# AWARENESS OF DOTS REGARDING MANAGEMENT OF PULMONARY TUBERCULOSIS, AMONG RESIDENT DOCTORS AND FINAL YEAR MEDICAL STUDENTS IN TERTIARY LEVEL HEALTH CARE FACILITY

RAZIA CHAUDHRY, M. SAEED ZAHEER AND NAHEED HUMAYUN SHEIKH

*Department of Community Medicine, Allama Iqbal Medical College, Lahore*

**ABSTRACT**

*Objective:  To assess and compare the awareness level regarding management of pulmonary tuberculosis including DOTS among resident doctors of JHL and final year medical students of AIMC and to find weak areas regarding it which need interventions according to WHO recommendations, at tertiary care level hospitals. It is a cross sectional comparative, study carried out from May 2010 to Sept. 2010, of Jinnah Hospital Lahore.*

*Material and Methods:  In this study regarding awareness of DOTS strategy among doctors and medical students, doctors had designation as SRs 8, PGs 36, SHOs 56 and final year students were 110 (Total 210). A semi – structured questionnaire was filled by the trained medical students.*

*Results: Regarding sputum microscopy for AFB as standard test for diagnosis of new case of pulmonary TB, 50% resident doctors and 51% students answered in favour of it, while 20% doctors and 12% students preferred x-ray chest as 1st choice and rest 15% preferred isolation by culture, mycodot and severity of symptoms (P = 0.04). Regarding the knowledge about time taken for growth of AFB on culture media 70% doctors and 61% students answered correctly (P = 0.2122), whereas 83.8% students and 89% residents knew what 'DOTS' stands for? Both 84% doctors and students gave multiple reasons in favour of "why DOTS" as it is cost effective, better patient's compliance and stops MDR. Only 10% said that it is WHO'S recommended strategy (P = 0.002). Only 30% doctors follow the complete standard management regime as described by DOTS for different categories of patients with pulmonary tuberculosis while only 16% 5th year medical students were able to classify patients according to drug regimen and category. Sixty % doctors 34% SRs, 20% PGs and 6% house officers chose "sputum microscopy" as best tool to monitor the progress of case3 under treatment for pulm. TB. while 20% preferred chest X-ray for this purpose.*

*Conclusion:  There are multiple weak areas about knowledge and practices of doctors in tertiary care level hospitals about DOTS and its strategies for patients of pulmonary tuberculosis. Majority of the doctors were not aware that DOTS facility is available in JHL. Hence education of hospital doctors is important because private practitioners (pps) generally tend to follow the prescription written by doctors in the teaching hospitals.*

*Key Words:  Knowledge, DOTS, Management of Pulmonary TB.*

## INTRODUCTION / LITERATURE REVIEW

Pakistan is ranked 8th in terms of estimated number of tuberculosis (TB) cases by WHO in 22 high burden countries[1] almost 1.5 million people suffer from tuberculosis in this country of 1.76 million population indicating a prevalence exceeding 1% of the total population.[2] Global tuberculosis report by WHO mentions the case notification rate for Pakistan as 23 / 100,000 in the year 2001.[3] World Health Organization (WHO), in its effort to control TB, declared it a global emergency in 1993. Government of Pakistan declared TB a national emergency in 2001, and have expanded the WHO recommended TB control strategy (DOTS) throughout the health services of the Ministry of Health by May 2005 and "STOP TB"

by 2015.[4] Currently a huge project (moving towards comprehensive DOTS) of the National TB Control is being run in the country through the financial support of the Global Fund to fight AIDS, TB and Malaria.[5] By fully using the DOTS strategy, most of the deaths that occur due to TB can be prevented. The method is not only cost effective but also stops the deadly cycle of infection and its success has been proven in diverse areas such as China, Peru, Vietnam and Bangladesh with cure rates up to 95% even in the poorest of countries. The strategy was developed from the collective best practices, clinical trials and programmatic operations of tuberculosis control over the past two decades.[6] A systemic review study was conducted in Australia to identify publi-

shed studies assessing tuberculosis recurrence after successful treatment with standard short course regimens for six months to determine the strength and sufficiency of evidence to support current guideline. The primary outcome was the proportion of successfully treated patients recorded with recurrent tuberculosis during the follow-up period. Results of 16 studies out of 17 met the criteria. Conclusions showed that despite DOTS being implemented for more than 10 years and millions of patients treated for tuberculosis, a few studies have assessed the ability of standard DOTS regimens of result in lasting cure for patients treated under routine programmatic conditions.[7]

