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Original Investigation

Default in Tuberculosis Treatment among Women Registered in DOTS Center of Taplejung District, Nepal: A Descriptive Study

Surendra Kumar Chaudhary[1*], Mausam Karn[2], Sandip Nayong[3], Vijay Kumar Sah[4], Vijay Kumar Kapar[5], Rakesh Kumar Yadav[6], Ramji Yadav[7], Pramod Kumar Yadav[8]

[1]Department of Health, Bardibas Municipality Office, Bardibas, Mahottari, Nepal;
[2]Devpura Health Post, Rupetha, Dhanusha, Nepal;
[3]Urlabari Health Post, Urlabari Municipality, Office of the Municipal Executive, Morang, Nepal;
[4]Department of Internal Medicine, Janaki Medical College, Tribhuvan University, Nepal;
[5]Department of Obstetrics and Gynecology, Provincial Hospital, Madhesh Province, Janakpur, Nepal;
[6]Department of Pharmacology, IAAS, Tribhuvan University, Nepal;
[7]Department of Obstetrics and Gynecology, Chandrakala Hospital and Research Center Pvt. Ltd., Janakpur, Dhanusha, Nepal;
[8]Province Health Logistics Management Center, Ministry of Social Development, Madhesh Province, Nepal.

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***Correspondence:**
Surendra Kumar Chaudhary
Department of Health, Bardibas Municipality Office, Bardibas, Mahottari, Nepal.

E-mail:
linkwithsurendra@gmail.com

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ABSTRACT

INTRODUCTION: Default is one of the unfavourable outcomes for patients on DOTS and represents an important challenge for the control program. Therefore, this study was designed to assess default in tuberculosis (TB) treatment among women registered in DOTS center at Taplejung District of Nepal. **MATERIALS AND METHODS:** A descriptive cross-sectional study was conducted at Taplejung district of Nepal in the the year 2016. Records of TB patients from all DOTS centre for one year were obtained and treatment default cases for women were identified. Face to face interview was conducted by using semi-structured questionnaire to collect data from the patients. The data were entered and analyzed in MS Excel software. **RESULTS:** Out of total 30 female TB patients, 72.0% of respondents belonged to the age group of 15-49 years where as 73.3% of the respondents were Kirat and from Dalit caste ethnicity. Less than half of the respondents (48.0%) thought, feeling better after medication, was the reason for default TB. A second major cause for default in tuberculosis treatment was distance to reach DOTS center (12.0%) and lack of food at home (10.0%). Likewise, few respondents said lack of family support (6.7%), thinking about side effects (6.7%), medicine not working (3.3%) and stigma (6.7%) were the reasons for the default in tuberculosis treatment. **CONCLUSIONS:** Majority of the respondents left treatment because they felt better after medication. A second major reason for default in TB treatment was distance to reach DOTS center. The findings may be helpful in planning modifications in DOTS program of Nepal.

Keywords: Default, DOTS, Taplejung, tuberculosis, women.

INTRODUCTION

Tuberculosis (TB) is a chronic infectious disease caused by the bacterium Mycobacterium tuberculosis, which is one of the most virulent bacteria. M. tuberculosis can infect any part of the body, but lungs are the most common site of infection [1]. Tuberculosis of the brain, kidneys, lymph nodes, and spine is not infectious, but it is infectious in the lungs and/or throat. The bacterium that causes tuberculosis is spread through the air as droplet nuclei released from the lungs of people who have pulmonary or laryngeal TB [2]. Because a large number of risk factors predispose to TB transmission, transmission dynamics vary greatly across geographic regions. TB is classified into three types based on the location of infection and the host's response: pulmonary tuberculosis (PTB), extra-pulmonary tuberculosis, and disseminated tuberculosis [3].

Nepal is a developing country with poor socioeconomic conditions of majority of the population [4]. Poor socioeconomic conditions have

an impact on health and demonstrate the prevalence of infectious diseases, such as tuberculosis [5]. People in Nepal with lower socioeconomic status are more likely to develop tuberculosis, but diagnostic barriers may exacerbate the problem [6]. As a result, the rate of tuberculosis is rapidly increasing across Nepalese districts [7]. More than 30,000 people are infected with tuberculosis each year. According to the Global TB Report, 6000 to 7000 people die each year in Nepal from tuberculosis. In FY 2016/17, however, TB death among registered TB patients was 3% (1,023 deaths) out of 31,644 registered TB cases. TB mortality is high, despite the fact that most deaths are preventable if people can get proper diagnosis and treatment for tuberculosis. Nepal's National Tuberculosis Program (NTP) has adopted the global WHO's END TB Strategy as the country's TB control strategy. To address this problem, Nepal's National Tuberculosis Program (NTP) offers comprehensive health-care services focusing on early TB diagnosis, treatment, and control [8].

