TREATMENT OUTCOME OF TUBERCULOSIS PATIENTS REGISTERED AT TERTIARY CARE UNDER DOTS PROGRAM

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ABSTRACT

Background: Treatment outcome is key indicator to assess the effectiveness of TB control program. **Objective:** To determine the treatment outcome in tuberculosis patients registered at Department of Pulmonology, Sheikh Zayed Medical College / Hospital, Rahim Yar Khan. **Patients and Methods:** All the patients registered at DOTS clinic, Department of Pulmonology, Sheikh Zayed Medical College / Hospital, Rahim Yar Khan from 1st January, 2008 to 31st December 2009, were followed up till completion of their prescribed regimen to determine the WHO endorsed treatment outcome. Patients were classified according to site of disease (pulmonary vs extra pulmonary), history of previous treatment and sputum smear status. **Results:** Of the 1607 registered TB patients, majority of the patients (83.9%) were newly diagnosed, young (median age: 30 years) and have pulmonary TB (74.9%). Overall treatment success rate was 77%. New cases fared better (80.6%) than previously treated patients (53.7%). Among previously treated group, treatment outcome was as follows; relapse (62.7%), treatment after default (52.7%) and treatment failure (33.3%). Extra pulmonary tuberculosis cases fare better than pulmonary case with success rate of 87.7% & 72.5%, death rate 11% & 3.2%, failure rate 1.9% & 0.2% and default rate of 6.9% & 10.6% respectively. **Conclusion:** Considering the WHO standard of 85% treatment success rates, only the newly diagnosed patients were close to achieve the target. Previous exposure to anti tuberculosis treatment especially inadequate one was closely associated with poor outcome. Efforts should be made to ensure proper management of all TB cases.

Keywords: Tuberculosis, Treatment Outcome, Treatment Completed, Cured, Relapse, Defaulter, DOTS.

INTRODUCTION

Tuberculosis is still a common communicable disease worldwide despite the availability of effective treatment and global efforts to eliminate this deadly disease. One third of the world population is infected with tuberculosis. Every year more than 8 million people develop active tuberculosis (TB). More than 90% of the global TB cases and deaths occur in developing world. Pakistan ranks 6th among high burden countries worldwide and has an incidence rate of 231/100000 population.[1] A patient suffering from sputum smear-positive patients are the most potent sources of infection and have poor outcomes, as about two -thirds of them die within 2-3 years of developing disease.[2] Therefore, treatment of a known case of TB especially pulmonary TB is the mainstay of all TB control strategies.[3] An effective treatment not only cure the individual patient, but also prevent the spread of disease in the community and prevent development of drug resistance strains of

Mycobacterium Tuberculosis.[4] Considering these facts, effort has been made globally to ensure delivery of effective, standardized treatment for all TB patients. WHO has launched TB Control program under the name of DOTS (Directly Observed Treatment Short course).[5] Government of Pakistan endorsed the WHO recommended DOTS Strategy to control tuberculosis in country in 2001 and achieved countrywide DOTS coverage in all health facilities within the public sector health delivery system in 2005.[6] Department of pulmonology, Sheikh Zayed Medical College / Hospital, Rahim Yar Khan is running this program in the area of Rahim Yar Khan city since then. Treatment outcome is key indicator to assess the effectiveness of TB control program. The study was conducted to determine the treatment outcome in tuberculosis patients registered under DOTS at Department of Pulmonology, Sheikh Zayed Medical College / Hospital, Rahim Yar Khan.

PATIENTS AND METHODS

All the patients who have been diagnosed either by microscopy, culture, histopathology or clinical judgment by a competent clinician with a decision to treat with full course of anti-tuberculosis regimen were labeled as tuberculosis patient and registered in DOTS program at Department of Pulmonology, Sheikh Zayed Medical College / Hospital, Rahim Yar

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Khan. The cases registered from 1st January 2008 to 31st December 2009 were included in study. The patients who have tuberculosis of lungs and/or tracheobronchial tree with or without involvement of other organ were labeled as pulmonary tuberculosis. All patients who have tuberculosis of any organ of body without involvement of lungs & tracheobronchial tree were labeled as extra pulmonary TB. Patients were classified according to previous history of anti tuberculosis treatment[7] as shown in table I. Demographic characteristics of like age, sex, and disease related factors like site, type of patients and sputum smear status were recorded on a prescribed performa.