How many private practitioners (PPs) listening to usual complaints of fever, cough and weakness for over two weeks consider a diagnosis of active tuberculosis? In Pakistan, where TB is endemic and has assumed large proportions, the diagnosis would be considered and correctly tested by only a small percentage of PPs. A study conducted in Karachi showed that only 50% thought sputum microscopy as the preferred method for diagnosing enough and treating patients with pulmonary TB. Only 21% prescribed a correct regimen in accordance with National TB Control program or WHO guidelines. In such circumstances, if the PPs treating 80% patients presenting to them with tuberculosis, one can imagine how worse the situation can get.[8]

Despite the fact that WHO in its effort to control TB, declared it a global emergency it, still continues to account for the largest burden of mortality by any infectious agent worldwide. It is the second leading cause of adult death in Karachi. Globally, Pakistan alone accounts for 44% of total TB burden in Eastern Mediterranean Region. From 2000 to 2005, both the DOTS coverage and DOTS detection rate for Pakistan approximately doubled to 56%, but is still well below the population coverage of 24% suggesting that many patients don't have access to DOTS even within the designated DOTS area.[9] To further complicate the situation, Pakistan has an extremely high defaulter rate for the completion of TB treatment ranging from 79% in 1997 to 45% in 1999. It is universally accepted that a partially treated TB patient is worse than an untreated one as the chronic cases are the ones who excrete multi drug resistant organisms and increase the community burden of TB. Partial treatment with inappropriate regimens in terms of dosage and duration is probably the most important factor leading to rise in MDR – TB in Pakistan. In Karachi alone, the primary resistance rates for the first line of drugs were 11%, 2%, 3% and 9% for Isoniazid, Ethambutol, Rifampicin and streptomycin respectively which increased to 27%, 15%, 11% and 13% respectively in 1999.[10] There is need for not only uninterrupted long term treatment but also continuous monitoring of the patients to ensure treatment compliance. A multifaceted approach has to be adopted to improve TB management. Knowledge and practices of both PPs and hospital doctors ought to be addressed and reviewed regularly as prescription errors in anti-TB therapy are not just confined to PPs alone.[11]

## RESEARCH METHODOLOGY

This cross sectional study was conducted among resident doctors of JHL and final year medical students of AIMC. After calculating the required sample size of 201, every alternate resident doctor of above mentioned wards and students were interviewed (Systematic random sampling technique). Semi – structured questionnaire about all the variables was filled by trained medical students. Data analysis was done by SPSS. Descriptive statistics as percentages and proportions and univariate analysis was done using the chi-square test. Comparison between resident doctors and 5th year students was done to see the level of significance regarding knowledge about management of pulmonary tuberculosis including DOTS. P-value < 0.05 was considered significant.

## RESULTS

The study revealed that sputum microscopy for AFB as standard test for the diagnosis of new case of pulmonary TB, only 50% resident doctors and 51% students answered in favour of it, while 20% doctors and 12% students preferred x-ray chest as 1st choice and rest of the 15% preferred isolation by culture, mycodot and severity of symptoms. Regarding knowledge about time taken for the growth of AFB on culture media 70% doctors and 61% students answered correctly. As far as the rank of Pakistan among 22 high burden countries for TB, only 9% resident doctors and 2% students knew it correctly while eighty three (83.8%) of students and 89% residents knew that what "DOTS' stands for? Majority of the doctors and students both 84% preferred 'DOTS' strategy as best way for the treatment of pulmonary TB. Ninety two (92%) residents and 72% students were awared about the availability of DOTS facility in Jinnah hospital. Most of the doctors and students both gave multiple reasons in favour of "why DOTS" as it is cost effective, better patient's compliance and stops MDR. Only 10% said that it is WHO'S recommended strategy. Only 30% doctors follow the complete standard management regime as described by DOTS for different categories of patients with pulmonary tuberculosis while only 16% 5th year medical students were able to classify patients according to drug regimen and category. Sixty (60%) doctors (34% SRs, 20% PGs and 6% house officers) chose "sputum microscopy" as best tool to monitor the progress of case under treatment for

pulmonary. TB, while 20% preferred chest X-ray for this purpose. Very small proportion was in favour of improvement in symptoms. Knowledge about the terms as 'cured, relapse, treatment failure and default' was not satisfactory, only 48% resident doctors and 30% students told correct definitions. Regard-

ing the question on Multi Drug Resistance faced during the course of treatment of pulmonary tuberculosis, the answer was reasonably correct among 78% doctors and 84% 5th year students and no statistically significant difference was observed among two groups of health care providers.

