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A STUDY OF SOCIO-DEMOGRAPHIC PROFILE OF DEFAULTERS AND THE FACTORS RESPONSIBLE FOR DEFAULTING IN ONE OF THE TUBERCULOSIS UNIT OF GANDHINAGAR DISTRICT.

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ABSTRACT

Context: Tuberculosis (TB) is a major public health concern in India. Every year there are about 1.8 million new cases of TB and among them 0.8 million are infectious cases of sputum smear positive pulmonary TB. **Aims**: was to study the socio-Demographic profile of defaulters and the factors responsible for defaulters. **Settings and Design:** This was a cross-sectional study carried out among defaulters of one of Tuberculin unit. **Materials and Material:** Secondary data collection was done from District Tuberculosis Centre using a semi structured questionnaire. **Statistical Analysis Used:** Data Entry and Analysis was done using excel software. **Results:** Maximum numbers of defaulters were observed in the age group between 35-44 years. The proportion of defaulters decreased uniformly with increasing educational status. Drug toxicity was one of the main reasons for defaulting. **Conclusion:** Drug toxicity is the most common reason for defaulting, so counselling should be done for this.

KEYWORDS: Defaulter, Tuberculosis Unit, Tuberculosis.

KEY MESSAGES: Missing a single dose can lead to missing subsequent doses, so retrieval action should be taken as early as possible. Many patients are defaulting because of lack of motivation and family support, so counselling of the family members should also be done.

INTRODUCTION

India accounts for one-third of the global TB burden of the world. It has more TB cases than any other country in the world and twice as many patients on treatment as China, which has the next highest number.[1] Two persons die due to TB every 3 minutes, over 1,000 every day and almost 4,00,000 every year.[1] Patients with infectious pulmonary TB disease can infect 10-15 persons in a year.[1]

In India, TB kills more adults in the most productive age group (15-54 years) than any other infectious disease. Almost 4, 00,000 die every year.[1]

Defaulter in Tuberculosis

Any medical treatment course involving antibiotic, if taken irregularly or in sub-optimal doses, is a known risk factor for potential development of resistance to that antibiotic. This becomes more important when the treatment is longer and involves higher pill burden like Anti-Tuberculosis (TB) treatment. The therapeutic regimens given under the Directly Observed Treatment, Short course (DOTS) strategy as recommended by the World Health Organization (WHO) have been shown to be highly effective for both preventing and treating TB[2] but poor adherence to anti-TB medication is a major barrier to its global control.[3,4,5]

Based upon World Health Organization (WHO) recommendations, the Government of India implemented Directly Observed Treatment Short Course (DOTS) strategy under Revised National Tuberculosis Program (RNTCP).[6]

According to the RNTCP data for 2009, the cure rate among the retreatment group was 64%, mortality rate 7.8%, failure rate 5.6% and default rate about 14.1%.[7] DOTS has increased success rate of the coverage as well as cure rate. One area of problem is reducing the efficiency of DOTS strategy is default rate. A strict adherence to Directly Observed Treatment is likely to minimize defaults and is therefore essential for the desired treatment success.[8,9,10] Gandhinagar being the capital of Gujarat is privileged to have many relevant facilities. It would be interesting to learn about the situation of TB in the area of the capital. A scientific approach to know about the situation of RNTCP and DOTS in Gandhinagar district is to go through the secondary data. In RNTCP an excellent system is present to get variety of data. The data of Gandhinagar district was used for further exploration of the reasons for defaulting in this area.

AIMS AND OBJECTIVES

- To study the socio-Demographic profile of defaulters in Mansa TU.
- To study the factors responsible for defaulting in Mansa TU.
- To share the findings of the study with different levels of local health functionaries.

Subjects and Methods

Gandhinagar District is an administrative division of Gujarat, India, whose headquarters are at Gandhinagar, the state capital. It has an area of 64km², population of 1,334,455 of which 35.02% were urban (2001 census).

➢ This study was based on 2 important methods of data collection.

(1) Secondary data from District Tuberculosis Centre (DTC) Gandhinagar (Year 2004-2007)

(2) Interview of defaulter patients of the year 2007 by questionnaire of a single Tuberculosis Unit (TU), Mansa of Gandhinagar District.

- TU had addresses of all these defaulters. Collecting all the addresses, all of them had been visited at their residents one by one.
- These defaulters were interviewed by visiting them using a pre - tested questionnaire.
- **Inclusion Criteria:** All the defaulter patients, who registered during year-2007 and defaulted, were included in study.
- **Exclusion criteria:** The patients who were dead at the time of interview.

