Compliance of Tuberculosis Patients with Treatment

Banke, Bardiya & Surkhet Districts

Submitted to

National Health Research Council, Ramashah Path, Kathmandu
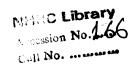
Principal Investigator: Ghan Shyam Pokhrel, MPH

Co-investigator: Shyam Lal Kandel, MPH

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Acknowledgement

It is my pleasure to express few words regarding the publication of study on **"Compliance of Tuberculosis Patients with Treatment in Banke, Bardiya & Surkhet Districts"**. This study contains the relevant information about health service providers and patients including health care delivery system in Directly Observed Treatment Short Course (DOTS) centre and sub-centre. I hope that this study will be a valuable document for the policy makers, planners and implementers of national, regional and district level in improving in TB control services.

First of all, I would like extend my sicnere gratitude to Dr Anil Kumar Mishra, Member Secretary of Nepal Health Research Council (NHRC) who gave me the opprtunity for conducting this study. I woluld like extend my appreciation to Mrs Shille Singh Rathaur, consultant for her valuable suggession in doing the field work. It would be unfair if I do not appreciate to Mrs. Chetna thapa, Mr. Abhaya Sharma, Mrs. Pearl Banmali and other staff of NHRC for thier supports in the process and finalize the study.

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Last, but not the least, I must express my sincere thanks to the respondents for giving thier gave valuable time and responses with regards to the study.

Ghan Shyam Pokhrel

Abbreviation

HMG	His Majesty's Government
AIDS	Acquired Immuno Deficiency Syndrome
BC	Before Crest
BCG	Bacillus Calmette Guerin
BCC	Behaviour Change Communication
DHO	District Health Office
DOHS	Department of Health Services
DOTs	Directly Observed Treatment Short Course
DPHO	District Public Health Office
HIV/AIDS	Human Immuno Deficiency Virus
INGO	International Non Governmental Organization
INH	Isoniazid
MDR	Multi Drug Resistant
NGO	Non Governmental Organization
NHRC	Nepal Health Research Council
NTP	National Tuberculosis Program
RAD	Return After Defaulter
PAS	Para Aminosalicylic Acid
PC	Patient Card
PCN	Patient Card Number
PHC	Primary Health Care Centre
PPD	Purified Protein Derivative
RHD	Regional Health Directorate
TB	Tuberculosis
TV	Television
WHO	World Health Organization

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Executive Summary

Paitent non compliance with treatment is the main problem in the TB control programme. DOTS strategy to treat the TB patients have focused on non compliance probemlem but need to do study on it to solve the existing problem. Objective of study is to determine the compliance of tuberculosis patients with treatment, identify main factors (knowledge/ believes, availability an accessibility of services) affecting compliance of tuberculosi patients with treatment.

SETTING AND DESIGN:

In this cross-sectional study, Districts were selected purposively and DOTS treatment centre were randomly selected in Banke, Bardiya and Surkhet districts and all patients who completed one month or more treatment and came to the health facility for drug (n=380) were interviewed using a structured, semi structured questionnaire. Collected data were processed and analyzed on computer. Frequency distribution and cross tabulation with relative percentage were used to show the distribution of variables. The association of dependent variable (compliance with treatment) with service delivery factors was observed with the help of p-values computed by the chi-square test.

RESULTS:

Out of total respondents 66.3% were economically productive (15-49 age group) with male & female ratio of 2:1 of which, 46.6% were illiterate & 16.3% were just literate without formal education. About 69% of the respondents were farmer, and 34% had income of < Rs1000 and average income of Rs. 2560. In employment status, Labor group had statistically significant lower compliance with P value 0.004. Similarly low-income status group had lower compliance with P value 0.035. Tarain ethnic group had statistically significant lower compliance with P value 0.00073. Patient non-compliance was in higher in large family and statistically significant (p value<. 05)

Among the 380 respondents 94% were new TB patients and 46% were sputum positive. Based on respondent's perception, 45% respondents were given information regarding taking regular medicine, 29 % self-protection, about disease 24%, 20 % proper sputum disposal. All most of non-compliance group were not given information about disease and treatment had lower compliance with statistically significant association with P value < 0.05.

