is supported by a study conducted by Samia et al, showing TB cases more common in females(51%vs 49%)[21].

In our study majority (30%) of the patients were in the age group more than 55years and lesser number (8.5%) of patients were in the age group less than 14 years, which is in contrast with the findings of previous studies conducted by Tumbo and Malmborg at al, in which more than half (52.3%) of the TB cases were among age group 12-32 years[22.23].

A study conducted in Nigeria shows 100% compliance and cure rate by strictly following DOTS strategy, proved the effectiveness of DOTS strategy[24].In a comparative study by Murali proved that TB treatment outcome by DOTS strategy was 91% as compared to Non-DOTS strategy like self-administered regimen (53%), imply the effectiveness of DOTS strategy over self-administered regimen[25].

A randomized control trial conducted by, Walley et al shows that there is no difference in the treatment outcome of three patients groups treated by DOTS through health care workers, DOTS through family members and self-administered therapy and concluded that further operational research is needed[26].Similarly, a study, conducted by Karumbi and Garner, resulted that there is no significant difference in treatment outcome either DOT conducted through health care workers or family member[27].Another systematic review concluded that DOT was not significantly better than self-administered therapy in preventing microbiologic failure, relapse, or acquired drug resistance[28].

In our study, the effectiveness of TB DOTS strategy was assessed by treatment outcome and 163 (24%) patients were declared cured and 409 (60%) declared completed their treatment resulting in overall success rate of 84.32%, which is not too far from the target set by WHO for 2035. This treatment outcome implies the effectiveness of DOTS strategy. No doubt that DOTS program has enhanced patient adherence to treatment, made possible uninterrupted supply of drugs, involvement of government and community, state of the art laboratory and reporting system.

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Authors Contribution

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