Table I: Type of TB Patient (Operational Definition

New Case	A patient who has never had treatment for TB or has taken Anti – TB drugs for less than 01 month and not registered with the program
Relapse	A patient previously treated for TB and declared cured or treatment completed by the program, becomes sputum smear or culture positive any time
Transferred In	A patient who has been transferred from another TB register to continue treatment
Treatment Failure	A patient who is started on a retreatment regimen after having failed previous (CAT-I) treatment
Return after default	A patient who returns to treatment, bacteriologically positive, following interruption of treatment for 02 or more consecutive months
Others	All cases that do not fit the above definitions, such as patients who were previously treated but for whom the outcome of their previous treatment is unknown, and / or patients who have re turned to treatment with smear negative pulmonary TB or extra – pulmonary TB, taken TB drugs for more than 04 weeks from outside the programme

Department of Pulmonology, Sheikh Zayed Medical College / Hospital, Rahim Yar Khan serves as a diagnostic and treatment centre for about 316244 people residing in Rahim Yar Khan city and surrounding few villages. Additionally, being a tertiary care centre, it serves as a referral centre for whole of district Rahim Yar Khan and neighboring district of Punjab, Sindh and Baluchistan. Patients belonging to areas outside the DOTS catchment boundaries of Sheikh Zayed Hospital, Rahim Yar Khan treatment centre were referred to concerned DOTS treatment centre for registration & treatment after necessary evaluation & diagnosis. In this way, only the patients from Rahim Yar Khan city were registered at our centre and they were subjects of this study. All patients treated outside DOTS program were excluded.

All the patients were being followed up till completion of their treatment, which was 06 months in case of category I (CAT I) and 08 months in case of category II (CAT-II). Treatment outcome was assigned according to WHO guidelines and adopted by National TB Control Program Pakistan and shown in Table II.[7] Treatment outcome was further analyzed in various type of tuberculosis patients according to age, sex, site of disease and type of patients. The data was entered and analyzed by using SPSS version15.

Table II: Treatment outcome

Cured	A patient registered as smear – positive, has completed the duration of treatment, and becomes sputum smear negative at the end of treatment and on at least one previous occasion.
Treatment Completed	A smear positive patient who has completed the duration of treatment and have at least one follow up smear negative results but none at the end of treatment due to any reason smear negative and extra pulmonary cases complete six months of treatment successfully.
Treatment Failure	A sputum smear positive patient who remains or becomes sputum smear positive at month five or later also a patient who was initia lly smear negative before starting treatment and became smear positive after completing the initial phase of treatment.
Died	A patient who dies for any reason during the course of treatment.
Default	A patient whose treatment was interrupted for two consecutive months after registration.
Transferred out	A patient who has been transferred to another recording and reporting unit for whom treatment outcome is not known.
Treatment Success	It is sum of patient who are declared cured and treatment completed.

RESULTS

Table III shows demographic characteristics (sex and age), sputum smear status and type of patients in each individual year of study and total in two years. There was slight male predominance and majority of patients were young adults (median age 30 years), three quarters (74.9%) of enrolled patients have pulmonary tuberculosis and majority (83.9%) were newly diagnosed. Among the pulmonary cases, 80.4% were sputum smear positive. Overall treatment outcome in each year of study and total of two years is shown in table IV.

Treatment success rate which is defined as sum of those cured & treatment completed was 77% which is below the WHO targets of 85%. Treatment outcome in male & female patients is presented in table V. Treatment failure rate was slightly higher in male 11.5% vs 7.6%. Other outcomes were comparable in both.

Treatment outcome in different type of patient is shown in Table VI. New cases showed most favorable outcome with success rate of 80.6% while treatment after failure fared worst with success rate of 33.33%. Treatment outcome in Pulmonary & Extra Pulmonary is shown in table VII; extra pulmonary cases fared better than pulmonary cases

with success rate 87.7% vs 72.5%, death rate 11% vs 3.2%, failure rate 1.9% vs 0.2% and default rate of 6.9% vs 10.6%.

