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FEATURE ARTICLE

Stop TB strategy- DOTS

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Introduction

Tuberculosis, an infectious disease caused by *Mycobacterium tuberculosis* is a serious global health problem and requires much attention to stop TB cases globally. Its severity cannot be underestimated as a single patient of TB can infect ten or more patients in a year [1]. Its mode of transfer is mainly through air. Hence spread of disease is very fast. Modern Anti-TB treatment can cure virtually all patients of tuberculosis. It is very important that treatment must be taken for the prescribed duration which is usually for six months. However, the treatment is often interrupted due to long duration of the regime and also as the patient feels better after one to two months of therapy. Apart from this, other factors that lead to patient's non compliance are ignorance, poverty, unemployment, illiteracy. Hence, these subgroups of patients are not cured completely and remain infected spreading the disease further in the community. Therefore just providing Anti-TB medication is not sufficient to ensure that patients are cured and free from Mycobacteria. To achieve this idealistic goal of stopping tuberculosis, a breakthrough strategy known as DOTS (Directly Observed Treatment Short course) was adopted.

Role of DOTS in Stop TB strategy

DOTS is a comprehensive strategy for tuberculosis cure which includes, diagnosis, improved drug supply and programme monitoring. It is the only strategy which has proven effective in controlling TB on a mass basis. DOTS is being successfully implemented in 182 countries worldwide [1]. India, an upper low-middle income nation has adopted and tested the DOTS strategy in various parts of the country since 1993 with excellent results, and by March 2006 nationwide DOTS coverage had been achieved. The first five countries in terms of incidence of total no. of T.B cases in 2008 were, India (1.6-2.4 million), China (1.0-1.6 million), South Africa (0.38-0.57 million), Nigeria (0.37-0.55 million), Indonesia (0.34-0.52 million) [2]. There was a whooping figure of 9.4 million estimated TB cases in 2008 and that of MDR-TB at 0.5 million in the year 2007 [2].

DOTS is a systemic strategy which includes the following five point strategies namely: 1) Political and administrative commitment 2) Good quality diagnosis as done by sputum microscopy for identification of TB patients for treatment. 3) Good quality drugs which includes an uninterrupted supply of anti-TB drugs. A box of medications for the entire treatment is marked for every registered TB patient, so full course of treatment is ensured and patient compliance to treatment is achieved. 4) The right treatment is given in the right way by making the treatment convenient. The heart of DOTS Program is 'Directly Observed Treatment' wherein a health worker or a trained person watches as the patient swallows the drug in his/her presence. 5) Systematic monitoring and accountability, where the case detection rate, cure rate, drop-outs is monitored at every level of health system [3].

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Global targets for TB control

Millennium Development Goals (Halt and Reverse the incidence, MDG 6, Target 8) lays down the following objectives to be accomplished- 1) By 2005, detect at least 70% of new sputum smear positive TB cases and cure at least 85% of them. 2) By 2015, reduce TB prevalence and death rate by 50% of 1990 statistics. 3) By 2050 eliminate TB disease as a public health problem.

Benefits of DOTS strategy

Under DOTS strategy the patient swallows the drug in front of a health worker/DOTS provider. Thus appropriate medications in correct doses and at correct intervals are administered, ensuring that the patients are taking the medicines. Hence Directly Observed Treatment is very accurate and successful. DOTS strategy more than doubles the accuracy of TB diagnosis. Its success rate is reported at more than 95 percent. It prevents the spread of TB by prioritizing sputum positive patients for diagnosis and treatment, hence reducing the incidence and prevalence of TB It helps poor patients by supplying free drugs, saving lives, reducing the duration of illness. It also removes social stigma and improves the quality of life of patients. By uninterrupted supply of TB drugs, all the patients get it easily in combi-packs, without break in the treatment.

Discussion

There is no doubt that DOTS has achieved its goal in controlling TB in some of the countries. From 1995-2008, a cumulative total of 36 million TB cases were successfully treated with DOTS program and up to 6 million deaths were averted. This indeed was praise worthy effort. Most dramatic and eventful result was seen in China where no. of detected cases of TB rose from 835 in 1990 to about 130,000 in 1995. About 91 percent of the patients who started treatment in 1993 got cured [3]. In Bangladesh, DOTS Strategy was started in 1993 and about 80 percent of the patients were cured till 1995. In 1997, WHO considered Bangladesh as a model country for the world for TB control. Maldives is the only country which achieved 85 percent cure rate which is the Global Target. In Nepal, DOTS was started in 1995 and more than 85 percent patients were cured. Six epidemiological regions including Central Europe, Eastern Mediterranean, high income countries, Latin America and Western Pacific have achieved Stop TB. The current target is

to halve the 1990 'mortality rate' by the year 2015. However the results are still awaited.