After the completion of data collection, data entry and analysis was undertaken using Microsoft Excel. Most of the responses were in the form of numbers. Proportions were calculated.

RESULTS

Maximum numbers of defaulters were observed in the age group between 35-44 years. Patients under the age of 25 years showed minimum defaulter rate. The proportion was three times higher in males as compare to females. Women after the age of 60 years reported higher proportion of defaulter rate as compared to male. Out of 24 defaulters 18 defaulters were 25-59 year age group, which is economically and socially active group (Table 1). Among the 24 defaulter patients 18 (75%) were married and five (20.8%) were unmarried (Table 2).

The proportion of defaulters decreased uniformly with increasing educational status. It is interesting that even two post-graduates become defaulter with high educational qualification

(table 3). 14 defaulters out of 24 are labours and farmers, two govt. servants were defaulting, out of six female defaulters five were housewives (table 4). Table 5 shows that defaulting was found to be start at 3rd month of initiation of treatment and rise up to 4 month and decline subsequently.

It is seen that 21 (66.7%) out of 24 defaulters had some addiction either smoking or drinking or both. A few cases (seven) told that they smoke regularly and nine cases confessed that they consume alcohol. Five patients told that they use both tobacco and alcohol. Only 8 patients reported that they neither smoke nor drink (Table 6). As high as two third of defaulters were of Category-2, Category-1 and Category-3 also had a few defaulters five and three respectively (Table-7). When all these defaulters were asked about the reasons for discontinuing the treatment, a variety of replies were available. Drug toxicity is one of the main reasons for defaulting.

Out of 13 observations of drug toxicity five patients had vomiting; five patients had gastritis; two patients had vertigo and one patient had boil at injection site. Many times patients are not ready for taking a long-term treatment, patient's poor faith in govt. service, attraction of private treatment – reasons lead to default and the patients started private treatment. During Intensive Phase due to loading doses, patients get early symptom relief and they gain weight, these tempt patient to discontinue the treatment. One patient with adenocarcinoma of lung was on chemotherapy and defaulted. One patient with left side lung collapse was taking surgical treatment and discontinued the treatment. One patient thought that it was a self-limiting disease and it will resolve itself, so there was no need to take treatment. One patient had excessive vomiting and she discontinued treatment thinking that there was un-natural power (mata) in her body and she resisted her to take treatment. One patient was on IP regularly, but due to no relief from symptoms even after two months of treatment, he discontinued the treatment (Table 8).

Table 1: Age- wise distribution of defaulter patients in the year 2007.

Age (Years)	Male (%)	Female (%)	Total (%)
<25	1 (5.6)	1 (16.6)	2 (8.3)
25-34	3 (16.7)	1 (16.6)	4(16.6)
35-44	7 (38.9)	2 (33.3)	9 (37.5)
45-59	5 (27.7)	0 (0)	5 (20.3)
>60	2 (11.1)	2 (33.3)	4 (16.6)
TOTAL	**18 (75)**	**6 (25)**	**24 (100)**

Table 2: Marital status of defaulters.

Marital status	Male (%)	Female (%)	Total (%)
Married	14(77.8)	4 (66.7)	18 (75)
Un-married	3 (16.7)	2 (33.3)	5 (20.8)
Widower	1 (5.5)	0 (0)	1 (4.2)
TOTAL	**18 (100)**	**6 (100)**	**24 (100)**

Table 3: Educational status of defaulters.

Education	No. of defaulter (%)
Illiterate	7 (29.2)
Primary	11 (45.8)
Secondary	3 (12.5)
High-secondary	1 (4.2)
Post-graduate	2 (8.3)
Total	**24(100)**

Table 4: Occupation of defaulters.

Occupation	No. of defaulters (%)
Labour	11 (45.8)
Housewife	5 (20.8)
Farming	3 (12.5)
Govt. service	2 (8.3)
Non-working	2 (8.3)
Student	1 (4.6)
Total	**24 (100)**

Table-5: Defaulter according to time after starting the treatment.

Month of treatment When pt. Become defaulter	No. of patients Defaulted (%)		
	Male	Female	Total
3rd	7(38.9)	1(16.7)	8 (33.3)
4th	6(33.3)	4(66.6)	10 (41.7)
5th	4(22.2)	0(0)	4 (16.7)
>=6th	1(5.6)	1(16.7)	2 (8.3)
Total	**18(100)**	**6(100)**	**24 (100)**

Table 6: Smoking–Alcohol habits among defaulters.