In 2001, the Directly-Observed Therapy, Short Course (DOTS) service was introduced to control, identify, and standardize treatment, including proper diagnosis, monitoring, and reporting of tuberculosis cases. The treatment under DOTS is given in two phases. The initial intensive phase of treatment is designed to kill actively growing and semi-dormant bacilli and is intended to shorten the duration of infectiousness with rapid smear conversion after two to three months of treatment. The use of four to five drug regimens in the intensive phase reduces the risk of development of drug resistance, failure and relapse. The continuation phase eliminates most residual bacilli and reduces failure and relapses. At the start of the continuation phase, the numbers of bacilli are expected to be low with less chance of selecting drug-resistant mutants [8,9]. Despite these tremendous efforts, the number of new tuberculosis cases has increased from 158 per 100,000 in 2014 to 245 per 100,000 in 2018, while the rate of TB case identification has been steadily declining [11-13]. In 2018, about 69,000 people had tuberculosis, but the National Tuberculosis Program only recorded 32,474 cases [13,14]. Meanwhile, more than half of all the tuberculosis cases go undiagnosed and untreated [14]. Nepal being a mountainous country with uneven population distribution, it is very challenging to make TB services equally accessible. Geographic barriers have made drug distribution and treatment supervision extremely difficult. Importantly, inaccessibility of the services and irregular medication results into poor patient compliance, with the treatment increasing the risk of drug resistance [15]. In both high-income and low-income countries, the disease disproportionately affects the poorest people. The United Nations adopted the Sustainable Development Goals for 2030 in 2015, with one of the goals being to end the global TB epidemic. However, the relapse and spread of the disease contributes to the emergence of drug-resistant and multidrug-resistant tuberculosis (TB), which is on the rise around the world [1]. Treatment default is defined by the World Health Organization (WHO), as treatment interruption for at least two months. Patients with pulmonary TB who default may have sputum samples that are smear positive for acid-fast bacilli (AFB), indicating high risk of transmission to others [16].

TB treatment default is also associated with an increased risk of mortality [17,18]. Treatment default is complex and is influenced by patient, treatment, systems, and community-level factors that vary by setting [18-20]. The number of deaths has decreased as a result of treatment with DOTS. Since April 2001, DOTS has been successfully implemented across the country. A total of 4,244 DOTS treatment centers provide tuberculosis treatment. The expansion of this low-cost, highly effective treatment strategy has demonstrated its efficacy in reducing mortality and morbidity in Nepal. In order to maintain the current significant results achieved by the National Tuberculosis Program (NTP), the NTP has coordinated with the public sector, private sector, local government bodies, I/NGOs, social workers, educational sectors, and other sectors of society [11]. DOTS out-reaching services are needed to those hard to reach areas and communities with low socio-economic conditions [8].

One of the unfavourable outcomes for DOTS patients is default, which poses a significant challenge for the control program. Inadequate treatment adherence is thought to be a contributing factor in drug resistance [21]. Gender, alcoholism, treatment after default, poor tuberculosis knowledge, irregular treatment, and socioeconomic status are just a few of the factors linked to higher default rates [22-24]. Non-compliance with

treatment has also been linked to other factors such as the disease, patients, and service providers [25,26]. Various causes and risk factors for default have been studied in India and other developing countries so far [22,24]. But, there is paucity of studies based on default in tuberculosis treatment among Nepalese population. Therefore, this study was designed to assess default in tuberculosis treatment among women registered in DOTS center of Taplejung district of Nepal.

MATERIALS AND METHODS

Study design and setting

A descriptive cross-sectional study was conducted at Taplejung district of Nepal in the year 2016. Taplejung district is located in the Eastern region of Nepal with an area of 3646 Km^2. The population of Taplejung district was 127461. The district has one district hospital, 2 primary health care centers, 48 health posts and 17 DOTS centres.