**Table 1:** *Key variables of "DOTS' strategy and their association with knowledge of resident doctors and medical students, regarding management of pulmonary tuberculosis.*

| Variable | | Resident Doctors (100) | | V Year Students (110) | | Total | P-value |
|---|---|---|---|---|---|---|---|
| | Test | No. | (%) | No. | (%) | | |
| Standard test to diagnose a fresh case of pulm. TB | Sputum microscopy | 50 | (50) | 56 | (50.9) | 106 | |
| | X-ray chest | 20 | (20) | 12 | (10.9) | 32 | |
| | Tuberculine test | 15 | (15) | 07 | (6.3) | 22 | |
| | Culture on LD md | 01 | (1) | 24 | (21.8) | 25 | |
| | Myco-Dot and PCR | 14 | (14) | 11 | (10) | 25 | |
| | Total | 100 | (100) | 110 | (100) | 210 | |
| Correctly identifying sputum microscopy as TB 'DOTS' Standard test | Yes | 18 | (18) | 33 | (30) | 51 | P = 0.04 |
| | No | 82 | (82) | 77 | (70) | 159 | |
| | Total | 100 | (100) | 110 | (100) | 210 | |
| Time taken by Mycobacterium tuberculosis to grow on L J media (6 – 8 weeks) | Correct | 70 | (70) | 68 | (61.8) | | P = 0.2122 |
| | Incorrect | 30 | (30) | 42 | (38.2) | 72 | |
| | Total | 100 | (100) | 110 | (100) | 210 | |
| Rank of Pakistan among 22 high burden countries for TB | Correct | 9 | (09) | 2 | (2.66) | 11 | P = 0.019621 |
| | Incorrect | 91 | (91) | 108 | (97.34) | 199 | |
| | Total | 100 | (100) | 110 | (100) | 110 | |
| What 'DOTS' stand for? | Correct | 89 | (89) | 92 | (83.6) | 181 | P = 0.2685 |
| | Incorrect | 11 | (11) | 18 | (16.94) | 29 | |
| | Total | 100 | (100) | 110 | (100 | 210 | |
| 'DOTS' strategy as best to treat Pulm. TB | Yes | 84 | (84) | 93 | (84.54) | 177 | P = 0.9136 |
| | No | 16 | (16) | 17 | (15.46) | 33 | |
| | Total | 100 | (100) | 110 | (100) | 110 | |
| Availability of 'DOTS' lin Jinnah Hospital? | Yes | 92 | (92) | 80 | (72.72) | 172 | P = 0.000291 |
| | No | 08 | (08) | 30 | (27.28) | 38 | |
| | Total | 100 | (100) | 110 | (100) | 210 | |
| Reasons for 'DOTS' as best way of T/M for Pulmonary Tuberculosis | Patient's compliance and is cost effective | 40 | (40) | 38 | (34.54) | 78 | P = 0.02200 |
| | Cure rate is high and stops MDR | 50 | (50) | 40 | (36.36) | 90 | |
| | WHO'S Recommended stgy | 10 | (10) | 32 | (29.09) | 42 | |

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|---|---|---|---|---|---|---|
| | Total | 60 | (100) | 110 | (100) | 210 | |
| Categorization of patients according to drug regimen | Correct Categorization | 30 | (30) | 18 | (16.36) | 48 | P = 0.1875 |
| | Incorrect Categorization | 70 | (70) | 92 | (83.63) | 162 | |
| | Total | 100 | (100) | 110 | (100) | 210 | |
| Monitoring tool for patients under Treatment | Sputum microscopy | 60 | (60) | 50 | (45.45) | 110 | P = 0.00516 |
| | X-ray chest | 21 | (21) | 46 | (4.80) | 67 | |
| | Improvement in symptoms | | | | | | |
| | Total | 100 | (100) | 110 | (100) | 210 | |
| Knowledge about relapse cured, default and T/M failure | Correct | 48 | (48) | 30 | (27.20) | 78 | P = 0.00190 |
| | Incorrect | 52 | (52) | 80 | | 132 | |
| | Total | 100 | (100) | 110 | (100) | 210 | |
| Knowledge about Multi Drug Resistance (MDR) | Correct | 78 | (78) | 84 | (76.36) | 162 | P = 0.777 |
| | Incorrect | 22 | (22) | 26 | (23.64) | 48 | |
| | Total | 100 | (100) | 110 | (100) | 210 | |