Habits	No. of defaulters (%)
Alcohol	9 (37.5)
Smoking	7 (29.2)
Alcohol + Smoking	5 (20.8)
None of above	8 (33.3)

Table 7: Category-wise distribution of defaulters.

Category	No of defaulters (%)		
	Male	Female	Total
1	4 (22.2)	1 (20)	5
2	12 (66.7)	4 (25)	16
3	2 (67)	1 (33)	3
TOTAL	**18 (75)**	**6 (25)**	**24**

Table 8: Reasons of defaulting given by defaulters (multiple response).

Reason of defaulting	No. of defaulters (%)
Drug toxicity	13 (31.7)
Started private Treatment	10 (24.4)
Early symptom Relief	6 (14.6)
Temporary Illness	5 (12.2)
Migration	2 (4.9)
Social Problem	2 (4.9)
Religious belief	2 (4.9)
No relief from symptom	1(2.4)
Total	**41 (100)**

DISCUSSION

Age- wise distribution of defaulter patient

Out of 24 defaulter patients 18 were 25-59 year age group. Shailendra Bhatanagar et al study shows that 66.9% of patients were between 21 and 50 years.[11]

Pranob chatterjee, barati benerajee et al comparative study shows that in different institutions the age distribution pattern has shown peak levels of defaulting in age 40-49 years.[12]

Sophia Vijay et al study shows that majority of the defaulters were in the age group 35-54 years.[13]

On comparing the age distribution pattern in defaulters it is seen that the age group of 20-50 years had more chances of defaulting, because as they were younger age group the symptoms were comparatively low. They had to spend some time to go to DOTS provider's home for taking drugs. As they were earning persons they were economically independent, so more prone to default and go to private clinics (Table 1).

Sex wise distribution of defaulter patient

Default rates are found significantly higher ($p<.05$) among male TB patients than those in female TB patients in case of Pakistan, Sri Lanka as well as in overall regional total.

(SAARC-Canada Regional TB & HIV/AIDS project, SARC TB centre).[14] P.G.Gopi, V.Chandrasekaran et al study on initial defaulter shows that the default rates among males and females were 17.0% and 8.4% respectively and the difference was statistically significant ($P < 0.01$).[15]

Although biological difference do not have anything to do with defaulting with AKT. During the secondary data analysis in this study a significant difference has been observed between male and female as far as the discontinuation of treatment is concerned.

In case of this study it is seen that the male: female ratio of defaulters was three: One which is nearly comparable with the other studies. Males were more defaulting than female. Male being more ambulatory and usually the bread-earner of the family need to move for employment. Most of the outdoor activity in family and society is done by male. Such circumstances make them vulnerable to discontinue the treatment as they may not follow the schedule timely (Table 1).

Marital status

Sophia Vijay et al study shows that a higher proportion of defaulted patients was among those married in contrast to the completed group.[13] In this study it is seen that out of 24 defaulted patients 18(75%) were married and five (20.8%) were unmarried.

Educational status of defaulters

In this study it is seen that 29% defaulters were illiterate, 45.8% defaulters were educated up to primary or they were illiterate. Default rate is inversely proportional to the education. Table 3 shows that defaulters are more in primary educated and illiterate persons.

There are two patients defaulted whose educational qualification was post-graduation. High education can't exclude the possibility of defaulting. High educated peoples are high skilful worker and so they are more migrating in nature, so low tendency to remain stable at one place.

Illiterate and primary educated people have not enough knowledge about the disease and treatment and they are not in contact with the newspapers and electronic media from where they can get knowledge. Because of the lack of awareness about the disease and treatment, the low educated people are more prone to default.

Pranav chatterjee et al study shows the educational status of defaulters. For all the centres the proportion of defaulters decreased uniformly with increasing educational status, the difference being significant ($p<0.05$).[12] Pandit & S.K. Chaudhary et al study shows that almost 50% were educated up to primary and 23% were illiterate.[16]

Employment status of defaulters

Dr Pandit & S.K.Chaudhary et al study shows that Occupation wise nearly 50% of patients were labourers, few from either business or Government servants.[16]

In this study it is seen that 14 defaulters out of 24 are labours and farmers & two are govt. servant.