Participants, sampling and sample size

Women TB patients whose treatment was interrupted for two consecutive months or more in one year registered in DOTS center were included whereas male TB patients were excluded.

Taplejung district was selected purposely. There were seventeen DOTS centers in Taplejung district and all seventeen DOTS centers of Taplejung were selected for this study. Records of TB patients from all DOTS centre for one year were obtained and treatment default cases for women were identified. Patients were contacted with the help of DOTS centers and community people. All together 30 treatment default TB cases (women patient) were identified.

Data collection and study variables

World Health Organization (WHO) defines treatment default as, treatment interruption for at least two months [16]. Face to face interview was conducted by use of semi-structured questionnaire to collect data from the patients. Questionnaire included personal profile like age, ethnicity, religion, education, occupation and income. Knowledge and preventive practices among TB patients were also collected. Reason responsible for default in tuberculosis treatment among patients were obtained.

Statistical analysis and data management

The collected data was compiled and checked for accuracy. The data were entered and analyzed in MS Excel software. Frequency was obtained for each of the variables and presented.

Ethical considerations

Before conducting research, approval was taken from concerned authority of Saptarishi Multiple College, Rajbiraj, Saptari, Nepal. A letter of permission was also obtained from District Health Offices, Taplejung, Nepal. Informed consent was taken from each respondent before collecting the information after explaining objective of the study. Confidentiality was maintained throughout the process.

RESULTS

Table 1 reveals the personal profile of TB patients. Majority (72.0%) of respondents were in the age group of 15-49 years where as 73.3% of the respondents were Kirat and from the Dalit caste ethnicity. Majority (60.0%) of respondents were illiterate, had income ranges from Nrs. 5000 to 8000 and half (50%) of them were labor.

Table1| Personal profile of TB patients

Age group	**Number**	**Percentage**
15-30	14	36.0
31-49	11	36.0
>50	5	18.0
Religion		
Kirat	22	73.3
Hindu	8	26.7
Caste/ ethnicity		
Dalit	22	73.3
Janjati	4	13.3
Upper caste	4	13.3
Education Level		
Illiterate	18	60.0
Primary	9	30.0
Secondary	3	10.0
Occupation		
Labour	15	50.0
Farmer	12	40.0
House wife	3	10.0
Per capita income of family(in NRs)		
< 5000	9	30.0
5000-8000	18	60.0
>8000	3	10.0

Table 2 shows knowledge of TB patients regarding tuberculosis. Majority (35%) of the respondents had no idea about the cause of TB, 30% told smoking causes TB and 20% said that the cause of TB was microorganisms whereas one fourth (25%) said that TB was caused due to the sins of previous life. Majority (53.33%) of the respondents said that, regular cough more than two weeks were major symptom of TB followed by blood in sputum (3.3%), loss of appetite (16.7%), high fever (6.7 %), weight loss (13.3%) and few had no idea about the symptoms of TB. Regarding mode of transmission, less than half (45.0%) respondents said that Tb was transmitted through respiratory route and few said that transmission was from mouth and blood (5.0% each) whereas 25% didn't know about it. Maximum respondents (80.0%) reported that TB was curable and more than half (55.0%) respondents had heard about DOTS.

Table 2 | Knowledge regarding tuberculosis among TB patients

Knowledge among TB patients	Number (n=30)	Percentage
Knowledge on Causes of TB		
Microorganisms	6	20.0
Sin of previous life	5	25.0
Smoking	9	30.0
Don't know	10	35.0
Knowledge on symptoms of TB		
Regular cough more than two weeks	16	53.3
Blood in sputum	1	3.3
Loss of appetite	5	16.7
High fever	2	6.7
Weight loss	4	13.3
Don't know	2	6.7
Knowledge on mode of transmission of TB		
Respiratory route	13	45.0
From blood	2	5.0
From mouth	2	5.0
Handshaking	1	3.0
Heredity	5	17.0
Don't know	7	25.0
Knowledge on Curability of TB		
Yes	24	80.0
No	2	5.0
Don't know	4	15.0
Knowledge about DOTS		
Yes	16	55.0
No	14	45.0

Preventive practices among TB patients

Table 3 shows less than half (46.7%) respondents didn't use any cover during sneezing and coughing. One third (33.3%) of respondents covered mouth and nose with hands whereas only 10% of respondents covered mouth and nose with handkerchief. Few (10%) moved out from the places during sneezing and coughing.

