

# A study on reasons for nonadherence to 99DOTS among HIV-tuberculosis coinfecting patients in Davanagere district, Karnataka

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## ABSTRACT

**Background:** Ensuring the patient's adherence is the critical challenge in tuberculosis (TB) treatment. To monitor the adherence to anti-TB drugs in HIV-TB coinfecting patients, 99 directly observed treatment short (99DOTS) course has been introduced. **Objectives:** The objectives of the study were to know the reasons for nonadherence to 99DOTS among HIV-TB coinfecting patients. **Materials and Methods:** A community-based cross-sectional study was conducted among 85 HIV-TB coinfecting patients on 99DOTS in Davanagere district. A pretested semi-structured questionnaire was used to collect the data from October to December 2016. Data were analyzed using SPSS software v16.0. Descriptive statistics such as frequency and percentage were calculated. **Results:** Of 85 study subjects, 81 (95%) of them were found to be nonadherent. Multiple factors were reasons for nonadherence, i.e. did not take TB medication (53%), not aware that they should call daily (35%), do not know how to use mobile phone (30%), network problem and mobile issues (20%), and used to call from any of the unregistered phone numbers (17%). Forgot to call after taking medication (6%) and registered phone number was of neighbors/relatives (5%). Reasons for not taking the medications were forgot to take medications (26%), discontinued because of too many pills (11%), avoid the side effects (9%), improvement in health (7%), alcohol intake (6%), due to other illness (6%), and stigma at home (3%). **Conclusions:** HIV-TB coinfecting patients on 99DOTS were found to be nonadherent because of multiple reasons. Orientation regarding the importance of adherence to drugs and calling daily after medication only from a registered number is required before initiation of treatment.


**KEY WORDS:** Nonadherence; 99Directly Observed Treatment Short, Tuberculosis; HIV-tuberculosis Coinfection

## INTRODUCTION

The World Health Organization has estimated that about 10.4 billion people suffer from tuberculosis (TB) and among them, 1.4 million people die of TB each year.<sup>[1]</sup> About 1.2 million, i.e. 11% of new TB cases are associated with HIV and among which 0.4 million people die worldwide. India

accounts for approximately 14% of the world's TB burden, with an incidence of 167 per 100,000 persons, 5% of these TB patients are the people living with HIV.<sup>[2]</sup>

Patient's adherence to TB treatment is a critical challenge. In India, high treatment success in the public sector is mainly associated with the directly observed treatment short course (DOTS) course strategy.<sup>[3-5]</sup> An important challenge faced by the patient and the provider under DOTS treatment is frequent traveling throughout the course of treatment. Tracking the patients who have missed the dose and responding to it accurately and in a timely way will be another challenge for program managers. Risk of mortality and spread of disease are the consequences of poor treatment.<sup>[6]</sup> As the duration of treatment is for a longer duration, motivation for the patients

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is required all throughout the treatment course to improve the medication adherence.

Many countries have started the use of telecommunication in the health sector, especially in mobile communication. In India, mobile communication is revolutionizing social and economic life.<sup>[7]</sup> In the World, Indians are the second largest mobile users.<sup>[8]</sup> Since the mobile phones are available at low-cost and with affordable airtime rates, it can be used as one of the modes for monitoring and improving the healthcare facilities.<sup>[9]</sup>

99DOTS was thus introduced to monitor the adherence to anti-TB drugs, which is a low-cost approach to monitor and improve the adherence to TB medications. In this technique, a custom envelope with hidden phone numbers will be used to wrap the anti-TB blister. Those phone numbers will be visible only after dispensing the doses. Patients have to make a free call to that hidden phone number daily after taking the medication, which yields the high confidence that the dose was “in-hand” and has been taken. Hence, this becomes an easy way to monitor the adherence, which is of no cost to the patients or the providers.<sup>[10]</sup> There are limited studies regarding the reasons for the non-adherence to anti-TB medications. Hence, this study was undertaken to know the extent of adherence to 99DOTS and the reasons for the non-adherence to anti-TB medications among HIV-TB coinfecting patients.