Defaulter according to time after starting the treatment

Chatterjee et al study shows that defaulting was found to start at the 3rd month, rise up to 4th month and then decline subsequently. The pattern was similar in all the institutions.[12]

Similar findings have been reported by Chatterjee P, Sen Gupta G, wherein a modified life table analysis of defaulters showed default starting from the 3rd month, continuing up to the 7th month and then levelling off.[17]

In this study it is seen that out of 24 TB patients 18 (75%) patients were defaulted in 3rd and 4th month. As during Intensive Phase the recovery is fast, patients feel well and prone to default. After five months and more of starting of treatment the defaulter rate is decreased (Table-5).

Alcohol consumption

Alcoholic patients do not go regularly to the DOTS centre for taking drugs, because of the lack of orientation after taking alcohol and sometimes due to social stigma to go to DOTS centre. AKT drugs are hepato-toxic in nature, the side effects like vomiting and others are common which lead to stoppage of treatment. Alcoholism has been identified as an important predictor of non-compliance in different parts of the world viz., New York City, England, Ireland, Denmark and Chile.[18,19]

Alcoholics were significantly more among the defaulted (Cat I-56.7%; Cat II-68.7%) compared to the completed group (Cat I-13.2%; Cat II-29.2%).[20] In K. Jaggarajamma et al study of reasons for default; one of the reasons given by the patients was: consumption of

alcohol 21 (15%), According to DOT providers one of the reasons was alcohol consumption 28 (21%).[21]

In this study it is seen that out of 24 defaulter patients nine patients were alcoholics. As more number of TB patients is labours and alcohol addiction is more common in labours, it is one of the major reasons for more defaulter rate.

Drug Toxicity & drug related problems

Dr Pandit et al study observed that majority of patients on DOT stopped treatment because of toxicity of drugs. Toxic effects of drug accounted for 5.8% of defaults.[16] Khanna et al (1977)[22] also reported nearly similar percentage attributable to toxicity of drugs. The toxic manifestations ranged from the feeling of heat to severe skin rashes in some cases. K. jaggarajamma et al study on reasons for non-compliance: one of the reasons given by patients was drug related problems like nausea, vomiting, giddiness 59 (42%).[21]

In this study as per opinion of the defaulted patients out of 24 cases 13 defaulted patients told that they stopped treatment because of toxicity of drugs. Out of 13 observations of drug toxicity five patients had vomiting; five patients had gastritis; two patients had vertigo and one patient had boil at injection site. There were no severe reactions given by the patients, it could be managed at local or PHC level easily.

As the AKT drugs are hepato-toxic nausea, vomiting and gastritis is seen in the initial period of treatment. More numbers of tablets to take at a single time make the patients more irritable. In cat-2, patients have to take Streptomycin injection deep intra-muscularly on thin buttocks on alternate day. The patients feels more stress and prone for defaulting. Vertigo is seen with mal-nourished patients with empty stomach.

Improvement in symptoms

K. Jaggarajamma et al study found 20% of the patients defaulted because of relief from symptoms.[21] V.K. Srivastav et al study shows that relief of symptoms was responsible for 9.0% of total defaults.[23]

In this study it is seen that out of 24 defaulted patients six (25%) patients defaulted because of early symptom relief. Initial defaulter is one of the major problems to tackle with. The reason given by the patients was their symptom was mild and it recovered early and now there was no need for treatment.

Treatment from private sector

K. Jaggarajamma et al study shows that one of the reasons of defaulting was treatment from other private or public health facility 19 (13%).[21] In this study it is seen that out of 24 defaulted patients ten patients gave reason for defaulting was started private treatment. As DOTS is not given at home, patient had to go to DOTS provider's home. Treatment in private is more flexible than the DOTS supplied by RNTCP. The faith in govt. service is still less in general public. They do not want to disclose their identity as a tuberculosis patient, because of social stigma attached to it.

Migration

K. Jaggarajamma et al study shows that migration was one of the reasons for default among 25 (24%) of patients. Since migration, whether temporary or permanent, contributes to nearly one fourth of default.[24] K. Jaggarajamma et al study shows, DOT providers told the problem of migration was in 41 patients (31%).[21]

In this study the migration was seen in two defaulted patients out of 24 defaulters. Both the patients were migrated in search of work.

Many patients on DOTS are labourer and farmers. As they earn daily wages the place for work is not fixed, they have to move to different places in search of work to earn. Even the migration problem is seen with govt. employees and the students who have to shift to other places for transfer and further study.

