Original Research Article

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A socio-demographic study of the "loss to follow-up in TB cases under DOTS" in and around tertiary teaching care hospital

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ABSTRACT

Background: India had 2.6 million cases of Tuberculosis as per the latest count and ranks 14th among 22 high TB burden countries globally. Loss to follow-up is a TB patient who did not start treatment or whose treatment was interrupted for 2 consecutive months or more. Knowing the demographic profile and reasons for non-adherence to treatment among the loss to follow up TB cases helps in prevention of infection source, development of resistant strains and also helps in reducing relapse rate and mortality, which helps in achieving the end TB strategy.

Methods: The aim of this study was to know the socio-demographic profile of "loss to follow up in TB cases under DOTS" in and around tertiary teaching care hospital. A retrospective analytical study was done after getting a sample size i.e.79 cases from the register obtained from Tuberculosis unit, Government Hospital, Nandyal.

Results: Out of 79 cases, 45 (57%) belonged to upper lower class (IV), 15 (19%) belonged to lower class (V), 14 (17.7%) belonged to lower middle class (III), 5 (6.3%) belonged to upper middle class, according to modified Kuppuswamy classification.

Conclusions: The study showed that most of the patients belonged to upper lower class and there was significant association between (a) socio-economic status and symptoms appeared, (b) socio-economic status and investigations done, (c) socio-economic status and the person who diagnosed first, (d)socio-economic status and under whose supervision treatment was taken.

Keywords: Tuberculosis, Upper lower class, Non-Adherence, Lost to follow-up, Directly observed treatment short course

INTRODUCTION

As per WHO data India has 24 per cent of world's TB cases compared to the South-East Asian countries that account for 60 per cent of total cases worldwide. Inspite of TB being discovered more than 100 years ago and implementation of RNTCP in 1962, still there are loss to follow up cases of TB. There are many reasons for this, one of them being lack of education, low socio-economic status that results in less patient compliance. This made

me to take up this study to know the demographic profile of loss to follow up cases.

India is the country with the highest burden of TB.¹ On the basis of prevalence rate, India ranks 14th among 22 high TB burden countries globally.³ One-fourth of the global incident TB cases occur in India annually. As per WHO Global TB Report, 2015, out of the estimated global annual incidence of 9.6 million TB cases, 2.2 million were estimated to have occurred in India. We have achieved the TB Millennium Development Goals

and STOP TB target of 50 per cent reduction in TB prevalence and mortality due to TB.

"Lost to follow-up" is a TB patient who did not start treatment or whose treatment was interrupted for 2 consecutive months or more (previously known as default cases).² In the year 2014, new smear positive default cases were 5% and new smear negative cases were 6%.¹ Mere notification and taking of medication in the presence of DOTS provider are not sufficient to tackle the problem of lost to follow up TB cases. Knowing the reasons for non-adherence to treatment among the lost to follow up TB cases helps in prevention of infection source, development of resistant strains and also helps in reducing relapse rate and mortality, which helps in achieving the End TB strategy.

2016 Theme: "Unite to End TB" was adopted on the lines of 2030 Sustainable Development Goals (SDGs) by the United Nations. The goal 3 (good health & well-being) of the SDG aspires to ensure well-being and health for all. It also includes a bold commitment to end the epidemics of AIDS, malaria, tuberculosis and other communicable diseases by 2030.⁴

From 2016, the goal is to end the global TB epidemic by implementing the End TB Strategy. Adopted by the World Health Assembly in May 2014 and with targets linked to the newly adopted SDGs, the strategy serves as a blue print for countries to reduce the number of TB deaths by 90% by2030 (compared with 2015 levels), cut new cases by 80% and ensure that no family is burdened with catastrophic costs due to TB.

METHODS

The present study is a retrospective analytical study, from January 1, 2017–May 31, 2017. A total 79 cases are included after obtaining data from the register (i.e. the information regarding loss to follow-up cases) from Tuberculosis office, Government General Hospital, Nandyal.

After taking the address of the patients from the register, cases were interviewed at their residence with the help of pre-tested semi-structured questionnaire. Consent was taken from the patients before filling the questionnaire, after defining the purpose of the study.

Inclusion criteria

The patients residing in and around Nandyal, registered in Tuberculosis office, Government General Hospital, Nandyal, belonging to age of above 30 years were included in the study.

Exclusion criteria

The patients who were of age below 30 years and who were not found at their residence after 3 minimum visits

to their address, and patients who were not willing to participate in the study were excluded from the study.

Statistical analysis

Statistical analysis was done using Predictive Analytics Software (SPSS 24 version).