## MATERIALS AND METHODS

A community-based cross-sectional study was conducted in Davanagere district of Karnataka among the HIV-TB coinfecting patients on 99DOTS treatment.

All HIV-TB coinfecting patients (pulmonary and extrapulmonary TB) more than 18 years of age on 99DOTS with a minimum duration of 1 month were included as study participants. Patients who cannot be traced or who were not present at the time of visit to their home and patients who are non-cooperative and unwilling to participate in the study were excluded.

Data collection procedure was for 3 months from October 2016 to December 2016. There were 105 HIV-TB coinfecting patients on 99DOTS in Davanagere district. Considering inclusion and exclusion criteria, 85 patients were interviewed. Universal sampling technique was followed. Patients were interviewed face to face using a pretested semi-structured questionnaire, which included the questions regarding sociodemographic details, reasons for nonadherence to 99DOTS and reasons for nonadherence to TB medications.

### Operational Definition

In this study nonadherence to 99DOTS is considered if patient miss to call for more than 5 days in past 1 month.

Ethical clearance was obtained from the Institutional Ethical Board before the start of the study. A written consent was obtained from each patient before enrollment.

Data were entered in MS Excel and analyzed using SPSS software v16.0. Descriptive statistics such as frequency and percentage were calculated.

## RESULTS

Of 85 study subjects, 4 (5%) of them were adherent to 99DOTS, were as 81 (95%) of them were found to be nonadherent [Table 1].

Among 81 nonadherent study subjects, 53 (66%) of them constituted males and 28 (34%) of them were females. More than half, i.e. 45 (56%) of the study subjects were between the age of 31–45 years with a mean age of  $36.33 \pm 2.36$  years. 79 (98%) of them were Hindus, 41 (51%) of them were the residents of urban area, among which 45 (56%) of them were literate, 61 (77%) of them were employed, and 64 (79%) of them were married. A maximum number of the study participants belonged to the middle (25%) and upper low (32%) socioeconomic class [Table 2].

Among the nonadherent study subjects 69 (85%) of them where alcoholic, 68 (84%) were newly diagnosed of TB, 43 (53%) of them were people living with HIV since 1–5 years and 24 (30%) of them did not know how to use a mobile phone [Table3].

Multiple factors were responsible for nonadherence to 99DOTS. Responses were 43 (53%) of them were nonadherent to TB medication, so they did not call to the toll free number of 99DOTS monitoring, 28 (35%) of them were not aware that they should call daily, 24 (30%) of them did not know how to use mobile phones, and 17 (20%) of them had network problem and mobile issues. 14 (17%) of them used to call from any of the unregistered phone numbers. Other reasons for not making phone calls were forgot to call after taking medication (6%) and registered phone number was of neighbors/relatives (5%) [Table 4].

Reasons for not taking the medications were 21 (26%) they forgot to take medications, 9 (11%) discontinued because of too many pills, 8 (9%) of them responded as to avoid the side effects. Other reasons for not taking the medications were an improvement in health (7%), alcohol intake (6%), due to

**Table 1:** Adherence of patients to 99DOTS

Patients on 99DOTS	No. of patients <i>n</i> =85 (%)
Adherent	4 (5)
Nonadherent	81 (95)

99DOTS: 99directly observed treatment short

**Table 2:** Sociodemographic profile of study subjects

Sociodemographic characteristics	Categories	Frequency n=81 (%)
Age (years)	≤30	6 (7)
	31–45	45 (56)
	46–60	26 (32)
	≥61	4 (5)
Gender	Male	53 (66)
	Female	28 (34)
Religion	Hindu	79 (98)
	Muslim	2 (2)
Locality	Urban	41 (51)
	Rural	40 (49)
Education	Illiterate	36 (44)
	Literate	45 (56)
Occupation	Unemployed	20 (23)
	Employed	61 (77)
Socioeconomic status (modified B G PRASAD classification 2015)	I	6 (7)
	II	6 (7)
	III	25 (31)
	IV	26 (32)
	V	18 (23)
Marital status	Married	64 (79)
	Unmarried	2 (2)
	Divorced/Widow/widower	15 (19)