Table 3 | Preventive practices among TB patients

Precaution during sneezing / coughing	Number (n=30)	Percentage
Didn't use any cover	14	46.7
Cover mouth and nose with hands	10	33.3
Cover mouth and nose with handkerchief	3	10.0
Move out from the place	3	10.0
Disposal of Sputum		
Burry in pit	1	3.3
Throw in open pit	9	30.0
Throw haphazardly	20	66.7

Distance and time to reach DOTS center among TB

Table 4 shows that more than half (53.3%) of DOTS center were at distance of 5 or more km and around one third (36.7%) respondents spent two or more hour to reach to the DOTS center from their home.

Table 4 | Distance and time to reach DOTS center among TB patients

Distance of DOTS center (in km)	Number (n=30)	Percentage
<1	2	6.7
1-2	4	13.3
3-4	8	26.7
5 or more	16	53.3
Time to reach DOTS center (in hour)		
Less than half	4	13.3
Half to less than one	6	20.0
One to less than two	9	30.0
Two or more	11	36.7

Reason responsible for default in tuberculosis treatment among patients

Table 5 demonstrates reasons for default in tuberculosis treatment among patients. Less than half of the respondents (48.0%) thought feeling better after medication was the reason for default TB. A second major cause for default in tuberculosis treatment was distance to reach DOTS center (12.0%) and lack of food at home (10.0%). Likewise, few respondents said lack of family support (6.7%),

thinking about side effects (6.7%), medicine not working (3.3%) and stigma (6.7%) was the reason for the default in tuberculosis treatment.

Table 5| Reasons for default TB with DOTS as reported

Reasons	Number (n=30)	Percentage
Feeling better after medication	14	46.7
Distance to reach DOTS center	7	23.3
Lack of food at home	3	10.0
Lack of family support	2	6.7
Side effects	2	6.7
Medicine not working	1	3.3
Stigma	1	3.3

DISCUSSION

TB is a main contributor to the global burden of diseases, and is one of the top 10 causes of death in the world [27]. TB treatment default is an important public health problem that undermines TB control efforts. The timing of default in tuberculosis patients on treatment in the developing world is poorly understood [28]. The present study reported nearly one third of the respondents were in the age group of 15-49 years belonging to Kirat and the Dalit caste ethnicity. In a similar type of study, the study population consisted of (33%); ages ranged from 18 to 83 years [29]. Majority (60.0%) of respondents were illiterate, had income ranges from Nrs. 5000 to 8000 and half (50%) of them were labor in our study. Almost similar results were obtained by Nepal AK et al. [30]. Most study subjects were married (54%), and unemployment was common (40%) [29]. In another study on treatment default amongst patients with tuberculosis in urban Morocco, mean age of the study participants was less than 50 years [31].

Our findings reports that, 35% of respondents had no idea what causes TB, 30% said smoking causes TB, 20% said microorganisms cause TB, and a quarter (25%) said TB was caused by previous life sins. The majority of respondents (53.33%) said that a persistent cough lasting more than two weeks was the most common symptom of tuberculosis, followed by blood in sputum (3.3%), loss of appetite (16.7 %), high fever (6.7 %), and weight loss (13.3%), with only a few saying they were unaware of the symptoms. In terms of mode of transmission, less than half of those polled (45.0%) said TB is transmitted through the lungs, and only a few said that, it was transmitted through the mouth and blood (5.0 % each), while 25% didn't know. The majority of respondents (80.0%) assumed TB is curable, and more than half (55.0%) have heard of DOTS. Sneezing and coughing were not covered by less than half of the respondents (46.7 %). Only 10% of respondents covered their mouth and nose with a handkerchief, while one-third (33.3%) covered their mouth and nose with their hands. During sneezing and coughing, only 10% of the respondents left the area.