About 64% respondent collected drug once week, 29% daily and rest of other monthly. Who collected drugs in short interval had higher compliance with statistically significant (P value 0.006). 92% respondents collected drug after 10 o'clock (fixed office time), rest of other before 10 o'clock or any time. Who collected drugs at fixed time had higher compliance with statistically significant P value 0.046.

 86% respondents came with in an hour, 74% walked on foot up to health facility for drug collection, there was no statistically significant differences with accessibility of service and compliance.

CONCLUSION:

The compliance of TB patients is found quite high in study area. Result showed that the poverty, large family size, low education status, inadequate awareness about disease and treatment arisen by health worker and not proper advice given by private practitioners were causes of non compliance. It is suggested to improve the information education and communication system prior to TB treatment and follow up about knowledge during treatment focusing on labor, terrain ethnic group, and low education status groups so that the number of non-compliance could be reduced. Besides the fixed office time, it is necessary to provide extra time (either in the morning or in the evening) for those who cannot attend DOTS clinic in office time. Strengthening the relationship, and cooperation with private practitioners to adopt NTP strategy is very important to manage TB patients in their daily practice.

1. INTRODUCTION:

Robert Koch discovered *Mycobacterium tuberculosis* as a causative organism of tuberculosis in 1882. Tuberculosis has been a major public health problem since ancient time. TB remains one of the deadliest of modern plagues and HIV/AIDS .World wide tuberculosis claims 2-3 million lives every year; between 5500-8200 per days. About every four out of ten cases worldwide live in this region. Bangladesh, India, Indonesia, Myanmar, Nepal and Thailand contribute more than 95 % of regional cases. Everyday more than 1,500 people die from tuberculosis in this region. The situation is further complicated by the rapidly spreading HIV epidemic and by the emerging drug resistant strains of tuberculosis [1].

The consequences are often the most visible in developing countries such as Nepal. Nepal has an incidence of 20000 new sputum positive and 44000 all type of cases of new tuberculosis per year [2] and tremendous economic, geographical and social barriers to case identification and treatment. Several researches have done on tuberculosis and its chemotherapy in the world mainly in developing country. Nowadays there are very good diagnostic tools like sputum microscopy and effective drugs are available everywhere in the world. The tuberculosis patient has to take drugs for six to eight months regularly in order to get cured. The compliance of patient in drug taking in most of the developing countries like Nepal is very low but the situation is improving after DOTS implementation. It is very difficult to keep patients to complete the full course of treatment. Non compliance creates drugs resistant and increase source of infection for incurable tuberculosis, which is more dangerous than HIV/AIDS from a public health point of view. But the compliance rate is gradually increasing after implementing DOTS strategy to treat the TB patients. Tuberculosis can be controlled, if we can encourage high compliance of tuberculosis patients with treatment. Therefore, it was necessary to study on compliance of tuberculosis patient with treatment, especially in those area the prevalence of tuberculosis is high.

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2. STATEMENT OF THE PROBLEM:

Nepal is divided into 5 regions; each region divided in to 9- 19 districts. The mid-western region is the largest and least developed region out of the five. It comprises fifteen administrative districts with population of approximately 3 million. Majority of the people live in flat and low hill districts where studied was carried out. Approximately about 1 million people live in the three studied districts. There was low compliance of patient in drug taking in most of the developing countries. The study areas have high prevalence and also low compliance comparatively in the region, however DOTS improving treatment outcome day by day. It was very difficult to make patients to complete the full course of treatment. This creates drugs resistant and increase source of infection for incurable tuberculosis, which is more dangerous than HIV/AIDS. Tuberculosis can be controlled, if we can encourage high compliance of tuberculosis patients with treatment. Therefore, it was necessary to study on compliance of tuberculosis patient with treatment, especially where there is high prevalence of tuberculosis in urban as well as rural area.