## DISCUSSION

Considering sputum microscopy as standard test under DOTS, very few resident doctors and students preferred it. Evidence from several countries indicates that, although cure rates are approaching the global target, the case detection target may not be met, even with 100% DOTS implementation in designated public facilities.[12] Another questionnaire survey, performed among one hundred doctors in various parts of Lahore to investigate the knowledge of general practitioners regarding the diagnosis and treatment of tuberculosis showed that in a suspected case of tuberculosis, 80% would recommend x-ray chest, 10% would advise sputum examination and rest would depend on ESR and Mycodot test. Ten percent of doctors were giving anti-tuberculous chemotherapy according to body weight. Five percent of doctors were aware of drug resistance, 20% were doing health education, 90% claimed to try to update their knowledge through medical representatives and medical conferences. Among private practitioners there is marked reliance on chest x-ray. Mantoux test, ESR and Mycodot test. Sputum examination being neglected.[13] However about an equal proportion (89 and 83%) of doctors and students knew that what DOTS stands for. In an Indian study of same title conducted in Safdar Jang Hospital New Dehli the proportion of correct answer among doctors of all categories was in the range of 60 – 70%.

As government has provided the facility of treatment under DOTS in all tertiary care hospitals and in our study significant number of resident doctors and students knew that treatment of TB. under DOTS is available in JHL. There is not only a need of uninterrupted supply of drugs but also continuous monitoring of the patients to ensure treatment compliance. A multifaceted approach has to be adopted to improve TB management. Knowledge and practices of both PPs and hospital doctors ought to be addressed and reviewed regularly as prescription errors in anti-TB therapy are not just confined to PPs alone. Education of hospital doctors is also important because PPs generally tend to follow the prescription written by doctors in the teaching hospitals; so a wrong prescription written in the hospital could adversely influence the prescribing habits of PPs.[15]

While considering reasons for DOTS as best way of treatment about an equal number of doctors and students gave multiple reasons and advantages in favour of DOTS. This is a descriptive study included 82 pulmonary TB patients (50 female and 32 males) aged between 15 – 65 years in AZARBUAN, IRAN. The Integrated Model of Health Behaviour was used to elicit information related to factors. It evaluated socio-demographics and 5 components (knowledge, cues, health beliefs, self efficacy and social support) among tuberculous patients. Sixty – three percent complied with treatment. There were significant differences between compliance and health beliefs and self – efficacy. On the contrary, there were no significant differences between knowledge and socio-de-

mographic characteristics and compliance of treatment. The compliant patients had a good self – efficacy and health beliefs as compared to non compliant TB patients.[16] However very low % of doctors and students follow the complete standard management regimens as described by DOTS for patients as fresh case of pulmonary TB and the same % knew about relapse, treatment failure, default and a case of extra pulmonary tuberculosis. This indicates the poor knowledge and practices for DOTS in tertiary care mega hospitals. Attention of the managers and administrators is needed towards this flaw. Previous cases, which have for one reason or another suffered from MDR for TB need DOTS plus which is a programmed management of drug – resistant TB. Patients would drop out before the prescribed course of drugs on account of many reasons. These aborted courses of ATT drugs brought on the multi – drug resistant TB, which needs even more attention. The modern treatment which is DOTS, or DOTS plus is open to all who have TB. This is the strategy adopted by WHO and is termed to universal access.[17] In this study knowledge regarding relapse, cured case, treatment failure and default, an equall number (28%) of both groups had correct knowledge, another weak area indicated. A similar study carried out in Safdar Jang Hospital New Dehli showed the results in contrast to our results where 70 – 78% doctors were found to have good knowledge regarding definitions of relapse, default, treatment failure, and cure.[18] Treatment under DOTS prevents Multi Drug Resistance which is very common among TB patients. A large number of doctors (80%) had the knowledge of MDR, its causes and treatment for it. The World Health Organization estimates that up to 50 million persons worldwide may be infected with drug resistant strains of TB. The fatality rate of MDR – TB is 20 – 80%. Drug resistant tuberculosis cases are on the rise in Pakistan. The reasons for this menace are multiple including improper prescription, poor compliance and over the counter sale of anti-TB drugs. Considering the fact that resistant tuberculosis is difficult to manage, it is suggested that these drugs should only be used after consultation with a physician experienced in the treatment of drug resistant TB. The most frequent mistake made by treating physicians is addition of one drug in the failing regimen. At present, 27 potential anti-TB drugs are at various stages of development. The aim is that by 2011 at least one of these molecules completes the journey and should come in the market.[19]

In *conclusion* there are multiple weak areas about knowledge and practices of doctors in tertiary care hospitals about DOTS and its strategies for patients of pulmonary tuberculosis which are under treatment. Inspite of availability of DOTS facility in JHL. The majority of the doctors were not aware of it and those who knew, majority were not practicing it. Education of hospital doctors is important because private practitioners generally tend to follow the prescription written by doctors in the teaching hospitals.