DOTS has proven to be a very successful strategy in many countries like China, Bangladesh, Maldives and Nepal, to name a few. But the development of Multi-Drug Resistant TB (MDR-TB) poses as serious threat to public health. MDR TB is defined when *Mycobacterium tuberculosis* develops resistance to Rifampicin and Isoniazid, the two most effective bactericidal anti-tubercular drugs. Thus, to tackle this problem, DOTS-PLUS strategy was formulated. Yet, MDR-TB cases have been seen increasing in particular parts of the world like Eastern Europe, Russian Federation and Ukraine. In 2004, reported global MDR-TB cases were 17,283. 60 percent of these total global cases were reported from the European Region especially from Eastern Europe, Baltin States of Estonia, Latvia and Lithuania. Thus, DOTS success rate are lower in these regions and so also the detection of smear positive cases and coverage of DOTS as compared with the global figures [4]. These are the main problems encountered by the Millennium Development Goals for TB control in Europe [5]. In Eastern Europe the incidence of active TB increased from 41.7 per 100,000 populations in 1995 to 84.1 per 100,000 in 2005 while mortality rates also doubled from 14.3 per 100,000 populations in 1995 to 25.3 per 100,000 in 2005. In Ukraine, the DOTS coverage rate was only 29 percent by 2005 which constituted the world lowest and is a matter of great concern [5]. The reasons for poor DOTS performance were less number of hospitals and beds, lack of capital investment for the health system, shortage of health workers, low salary, poor diagnostic system, inadequate number of microscopes and trained persons and non usage of fixed dose drug combination. In many patients drug intake was not directly observed and termed as Partially Observed Treatment Short course (POTS). Patients were given drugs to take themselves at their homes without observation and monitoring. Although TB control programs were guided by Ministry orders, there were no National Standard guidelines for managing TB/HIV co-infection. Thus, DOTS implementation in Ukraine was very challenging. There is a need for stronger health ministry leadership to establish a National TB program as well as health system weaknesses needs improvement.

The compliance to DOTS therapy is one of the important factors that affect the outcome of therapy. Compliance can be defined as the extent to which a patient's behavior coincides with medical advice. Non-compliance to self administered multi-drug tuberculosis treatment regimens is common and is the most important cause of failure of initial therapy and relapse [6]. Non-compliance may also result in acquired drug resistance, requiring more prolonged and expensive therapy that is less likely to be successful than the treatment of drug susceptible tuberculosis [6]. The adoption of DOTS has been associated with reduced rate of treatment failure, relapse and drug resistance [7].

The studies on acquired resistance (drug resistance among previously treated cases) from Gujarat (1980-86), India showed an increased resistance to Isoniazid and Rifampicin and MDR – TB rates of around 30% [7]. Despite the impressive gains in compliance associated with the use of DOTS, non-compliance with DOTS also occurs when patients fail to make themselves self available for the administration of drug therapy.

The study done by Tekle et al, found that 11.3% of all study population in Ethiopia in 1997-99 were noncompliant [8]. One study from China revealed that TB treatment was completed by 73.1% patients within 9 months while 28.9% failed to complete their regimen [9]. It was observed that majority of patients on DOTS stopped treatment because of drug toxicity. The other reasons were feeling better during treatment and lack of knowledge about various aspects of TB and its treatment [9]. It was also observed that those with adequate knowledge about disease defaulted less.

It has been observed that despite national implementation of the World Health Organization (WHO) DOTS strategy since 1996, South Africa ranked ninth highest of the tuberculosis (TB) high-burden countries in 2002, notifying 215 120 cases, at a rate of 481 cases per 100 000 population [10, 11].

The impact of DOTS on TB treatment outcomes remains unclear and adherence to treatment regimens is of prime importance for control as observed by Zwarenstein M et al [12], Walley J D et al [13] and Kamolratanakul P et al [14] during their randomized controlled trials. Also community participation and peer group education is especially relevant and necessary during the long courses of treatment for TB, where culturally sensitive support in or near a patient's home is necessary to maintain adherence to treatment regimens [15, 16, 17].

Conclusion

Hence by review of the DOTS achievements and failure in the STOP TB Strategy it can be concluded that DOTS success depends on the implementation of its five components in any country with honesty and seriousness. Provision of good laboratory services having good quality microscopes and trained laboratory technicians to detect smear positive cases is of utmost importance. There must be reserve stock of medicines (anti-TB drugs) at least for one year, so that there is no drug shortage. Adequate training for doctors/ para medical staff / DOTS providers and private doctors should be done. Funding should be increased and finance has to be planned for effective TB control. Monitoring and reporting needs improvement for successful TB control. The innovative strategies in health education are the need of the hour.

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Competing Interests

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