No improvement in symptoms

In this study it is seen that 1 defaulted patient out of 24 defaulters had no improvement after two months of anti-tuberculosis treatment. It would be due to the multi-drug resistant tuberculosis. The prevalence of multi-drug resistant tuberculosis is 1% to 3% and the prevalence of XDR-TB is 9.9% among MDR-TB. If the patient was of MDR-TB or XDR-TB, the treatment can't cure or stop the progress of the disease, so there are chances to deteriorate the condition of the patient even with regular treatment.

Summary and conclusion

The failure to take prescribed medication is a universal perplexing phenomenon. It is invariably true for a chronic disease like TB. TB, as it is a communicable disease requiring prolonged treatment, poor adherence to a prescribed treatment increases the risk of morbidity,

mortality and spread of disease in the community thus increasing the prevalence and incidence of the disease in the community. The similar conditions prevail in the Gandhinagar district and also in the state of Gujarat as a whole.

TB affects all the age groups but there is difference in the rate of defaulter according to the age. In our study the age group of 35-44 years had defaulted more paving a way to get further insight into the reasons for the same. While considering sex as a variable our study results conclude that males default more than the females and the reasons could be many as discussed earlier. A higher proportion of defaulting was seen in married in contrast to the completed group.

Education obviously plays a vital role when related to defaulter rate. Our study results also showed that default rate is inversely proportional to the education. The defaulters were more in primary educated and illiterate persons. Education brings about increase in the knowledge about the disease and awareness regarding the consequences on discontinuing the treatment which in turn reflects on the defaulter rate.

Occupation as such although not directly, has a role in the defaulting. In our study the labourers and farmers were more defaulting. The probable reason could be the uncertainty of the place of work and also long duration of work. Alcoholics were significantly more among the defaulted compared to the treatment completed group. Alcohol is hepato-toxic and the anti-TB drugs are also hepato-toxic, the liver damage lead to increase the other symptoms like nausea and vomiting, which leads to discontinue the treatment. Other than the physical there is also a major influence of alcohol on the behaviour of the patients. The alcoholics prioritize the consumption of alcohol first compared to rest of the things in life and it is true for TB treatment also.

Most of the patients when analysed defaulted during the initial period of three months of starting the treatment. After three months the defaulter rate was much lower. Drug toxicity and drug related problems were the major factor identified for these findings in this study. The problems were nausea, vomiting, boil at injection site and vertigo. 10%-20% patients were defaulted because they got relief from symptoms. It is one of the major factors for defaulting in early phase. So we can conclude that when we are looking to decrease the defaulting we should consider the side effects of the drugs and be aware that the initial months of treatment is crucial. The counselling has a key role in achieving this objective.

As the labourers and farmers are more migrating in search of work and money, the migration was account for one fourth of the defaulters. The transient nature of their work and the long duration of TB treatment make it difficult for seasonal migrant workers to balance their economic needs with their health needs.

Due to the increase prevalence of MDR-TB and XDR-TB and some other reasons, sometimes no improvement is seen in TB patients even after taking regular treatment and patient get defaulted.

Recommendation

- From the study drug toxicity is the most common reason for defaulting, so counselling should be done for drug toxicity.
- As nausea and vomiting are most common side effects antacids should be given during initial period.
- As even missing a single dose can lead to missing subsequent doses, so retrieval action should be taken as early as possible.
- Many patients are defaulting because of lack of motivation and family support, so counselling of the family members should be done.
- If there are any difficulties with the DOTS provider's place and timing then any family member can be designated as DOTS provider.
- If patient is alcoholic then counselling should be done to stop drinking alcohol.
- To decrease the defaulting because of migration, the patient's house should be visited before start of treatment. Home-visit at the time of starting the treatment by MO, FHW & DOTS provider with the patient wise box (PWB) increases the faith in system and treatment.
- Patient has to come on fixed day to take his treatment, but if he does not come in time then the DOTS provider can call the patient on his mobile no, because nowadays almost everyone has mobile phones. So the patient can be remembered of his treatment and if the patient refuses retrieval action in form of home visit can be done on the same day by FHW or MPHW.
- Before initiating the treatment for TB, patient can be shown a video having the details of the disease, its complication, treatment and side effects. Patient feels the personal attention given to him. These make patient sensitive to take regular treatment.