RESULTS

A total of 79 cases were included in the study. Loss to follow up in TB cases was more among the age group of 31-50 years. The study showed a male preponderance i.e males were 75.9% and females were 24.1%. The cases are more among illiterates (39.2%). Nearly 57% of loss to follow up cases belongs to upper lower class according to modified Kuppuswamy scale of classification (Table 1).

Table 1: Socio-demographic profile of loss to follow up TB cases.

Age (yrs)	Number (%)
<30	16 (20.3%)
31-40	17 (21.5%)
41- 50	16 (20.3%)
51- 60	20 (25.3%)
>61	10 (12.6%)
Sex	
Male	60 (75.9%)
Female	19 (24.1%)
Education	
Illiterate	31 (39.2%)
Primary school	9 (11.4%)
Middle school	11 (13.9%)
High school	19 (24.1%)
Intermediate	5 (6.3%)
Graduate post graduate	4 (5.1%)
Socio-economic class	
(Modified Kuppuswamy classification)	
Upper middle (II)	5 (6.3%)
Lower middle (III)	14 (17.7%)
Upper lower (IV)	45 (57%)
Lower (V)	15 (19%)
Total	79 (100%)

Most of them were illiterates and were diagnosed first at government general hospital (Table 2).

Our findings revealed that majority of cases were diagnosed by all types of investigations, (i.e. sputum, chest x ray and only clinical examination) (Table 3).

Most of the cases (58.2%), irrespective of the occupation have undergone all types of investigations (sputum, chest x ray and clinical examination) (Table 4).

All the pointing symptoms were noted in most of the cases irrespective of their socio-economic status (86.7%) (Table 5).

Irrespective of socio-economic status, 58.2% of the cases have undergone all types of investigations (Table 6).

Majority of the cases belonging to upper lower socioeconomic status, diagnosis was first done by G.P (MBBS), i.e. 25 (55.6%), followed by others (Table 7).

The DOTS provider was the main health personnel to supervise most of the cases i.e. 64 (81%) cases (Table 8).

Table 2: Education (modified Kuppuswamy classification) vs. place where diagnosis was first done.

Education	РНС	District Hospital	Govt general hospital	Santiram general hospital	Private clinical hospital	Total
Illiterate	1 (3.2%)	0 (0%)	17 (54.8%)	10 (32.3%)	3 (9.7%)	31 (100%)
Primary school	0 (0%)	1 (11.1%)	6 (66.7%)	0 (0%)	2 (22.2%)	9 (100%)
Middle school	0 (0%)	0 (0%)	7 (63.6%)	1 (9.1%)	3 (27.3%)	11 (100%)
High school	1 (5.3%)	0 (0%)	16 (84.2%)	0(0%)	2 (10.5%)	19 (100%)
Intermediate	0 (0%)	0 (0%)	3 (60%)	1 (20%)	1 (20%)	5 (100%)
Graduate and post graduate	0 (0%)	0 (0%)	1 (25%)	0 (0%)	3 (75%)	4 (100%)
Total	2 (2.5%)	1 (1.3%)	50 (63.3%)	12 (15.2%)	14 (17.7%)	79 (100%)

Chi –square (X²)=32.6, df=20, p=0.037

Table 3: Education (modified Kuppuswamy classification) vs. investigation done.

Education	Sputum (%)	Chest X-ray (%)	Only clinical exam (%)	All (%)	Total (%)
Illiterate	10 (32.3)	0 (0)	1 (3.2)	20 (64.5)	31 (100)
Primary school	3 (33.3)	0 (0)	0 (0)	6 (66.7)	9 (100)
Middle school	4 (36.4)	0 (0)	0 (0)	7 (63.6)	11 (100)
High school	10 (52.6)	0 (0)	0 (0)	9 (47.4)	19 (100)
Intermediate	1 (20)	0 (0)	0 (0)	4 (80)	5 (100)
Graduate and post graduate	3 (75)	1 (25)	0 (0)	0 (0)	4 (100)
Total	31 (39.2)	1 (1.3)	1 (1.3)	46 (58.2)	79 (100)

Chi –square (X^2) :26.92, df=15, p=0.029.

Table 4: Occupation vs. investigations done.