Table III: Characteristics of subjects

Total Patients	2008		2009		Total
	705		**902**		**n=1607**
	Total	%	Total	%	
Male	394	55.9	459	50.9	853 (53.1%)
Female	311	44.1	443	49.1	754 (46.9%)
Disease Classification					
Pulmonary	535	75.9	668	74.1	1203 (74.9%)
Extra Pulmonary	170	24.1	234	25.9	404 (25.1%)
Type of Patients					
New	604	85.7	744	82.5	1348 (83.9%)
Previously Treated	101	14.3	158	17.5	259 (16.1%)
Relapse	45	6.4	65	7.2	110 (6.8%)
Defaulter	17	2.4	59	6.5	76 (4.7%)
Failure	4	0.6	8	0.9	12 (0.7%)
Other	35	5.0	26	2.9	61 (3.8%)
Sputum for AFB Smear					
Positive	433	61.4	534	59.2	967 (60.2%)
No AFB	102	14.5	134	14.9	236 (14.7%)
Not Applicable	170	24.1	234	25.9	404 (25.1%)

Table IV: Overall treatment outcome

Treatment Outcome	Pulmonary (n=1203)	Extra Pulmonary (n=404)	Total (n=1607)
Treatment Success	**885 (73.5%)**	**352 (87.1%)**	**1237 (77.0%)**
- Cured	- 520 (43.2%)	- 00 (00.0%)	- 520 (32.4%)
- Treatment Completed	- 365 (30.3%)	- 352 (87.1%)	- 717 (44.6%)
Died	**132 (11.0%)**	**13 (3.2%)**	**145 (9.0%)**
Failure	**23 (1.9%)**	**1 (0.2%)**	**24 (1.5%)**
Defaulter	**127 (10.6%)**	**28 (6.9%)**	**155 (9.6%)**
Tranfered Out	**36 (3.0%)**	**10 (2.5%)**	**46 (2.9%)**

Table V: Treatment outcome by sex

Treatment Outcome	Total Patient (n=1607)	Male (n=853)	Female (n=754)
Treatment Success (Cured + Treatment Completed)	1237 (77.0%)	642 (75.3%)	595 (78.9%)
Died	145 (9.0%)	73 (8.6%)	72 (9.5%)
Failure	24 (1.5%)	13 (1.5%)	11 (1.5%)
Defaulter	155 (9.6%)	98 (11.5%)	57 (7.6%)
Tranfered Out	46 (2.9%)	27 (3.2%)	19 (2.5%)

Table VI: Treatment outcome by type

Treatment Outcome	New (n=1348)	Relapse (n=110)	Transfer (n=03)	Other (n=58)	Treatment After Defaulter (n=76)	Treatment After Faiure (n=12)
Treatment Success	**1087 (80.6%)**	**69 (62.7%)**	**2 (66.7%)**	**35 (60.3%)**	**40 (52.7%)**	**4 (33.3%)**
- Cured	- 423 (31.4%)	- 46 (41.8%)	- 2 (66.7%)	- 17 (29.3%)	- 29 (38.2%)	- 3 (25.0%)
- Treatment Completed	- 664 (49.3%)	- 23 (20.9%)	- 0 (00.0%)	- 18 (31.0%)	- 11 (14.5%)	- 1 (8.3%)
Died	**94 (7.0%)**	**14 (12.7%)**	**0 (00.0%)**	**13 (22.4%)**	**22 (28.9%)**	**2 (16.7%)**
Failure	**11 (0.8%)**	**8 (7.3%)**	**0 (00.0%)**	**1 (1.7%)**	**2 (2.6%)**	**2 (16.7%)**
Defaulter	**122 (9.1%)**	**13 (11.8%)**	**1 (33.3%)**	**7 (12.1%)**	**9 (11.8%)**	**3 (25.0%)**
Tranfered Out	**34 (2.5%)**	**6 (5.5%)**	**0 (00.0%)**	**2 (3.4%)**	**3 (3.9%)**	**1 (8.3%)**

Table VII: Treatment outcome by disease classification

Treatment Outcome	Pulmonary (n=1203)	Extra Pulmonary (n=404)	Total (n=1607)
Treatment Success	**885 (73.5%)**	**352 (87.1%)**	**1237 (77.0%)**
- Cured	- 520 (43.2%)	- 00 (00.0%)	- 520 (32.4%)
- Treatment Completed	- 365 (30.3%)	- 352(87.1%)	- 717 (44.6%)
Died	**132 (11.0%)**	**13 (3.2%)**	**145 (9.0%)**
Failure	**23 (1.9%)**	**1 (0.2%)**	**24 (1.5%)**
Defaulter	**127 (10.6%)**	**28 (6.9%)**	**155 (9.6%)**
Tranfered Out	**36 (3.0%)**	**10 (2.5%)**	**46 (2.9%)**

DISCUSSION

This is the first study on treatment outcome of TB patients from the area of Rahim Yar Khan. As the treatment outcome was assigned according to the recommendations of WHO, results can be compared with studies from other areas of Pakistan and abroad. Treatment outcome is key indicator to measure the success of TB control program. National surveys are important as they will assess overall performance. Regional studies are also vital because these can provide meaningful insight into the performance of local program, identify specific problems hindering the success and ways to rectify them.