In a similar study, 15% of participants had no idea about the cause of tuberculosis. Before their disease was diagnosed, 52 % had never heard of tuberculosis. In terms of the cause of tuberculosis, 19% of participants believed that smoking and chewing tobacco were the cause of TB. Poor nutrition, according to 17 %, was the leading cause of tuberculosis, followed by drinking alcohol (12%), cold air (9%), dust (8%), food scarcity (7%), evil eye (2 %), and work load (2 %). When asked about the symptoms of tuberculosis, 21% said coughing for two weeks or more was a symptom of the disease. However, 17% of said that sputum with blood was a TB symptom. 21% believed that TB was spread through contaminated food and water. Another 21% presumed the mode of transmission was through sharing drinking materials, followed by coughing, sneezing, and breathing (14%), drinking raw milk (11%), sharing feeding materials (10%), heredity (8%), and contact with patients (7%). However, 11% of the participants were unaware of the mode of spread [32]. According to a study conducted by Nepal AK et al. in a research on compliance with DOTS among tuberculosis patients under community-based DOTS strategy in Palpa District, Nepal, those with high knowledge of TB and its treatment had a higher proportion of compliance on DOTS than those with moderate and low knowledge levels [30]. The exploration of general knowledge about TB showed a lack of understanding of the disease in our study. This could be due to a lack of family history of tuberculosis, illiteracy, ignorance, and never reading or attending public TB education.

Our study demonstrates that more than half (53.3%) of DOTS center were at distance of 5 or more km and around one third (36.7%) respondents spent two or more hour to reach to the DOTS center from their home. The possibility is due to lack of transportation facility and DOTS center is far by

walking distance. Studies have shown that distance and inconvenient consulting hours hinder the patients compliance with the treatment [33,34]. Therefore, increasing the service accessibility also would reduce the non- compliance and help the patients in complete and regular treatment.

Less than half of the respondents (48.0%) thought feeling better after medication was the reason for default TB. In line with this study, patients did not seem to know enough about the treatment itself, since defaulter's main reason for defaulting was the feeling of being cured was also demonstrated by Slama K et al. [35]. Distance to a DOTS center (12.0%) and a lack of food at home were the second and third most common reasons for tuberculosis treatment failure (10.0%). Similarly, few respondents reported a lack of family support (6.7%), concern about side effects (6.7%), medicine not working (3.3%), or stigma (6.7%) as reasons for not starting treatment for tuberculosis. Cherkaoui I et al. [31] reported the main reason for defaulting according to the 108 defaulters was the feeling of being cured followed by the treatment being too long, the lack of overall time and the lack of knowledge about the benefits of finishing the treatment. Various misconception and stigma were noted in the study like TB affects in marriage arrangement. Because of the fear of difficulty in finding partner for marriage, parents may be reluctant to send girls of marriageable age for treatment as reported by Barnhoorn et al. [36] among tuberculosis patients in Wardha district, India. In Pakistan, patients often denied their TB diagnosis and rejected the treatment due to fear of social isolation [37].

Patients' negative attitudes may make them reluctant to reveal their illness, resulting in a delay in diagnosis and treatment. Other possibilities include refusing further treatment under the conditions offered, respondent migration, drug side effects, and having interrupted treatment under 'DOTS' but continuing treatment under 'Non-DOTS' conditions, either by purchasing tablets themselves or being given tablets by health services staff without direct observation. The defaults in Taplejung district could be explained by such conditions and problems. These issues are not addressed on a regular basis. These findings point to a lack of effective communication between health care providers and patients. It appears that modification in TB treatment is needed to improve communication between health care providers and patients. It is important to correlate the reasons of default with the time of default. This will help to focus on specific issues in different phases of treatment to prevent default. Our study has several limitations. We could only interview patients that we were able to locate, so our results may not be generalized to all patients who default from TB treatment in Nepal. A larger, well-designed study is needed to confirm our findings and provide guidance on how to treat patients who default.

CONCLUSIONS

TB treatment default is a complex public health problem that threatens TB control efforts. The study concludes with findings that majority of the respondents left treatment because they felt better after medication. A second major reason for default in TB treatment was distance to reach DOTS center as more than half DOTS centers were available at the distance of five or more kilometres from home of the respondents. Another, reasons for default in TB treatment was lack of proper availability of food and lack of family support, thinking about side effects of the drugs, thought about medicine not working, and stigma attached with TB were the reason for default in TB treatment. Therefore, health education and counselling activities in community level should be strengthened. Extensive study with larger samples and wider time span has been recommended as being crucial to establish the more valid reasons for default in TB treatment.

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Data Availability: Data will be available upon request to corresponding authors after valid reason.

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