Occupation	Sputum	Chest X-ray	Clinical examination	All	Total
Unemployed	3 (27.3)	0 (0)	0 (0)	8 (72.7)	11 (100)
Unskilled	9 (29)	0 (0)	1 (3.2)	21 (67.7)	31 (100)
Semi-skilled	7 (70)	0 (0)	0 (0)	3 (30)	10 (100)
Skilled	11 (64.7)	0 (0)	0 (0)	6 (35.3)	17 (100)
Clerical, shop-owner, farmer	0 (0)	0 (0)	0 (0)	8 (100)	8 (100)
Semi-profession	1 (100)	0 (0)	0 (0)	0 (0)	1 (100)
Profession	0 (0)	1 (100)	0 (0)	0 (0)	1 (100)
Total	31 (39.2)	1 (1.3)	1 (1.3)	46 (58.2)	79 (100)

Chi –square (X^2) =97.8, df=18, p=0.000.

Table 5: Socio-economic status vs. symptoms 1st appeared.

Socio-economic status	More than 2 weeks cough (%)	Weight loss (%)	Fever (%)	All (%)	Total (%)
Upper middle	3 (60)	0 (0)	0 (0)	2 (40)	5 (100)
Lower middle	0 (0)	0 (0)	0 (0)	14 (100)	14 (100)
Upper lower	2 (4.4)	3 (6.7)	1 (2.2)	39 (86.7)	45 (100)
Lower	3 (20)	0 (0)	0 (0)	12 (80)	15 (100)
Total	8 (10)	3 (3.8)	1 (1.3)	67 (84.8)	79 (100)

Chi –square $(X^2)=21.224$, df =9, p=0.012.

Table 6: Socio-economic status vs. investigation done.

Socio-economic status	Sputum (%)	Chest X-ray (%)	Clinical examination (%)	All (%)	Total (%)
Upper middle	1 (20)	1 (20)	0 (0)	3 (60)	5 (100)
Lower middle	7 (50)	0 (0)	0 (0)	7 (50)	14 (100)
Upper lower	18 (40)	0 (0)	0 (0)	27 (60)	45 (100)
Lower	5 (33.3)	0 (0)	1 (6.7)	9 (60)	15 (100)
Total	31 (39.2)	1 (1.3)	1 (1.3)	46 (58.2)	79 (100)

Chi –square $(X^2)=20.289$, df =9, p=0.016

Table 7: Socio-economic status vs. who diagnosed first.

Socio-economic status	Dots provider (%)	G. P (MBBS) (%)	Chest physician (%)	Total (%)
Upper middle	4 (80)	1 (20)	0 (0)	5 (100)
Lower middle	2 (14.3)	12 (85.7)	0 (0)	14 (100)
Upper lower	7 (15.6)	25 (55.6)	13 (28.9)	45 (100)
Lower	3 (20)	6 (40)	6 (40)	15 (100)
Total	16 (20.3)	44 (55.7)	19 (24.1)	79 (100)

Chi –square (X^2)= 20.216, df=6, p=0.003

Table 8: Socio-economic status vs. supervision.

Socio-economic status	Dots provider (%)	G.P(MBBS) (%)	Physician (%)	Chest physician (%)	RMP (%)	Health worker (%)	Total (%)
Upper middle	5 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	5 (100)
Lower middle	14 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	14 (100)
Upper lower	38 (84.4)	3 (6.7)	0 (0)	2 (4.4)	1 (2.2)	1 (2.2)	45 (100)
Lower	7 (46.7)	1 (6.7)	2 (13.3)	2 (13.3)	0 (0)	3 (20)	15 (100)
Total	64 (81)	4 (5.1)	2 (2.5)	4 (5.1)	1 (1.3)	4 (5.1)	79 (100)

Chi –square $(X^2)=24.962$, df=15, p=0.050

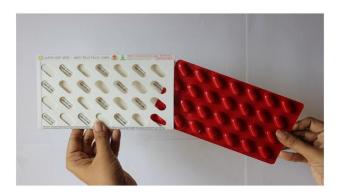


Figure 1: DOTS 99: Each time a patient takes a dose of medication, a hidden number is revealed which is unpredictable to the patient.

DISCUSSION

Loss to follow up in TB cases was more among the age group of 31-50 years. In Kumar study "Default proportion was higher in the age group of 25-54 years and in Bhatt study more cases were among 16-45 years. ^{5,6} In a study by Putera, most of the cases were of age 15–34 years (53.3) and 35–54 years (42.2) (Table 1).⁷



Figure 2: The revealed number completes a phone number where the first part of the number is printed on the front side of the envelope. The patient then makes a free call to the completed phone number.

Study showed a male preponderance i.e. males were 75.9% and females were 24.1%. In Mandal et al study, 70.45% were males. In Shringarpure study, 71.9% of loss to follow up cases were males (Table 1).