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REFERENCES

1. TB India (2004). RNTCP status report, RNTCP, Central TB Division. New Delhi: Ministry of Health and Family Welfare, Government of India; 2004.
2. Fox W, Gordon A, Mitchison D. Studies on the treatment of tuberculosis undertaken by the British Medical Research Council Tuberculosis Units, 1946-1986, with relevant publications. Int J Tuberc Lung Dis., 1999; 3: S231-S270.
3. World Health Organization. Global Tuberculosis Control: surveillance, planning, financing. World Health Organization, Geneva 2002 (WHO/CDS/ TB/ 2002.225).
4. Fox W. The problem of self- administration of drugs: with particular reference to pulmonary tuberculosis. Tubercle., 1958; 39: 269-274.
5. Addington W. Patient compliance: The most serious remaining problem in the control of tuberculosis in the United States. Chest., 1979; 76: 741-743.
6. People on health, Annual Report, Government of India, Ministry of Health and Family Welfare, New Delhi, India, 2010.
7. Central Tuberculosis Division Tuberculosis India: Annual Report of the Revised National Tuberculosis Control Programme. Directorate General of Health Services, Ministry of Health and Family Welfare. Government of India Publications through Central TB Division-accessible from location: Government of India. 2011. [Last accessed on 2011]. Available from: http://www.tbcindia.nic.in/.
8. TB India (2006). RNTCP status report, RNTCP, Central TB Division. New Delhi: Ministry of Health and Family Welfare, Government of India; 2006.
9. Park K. Park′s Textbook of Preventive and Social Medicine. 18 th ed. Jabalpur: Banarsidas Bhanot Publishers; 2005; 146-61.
10. Aggarwal SS, Aggarwal NS, Nagar SS, Makadia BK. Assessment of one year of RNTCP. Indian J Community Med., 2004; XXIX: 164-5.
11. Shailendra bhatanagar et al. Distribution pattern of TB patients attending District
12. Tuberculosis Centre Bijnor, UP (NTI bulletin., 2000; 36(1-2): 11-12.

13. Pranab Chatterjee et al. A comparative evaluation of factors for defaulting in treatment in Tuberculosis in the state of West Bengal, Jharkhand and Arunachal Pradesh, Ind. J. Tub., 2003; 50: 157.
14. 13. Sophia Vijay, Balasangameshwara .V.H, Jagannatha. P.S, Saroja V.N and Kumar P; Defaults among tuberculosis patients treated under DOTs in Bangalore city: A search for solution. Ind. J. Tub, 2003; 50: 185-195.
15. SAARC-Canada regional TB & HIV/AIDS project report, SAARC TB centre; 2004.
16. P.G.Gopi, V.Chandrasekaran et al. Failure to initiate treatment for tuberculosis patients diagnosed in a community survey and at health facilities under a DOTS programme in a district of South india. (Indian J Tuberc., 2005; 52: 153-156.).
17. Pandit N, Chaudhary SK. A study of treatment compliance in directly observed therapy for tuberculosis. Ind J Community Medicine., 2006; 31: 241.
18. Chatterjee, P., Sengupta, G., Assessment of defaulter problem in treatment of tuberculosis using modified life table. Paper presented at the National Conference on Tuberculosis and Chest diseases, Ahmedabad., 1997.
19. Comolet TM, Rakotomalala R, Rajaonarioa H.; Factors determining compliance with tuberculosis treatment in an urban environment, Tamatave, Madagaskar (Int J Tuberc Lung Dis., Nov 1998; 2(11): 891-7.).
20. SJ O'Boyle, JJ Power, MY Imbrahim. Factors affecting patient compliance with anti-tuberculosis chemotherapy using the directly observed treatment, Short Course Strategy (DOTS). *Int J Tuberc Lung Dis.*, 2000; 6(4): 307-312.
21. Brudney, K., Dobkin, J.; Resurgent tuberculosis in New York City: human immunodeficiency virus, homelessness, and the decline of tuberculosis control programme; Am Rev Respir Dis., 1991; 144: 745–749.
22. K. Jaggarajamma et al study on reasons for non-compliance among patients treated under RNTCP, Tiruvallur District, South India. (Indian J tuberculosis., 2007; 54: 130-135.).
23. Khanna, B.K., Srivastava, A.K. and Ali, M.: Drug default in tuberculosis; Ind. J. Tub., 1977; 24: 121.
24. Srivastava, V.K., Chandra, R., Jain, P.C. and Bhatnagar, J.K. A study of drug default in patients attending tuberculosis clinics in rural area; lnd.J. Tub., 1981; 28: 26.
25. K. Jaggarajamma, M. Muniyandi, V. Chandrasekaran, Sudha G. A Thomas, P.G Gopi and T. Santha. Is migration a factor leading to default under RNTCP; [Indian J Tuberc., 2006; 53: 33-36.].