In our study, treatment success rate was 77% which is less than the WHO target of 85%. However, treatment outcome of transferred out patients was not known and about 9% patients died before the completion of therapy. If these two groups are excluded from the analysis, treatment success rate rise to 88.9% which is above the WHO targets. Similar study from England and Wales published in 2007 showed overall treatment completion rate of 62%. Authors attributed this low rate partly to missing outcome information and partly due higher number of deaths. [8] Another study from England and Wales by Abubaker et al [9] found overall treatment success rate of 88% in children. During 2006 and 2007, out of the 349 694 pulmonary TB cases registered by National TB Control Program in Pakistan, 309 154 (88.4%) were treated successfully.[10] One study revealed treatment success rates of patients treated at a public hospital DOTS clinic (76%) and family physician DOTS clinic (74%) which are close to the results in this study.[11] However, results from three teaching hospitals of Peshawar in year 2007 were excellent, showing treatment success rate of 99.4% which is way above the target set by W.H.O.[12] Above mentioned difference of results from various parts of world signifies the need for regional studies.

Almost three quarter of total patients has pulmonary TB. As patients suffering from pulmonary tuberculosis are the most important source of infection in community, special emphasis should be directed to eliminate this source by early detection and proper treatment.[13] It is evident from the results of treatment outcome shown in table VII that extra pulmonary TB have better success rates of 87.1% as compared to pulmonary TB (73.5%) possibly due to fewer deaths, treatment failures and defaulters.

Considering various types of patents, new cases fared better with treatment success rate of 80.6%. Overall treatment success rate in previously treated patients (Relapse, defaulter and treatment failure) was 53.7%. Analysis of various subgroups in this category revealed success rate of 62.7% for relapse cases, 52.7% for treatment after default and 33.3% for treatment failure. Therefore, emphasis should be laid upon managing the new cases effectively to reduce the number of cases requiring retreatment.

About 10% patients stopped their treatment prematurely. It is a real cause of concern as management of these is associated with bad treatment outcome. In this study, only 38.2% patients declared cured, 14.5% completed treatment, 28.9% died and 2.6% had treatment failure. Unfortunately, 11.8% defaulted again. Higher default rates are considered a failure of a program to overcome natural human tendency to stop treatment when they feel subjective improvement or feel better without treatment if side effects to drugs develop.[13] Further studies are needed to determine causes of non adherence of patients to treatment in this area. Addressing these causes & tracking of non adherent patients can improve progress of any TB control program.[14]

Overall mortality in this study was quite high (9%). Further studies are required to find out causes of this high mortality. In this study, treatment outcome of 46 (2.9%) transferred out patients was not known which also affected the overall treatment success rates. This situation is most commonly observed in tertiary care facilities where complicated cases are initially treated before transfer out to their native towns.

Efforts should also be made to ensure better communication between various treatment units to record treatment outcome of transferred out patients.

Considering the fact that quite a large number of tuberculosis patients are being treated by private hospitals / practioners and all the surgical and medical specialties without being reported to TB control program, the results of this study may not be true reflection of treatment outcome in the community. Even more importantly, if the department of Pulmonology which has services of trained staff, uninterrupted supply of free medications and system to track the defaulters is achieving a treatment success rate of 77%, what can one expect for the groups mentioned above. It is worth mentioning that treatment by private practioners outside DOTS program is considered a risk factor for drug resistance and bad treatment outcome.

CONCLUSION

Overall treatment success rate was lower than WHO standards. History of previous exposure of anti tuberculosis treatment specially inadequate one was closely associated with poor outcome.

To improve treatment outcome various steps can be recommended as:

All case of tuberculosis should be registered and provided standardized treatment through TB control program.

Continuous surveillance of treatment outcome be ensured to measure the effectiveness of program.

Studies should be conducted to determine the predictors of non completion of treatment, so that the additional measures be taken in predisposed sub groups / individuals to improve completion rates.

Tracking of non adherent patients by health care workers can further improve outcome.

Acknowledgement

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