Illiterates were 39.2%, this shows that improving education helps in better counseling of the patient and patient compliance. In Gajbhare study, having better

education showed good treatment outcome. ¹⁰ In Sadana study showed according to literacy status, favourable outcome was maximum i.e. 92.1% in those who were above matric and 89.3% among those who were matric and below matric. ¹¹ While unfavourable outcome was 22.6% among the illiterate group. The result was found to be highly significant (p=0.03) (Table 1).



Figure 3: A large array of phone numbers will be maintained which are packaged in an unpredictable way to the patients and the only way for a patient to call the correct number is to dispense the pills. Incentives and additional counselling can be provided for those patients with low adherence.



Figure 4: Showing adherence pattern of the patients.

Nearly 57% of loss to follow up cases belongs to upper lower class according to modified Kuppuswamy scale of classification. In a study by Heemanshu, univariate analysis revealed the significant association of default with occupation, smoking, alcohol consumption, marital status and socio-economic status. ¹² A recent systematic review and meta-analysis by Tupasi demonstrated that provision of patient education which helps in improving socio-economic status was a strategy associated with lower rates of loss to follow-up. ¹³ In a study by Elmuttalut, multiple factors influenced non-compliance with TB treatment including inadequate knowledge about TB, low socioeconomic status, particularly education level and income (Table 1). ¹⁴

New findings in the study

Treatment default risk was 35% higher for patients with lower education level. 15 New finding in this study was

presence of a significant association (p=0.037) between education and place where the diagnosis was first done, majority of them were illiterates and majority of them were diagnosed first at government general hospital (Table 2).

There was a significant association (p=0.029), between education and type of investigation done. Majority of cases (illiterates followed by others) were diagnosed by all types of investigations (rather than a single investigation), followed by Sputum investigation. Less number of cases were diagnosed by chest X ray & clinical examination (Table 3).

There was a significant association (p=0.000), between occupation and type of investigation done. Most of them belong to unskilled occupation, and irrespective of the occupation all of them i.e. 46 (58.2%) cases had undergone all types of investigations (sputum, chest X-ray and clinical examination) (Table 4).

There was a significant association (p=0.012), between socio-economic status and symptoms first appeared. Most of the cases belonging to upper lower socio-economic status have presented with all symptoms i.e. 39 (86.7%) cases (Table 5).

There was a significant association (p=0.016) between socio-economic status and investigations done. Most of the cases had undergone all types of investigations i.e.46 (58.2%), followed by sputum examination as the second most common investigation done in 31 (89.2%) cases (Table 6).

There was a significant association (p=0.003) between socio-economic status and who diagnosed first of loss to follow up in TB cases. In the cases belonging to upper lower socio-economic status, diagnosis was first done by G.P (MBBS), i.e. 25 (55.6%). Among DOTS provider, G.P (MBBS), Chest Physician it was G.P (MBBS), who played a major role in diagnosing 44 (55.7%) cases, followed by Chest Physician diagnosing 19 (24.1%) cases and DOTS provider i.e. 16 (20.3%) cases (Table 7).

There was a significant association (p=0.050) between socio-economic status and under whose supervision the treatment was taken. Among the different health personnel who had done supervision of the treatment, DOTS provider was the main health personnel to supervise 64 (81%) cases, followed by G.P. (MBBS) supervised 4 (5.1%) cases, chest physician supervised 4 (5.1%) cases, health worker supervised 4 (5.1%) cases and RMP supervised 1 (1.3%) cases (Table 8).

CONCLUSION

The study showed more number of loss to follow up cases among 31-50 yrs age group. Males were more when compared to females. Lower educational level i.e. illiterates were more among loss to follow up cases which

showed improving literacy would help in reducing the loss to follow up cases. Lower socio-economic status was associated with more number of loss to follow up cases. Illiterates were mainly diagnosed primarily at Government General Hospital. In most of the cases, the diagnosis was done based on all types of investigation (sputum, chest x ray, clinical examination). The cases belonging to upper lower socio-economic status presented with all symptoms. In most of the cases, the diagnosis was first done by G.P. (MBBS). DOTS provider was the main person who had played major role in supervising the treatment among all the health personnel.

Limitations

Some cases couldn't be studied because of death, migration.

Recommendations

- Improving the literacy which helps in better compliance of the patient during the course of treatment.
- 2) Improving the socio-economic status which helps in reducing the number of loss to follow up cases.
- 3) Providing health education, counseling and follow up of loss to follow up in TB cases.
- 4) Strict monitoring of treatment for Loss to follow up cases and also initiating any programme for tracing these cases if necessary.
- 5) Strict implementation of DOTS 99 (Figures 1-4).

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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