3. LITERATURE REVIEW

Brief introduction of tuberculosis:

Tuberculosis is infectious disease caused by Mycobacterium tuberculosis. The disease is transmitted through the air. It primarily affects lungs and causes pulmonary tuberculosis. It can also affect any parts of the body except nail and hair. The disease also affects animals like cattle, this is known as "bovine tuberculosis" which may sometimes be transmitted to man. Mycobacterium tuberculosis can infect any part of the body but pulmonary (lung) tuberculosis is common. The pulmonary tuberculosis is highly transmitted from patients to healthy person via air. Therefore, pulmonary tuberculosis is major public health problem. One sputum smear positive tuberculosis patient can transfer disease to 10 - 15 persons per year if untreated. Regular cough more than two weeks, chest pain, fever/night sweats, loss of appetite, breathlessness, tiredness and haemoptysis are the main symptoms of pulmonary tuberculosis. Regular cough more than two weeks is the most common symptoms to suspect a symptomatic tuberculosis case for diagnosis. [7/8]

Brief history of tuberculosis:

If we look at history of tuberculosis, humanity has probably recognized tuberculosis as a killer disease since the Ice Age. It is noted before that traces of tuberculosis lesion have been found in lungs of 3000 years old Egyptian mummies. The Greek physician Hippocrates (459 - 377 BC) " the father of the medicine " wrote a description of the disease. Accumulation of clinical evidences showed that tuberculosis is a disease transmitted from man to man [9].

In 1882, German physician Dr. Robert Koch announced the discovery of tuberculosis bacilli and published an article " Etiology of TB ". Within eight years, he was able to make an extract of dead bacilli to form tuberculin purified protein derivative (PPD), which could be used as a diagnostic test for tuberculosis infection[9]. Another important development was provided by the French bacteriologist Calmette and Guerin who used specific culture media to lower the virulence of the M. bovine tuberculosis bacilli, creating the basis for the BCG vaccine. Initially BCG was given orally during 1921 - 1925. In 1927 the first human was vaccinated by interadermal techniques in 1927. Recognition of the value of BCG came in 1948 when it was accepted by tuberculosis workers from all over the world as a safe preventive measure. After that BCG was used worldwide. Now developed countries stopped to use BCG thinking the tuberculosis is shifted to old age group but developing countries still have widespread use of BCG today[3].

Before the availability of anti-microbial drugs, the cornerstone of treatment was run in the open air in specialized sanitarium, often in mountain areas. The modern era of tuberculosis treatment began in 1944 with high efficacy of streptomycin. In 1949, it was discovered that Para-aminosalicylic acid (PAS) prevented the emergence of drug resistance, if given in combination with streptomycin. Since then, the administration of two or more drugs in combination has been considered essential for adequate tuberculosis chemotherapy. In 1952 Isoniazid (INH) became available. After that it has remained an important component of all primary drug regimens because it is highly effective with relatively low toxic and inexpensive[10].

Ethambutol and Pyrazinamide, made tuberculosis curable in the great majority of patients. In 1967, Rifampicin went into the clinical trial and proved to have anti-tuberculosis bacterial effect. The discovery of Rifampicin was heralded as opening a new era in tuberculosis chemotherapy. By 1970 established the pair of drug became as the best multi drug regimen for tuberculosis. The addition of

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Pyrazinamide to INH and Rifampicin made a short-term (4-6 month) regimen a successful option for tuberculosis treatment[11].

Millions of patients have been treated for tuberculosis and cured. Since then, the disease virtually disappeared from the many countries in America and Europe. But it never disappeared from Africa and Asia. A few years ago, tuberculosis re-emerged in many developed countries. There was a big question, if tuberculosis can be cured, why is it still such a huge problem? Why didn't it decline in developing countries and why has it reappeared in the west?