**Table 3:** Distribution of nonadherent patients on basis of alcoholic status, previous TB treatment status, know to operate mobile phone and the duration of 99DOTS

Characteristics	Categories	Frequency n=81 (%)
Alcoholic	Yes	12 (15)
	No	69 (85)
Previously treated for TB	Yes	13 (16)
	No	68 (84)
Duration of HIV treatment	<1 year	26 (32)
	1–5 years	43 (53)
	>5 years	12 (15)
Know to operate mobile phone	No	24 (30)
	Yes	57 (70)

99DOTS: 99directly observed treatment short, TB: Tuberculosis

other associated illnesses (6%), and stigma at home (3%) [Table5].

## DISCUSSION

99DOTS is an approach for monitoring and improving the TB medication. Here, the patient makes a free call after taking the medication daily. It yields the high confidence that the patient has taken the drug if he makes a call to the

**Table 4:** Reasons for nonadherence to 99DOTS\* (not making phone calls)

Reasons for not making phone calls	No. of responses (%)
Did not take the drug	43 (53)
Not aware of calling daily	28 (35)
Dint knew how to use a mobile phone	24 (30)
Network problem and mobile issues	17 (20)
Used to call from unregistered number	14 (17)
Forgot to call	6 (7)
Registered number was neighbors/relatives	4 (5)

\*Multiple responses. 99DOTS: 99directly observed treatment short

**Table 5:** Reasons for nonadherence to TB medications in 99DOTS\*

Reasons for not taking medication	Number of responses (%)
Forgot to take drug	21 (26)
Too many pills	9 (11)
To avoid side effects	8 (9)
Improvement in health	6 (7)
Alcohol intake	5 (6)
Other illness	5 (6)
Stigma at home	3 (3)

\*Multiple responses. 99DOTS: 99directly observed treatment short, TB: Tuberculosis

hidden phone number. In this study, it revealed that 95% of the HIV-TB coinfecting patients were not making phone calls daily, but the adherence to the TB medication was found to be 47%, and 53% of the subjects have missed the dose and were nonadherent to the treatment. HIV-TB coinfecting patients on 99DOTS were found to be nonadherent because of lack of awareness regarding making a phone call after taking medication. Other reasons were they did not know how to use mobile phones, forgetfulness to call daily after taking medication, and had a network problem and mobile issues. Patients were also found to be nonadherent to TB medication because of forgetfulness, increased number of pills, to avoid the side effects of medications, other associated illnesses, alcohol intake, and stigma at home.

In the present study, adherence to TB medication was 47%, this finding contrasted the findings of the study conducted by Das *et al.*<sup>[11]</sup> and Bagachi *et al.*<sup>[12]</sup> which showed the medication adherence of 84%. Reasons for not making phone calls daily in 99DOTS were lack of awareness regarding making a phone call after taking medications; they did not know how to use mobile phones, forgetfulness to call daily after taking medication, network problem, and mobile issues. These findings were similar to the study findings conducted by R Elangovan and Arulchelvi.<sup>[13]</sup> Reasons for nonadherent to TB medications were forgetfulness, increased number of pills, to avoid the side effects of medications, other associated illnesses, alcohol intake, and stigma at home. These findings

were similar to the findings of the study conducted by Bagachi *et al.*<sup>[12]</sup> and Gebreweld *et al.*<sup>[14]</sup>

### Recommendation

Orientation regarding the importance of adherence to drugs and calling daily after medication only from a registered number is required before initiation of treatment. Patients and their caretakers should be trained regarding mobile phone usage. Incentives like free talk time/SMS will also increase the effectiveness and completion of treatment. Regular follow-up of nonadherent patients is also required.

### CONCLUSION

HIV-TB coinfecting patients on 99DOTS were found to be nonadherent because of multiple reasons such as lack of awareness regarding making phone call after taking medication, did not know how to use mobile phones, forgetfulness to call daily after taking medication, network problem and mobile issues, forgetfulness to take medications daily, increased number of pills, to avoid side effects, due to other illnesses, alcohol intake, and stigma at home.

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