## REFERENCES

1. Global TB Data base and country profile WHO. Report of TB control surveillance planning, financing WHO workshop for developing countries New Dehli 29 – 31 Oct. 2006 WHO / TB / 05.236, 2008; New Dehli India.
2. Helen S Cox, Martha Morrow, Peter W. Long term efficacy of DOTS regimens for Tuberculosis: systematic review. BMJ, dio10.1136/bmj.39463.640787. (Published 4 February 2008) Macfarlane Burnet Institute for Medical Research and Public Health, Melbourne, VIC 3004, Australia hcox@burnet.edu.au
3. Murali Madhav S., Udaya Kiran N. A comparative study of DOTS and NON-DOTS interventions in Tuberculosis cure. Indian Journal of Community – Medicine Vol. XXIX, No. 1, Jan. – Mar., 2009. Department of Community Medicine, Kasturba Medical College.
4. Bureau Report. International mission to monitor TB Program. The NEWS; Monday. August 10, 2009, Peshawar.
5. Khan JA, Malik A. Tuberculosis in Pakistan: Are we losing the battle? Department of Medicine, The Aga Khan University, Karachi. JCPSP 2009: Vol. 9.
6. Drug resistance of Mycobacterium tuberculosis in Karachi, Pakistan. Tropical Doctor, 2008; 23: 13-14.
7. Arif K, Ali SA, Amanullah S, Siddiqui I, Khan JA, Nayani P. Physician compliance with national tuberculosis treatment guidelines: a university hospital study. Int J Tuberc Lung Dis 2010; 2: 225-30.
8. Fennelyy KP, Iseman MD. Health care workers and tuberculosis: The battle of a century. Int J Tuberc Lung Dis 2009; 3: 363-364.
9. Sepkowitz KA. Tuberculin skin testing and the health care worker: Lessons of the Prophit Survey. Tuber lund Dis 2006; 77: 81-85.
10. Harries AD, Maher D, Nunn P. Practical and affordable measures for the protection of health care workers from tuberculosis in low – income countries. Bull World Health Organ 2008; 75: 477-489.
11. Corles JA, Stockton PA, Myers SB, Davies PDO. A worldwide Internet survey of public knowledge about Tuberculosis Pak J.
12. Corles JA, Stockton PA, Myers SB, Davies PDO. A worldwide Internet survey of public knowledge about Tuberculosis. Pak J Chest Med Mar 2006; 7 (Suppl): 15-6.
13. Javaid Ahmed Khan, Muhammad Irfan, Amna Zaki, Madiha Beg, Syed Fayyaz Hussain, Nadeem Rizvi. Knowledge, attitude and misconceptions regarding tuberculosis in Pakistani patients. J Pak Med Assoc May 2010; 56 (5): 211-4.
14. Ali Khan Khuwaja, Naushaba Mobeen. Knowledge about tuberculosis among patients attending family

practice clinics in Karachi J Liaquat Uni Med Health Sci May – Aug 2009; 44 (2): 44-7.

15. KU Saulat, R Shamshad, HU Masood, Ch Khalid, Waheed K, A Tayabb. Survey of knowledge of General Practitioners for the diagnosis and treatment of Tuberculosis in Lahore. Pakistan. Pak J Chest Med Jul – Sep 2008; 7 (3): 9-11.

16. Arif K, Ali SA, Amanullah S, Siddiqui I, Khan JA, Nayani P. Physician compliance with national tuberculosis treatment guidelines: a university hospital study. Int Tuberc Lung Dis 2009; 2: 225-30.

17. Murali Madhav S., Udaya Kiran N. A comparative study of DOTS and NON-DOTS interventions in Tuberculosis cure. Indian Journal of Community – Medicine Vol. XXIX, No. 1, Jan – Mar., 2008. Deptt. of Community Medicine, Kasturba Medical College.

18. RB Manin, MA Feizi. Factors responsible for compliance of medical t/m among compliant and non-compliant tuberculous patients treatment Uramia, Iran. Feb. 18; 2008. mah.rezai@yahoo.com

19. G Kunai, SK Rasania, A Khokhar, R Talwar, S Singh, P Tawari. Awareness regarding management of pulm. tuberculosis, including DOTS in SAFDAR JANG HOSPITAL New Dehli. 0-42; IAPSM. All India Institute of Medical Sciences New Dehli.