Global tuberculosis situation during 1993 – 2003:

In 1993 the World Health Organization declared tuberculosis a global emergency, so great was the concern about the modern tuberculosis epidemic. Every year, 8 to 9 million people develop tuberculosis. 95% of them live in developing countries. Estimation of the annual number of deaths from the disease ranges between 2 to 3 million. Tuberculosis kills more adults than any other single infectious disease. Forecasts of tuberculosis morbidity and mortality are presented for the decade 1990 - 2000. An estimated 88 million new case of tuberculosis of which 8 million will be attributable to HIV infection, will occur in the world during the decade, 30 million people are predicted to die in the same period including 2.9 million attributable to HIV infection. Tuberculosis poses a major threat to the health of people living in South East Asia. At least 1 in 3 people in this part of the world are infected with tuberculosis. It's the most important cause of death in the economically active population[3].

The tuberculosis trend and present situation in Nepal:

Tuberculosis is one of Nepal's major public health problems. About 45% of the population is infected with TB, out of which 60% are the productive age group. Every yeay 44000 people develop active TB, of whom 20000 have sputum posotive (infectious) pulmanary disease. Introduction of DOTS has already reduced the number of death; however 6000-7000 people continue to die every year from this disease[2] .

History of DOTS in Nepal:

1995 Dots policy Adopted, 1996 four Dots demonstration centres, 2000 **dots** coverage 75% of population in 66 district, 2001 Dots coverage 90% population in 75 district. [4]

Table No. 1: Case finding report of Midwestern Region (1996 – 2000)

Particulars	1996/097	1997/098	1998/099	1999/2000	2000/20001
New +ve	1120	1484	1457	1633	1766
Retreatment +ve	188	258	247	275	318
New Neg	1344	939	1051	1242	1394
EP	435	431	379	491	565

According to the given target case finding rate is accomplished (70%) however cure rate is below than 85 % that is why it needs to take into account the treatment compliance.

Table No. 2 : Case finding of 3rd quarter, 059/060

S. No.	Name of District	Smear Positive								Smear Negative		Extra Pulmonary		Total
		New		Relapse		Failure		RAD						
		M	F	M	F	M	F	M	F	M	F	M	F	
1	Banke	114	51	23	6	2	0	7	0	168	142	43	27	610
2	Bardiya	86	33	10	1	1	0	3	1	83	46	15	13	325
3	Dailekh	23	8	2	0	0	0	1	0	3	3	4	7	63
4	Dang	156	51	28	3	6	0	3	1	59	32	38	31	450
5	Dolpa	7	6	0	0	0	0	0	0	0	0	0	0	0
6	Humla	0	1	0	0	0	0	0	0	4	0	9	6	22
7	Jajarkot	19	19	1	0	0	0	0	1	11	10	8	14	87
8	Jumla	6	5	2	0	0	0	1	0	4	2	12	1	57
9	Kalikot	7	6	1	0	0	0	0	1	6	1	3	4	42
10	Mugu	3	1	0	0	0	0	0	0	0	0	3	1	9
11	Pyuthan	41	26	9	1	0	0	0	0	13	8	13	6	123
12	Rolpa	24	9	4	1	0	0	0	0	7	7	11	11	98
13	Rukum	8	13	4	1	0	0	1	1	7	9	7	14	69
14	Salayan	17	14	4	2	0	0	0	0	5	7	9	10	79
15	Surkhet	59	26	3	3	4	0	5	0	42	27	23	12	223
Total		570	269	91	18	13	0	21	5	412	294	189	0	2235

Above tabe indicate that Highest RAD is observed in Banke and followed by Surkhet, Dang and Bardiya similarly highest caseload is observed in Banke among the 15 district of midwest development region.

Compliance with treatment:

There are effective drugs available to cure the tuberculosis in an ideal situation. The anti-tuberculosis regimen may work in an ideal setting and demonstrates that it is efficacious, yet it still may not be effective in a "real life" setting because of the side effects of the drugs or long duration of treatment, the unavailability of service, poor communication between service provider and patient, stigma and difficult geographical situation are leading causes of poor compliance[6]. Noncompliance of patient is a major problem in tuberculosis control. Inadequate treatment can lead to life expand of patients (chronic), relapse, continue transmission of disease, and development of drug resistance. Of the patient for whom therapy was prescribed completed 6 month of treatment with good complaince Patient compliance was highest among the grade student and lowest among the workers Compliance may have resulted from the effect of patient characteristics on physician – patient interaction[21]

The current low case detection and treatment completion rate for tuburculosis patients in thailand may partly be due to the inability of poor patient to cope with the economic consequences of diagnosis and treatment. suggested improvement include the strict inforcement of an existing government policy of free care, the farther decentralization of services to reduce a travel costs and work absences, and social security payments for patient undergoing treatment.[13] These Studies indicate that standard demographic variables such as the patient's age, sex, educational level, religion, marrital status, and race do not cnsistently predict adherence level is the presence of a supportive family member.Poor adherence is associated with increased waiting time in clinics[15]

4.   RATIONALE/JUSTIFICATION

Global tuberculosis situation:

Tuberculosis is an ancient disease of great public health importance. It had long treatment and control program in the history of many countries of the world. The causative organism " *Mycobacterium tubercle bacillus*" was discovered more than 120 years ago and highly effective drugs and vaccine are available making tuberculosis a curable and preventable disease. [1] But Tuberculosis is still remaining a major public health problem all over the world. Many countries have neglected it far too long. According to estimation one third of the world's population is infected with tuberculosis.. Ninety five percent of them (tuberculosis cases) live in developing countries. It remains

the leading cause of the death among adults, which constitutes about **25% of** preventable death in developing countries. Tuberculosis kills more youth and adults than any other infectious diseases in the world. It is bigger killer than malaria and AIDS combined and kills more women than all causes of maternal mortality combined. Tuberculosis devastates families and many live more orphans than any other diseases.

Tuberculosis situation in Nepal:

The tuberculosis control program has been started since 1965. After the 1990, tuberculosis control centre was established to run the tuberculosis control programme effectively. During the early days, the program was vertically expanded through out the country, followed by integration of TB services with the existing basic health facilities, starting from 1983. With a notable success, tuberculosis cases and deaths declined year after year until 1992 when new TB cases began to alarmingly increase as the results of high HIV burden of the world. There was 6-7 thousands cases deaths per year due to tuberculosis, accounting for new 20000 sputum +ve cases per year. which is a declining trend from 1997 but the case finding and treatment coverage is still remarkable.

National tuberculosis control program in Nepal:

The National Tuberculosis Control Programme has been implemented with clear goal, objectives, policies and DOTS strategises. The patient Compliance with treatment is in increasing trend. However trend of Midwest development region is in constant for two year.

Table No. 3: Treatment success rate under DOTS

SN	EDR	CDR	WDR	*MWDR*	*FWDR*	*National*
2056/57	87	84	87	*88*	*86*	*87*
2057/58	88	88	87	*88*	*88*	*88*

Source:DOHS

Table No. 4: Cure rate in Midwestern development region in fiscal year 2057/58 - 59/60

District	Years		
	2056/57	2057/58	20059/60
Banke	85	82	83
Bardiya	87	89	85
Surkhet	88	85	80
Regional MWDR	85	85	83

There are effective drugs available to cure the tuberculosis in an ideal situation. The anti-tuberculosis regimen may work in an ideal setting and demonstrates that it is efficacious, yet it still may not be effective in a "real life" setting because of the side effects of the drugs or long duration of treatment, social stigma, unassessaible of health services and poor communication between services provider and and patients are leading to poor compliance of patients with treatment. Noncompliance is a major problem in tuberculosis control. Inadequate treatment can lead to relapse, continued transmission, and the development of drug resistance.

In 1993 WHO declared the Global Tuberculosis Emergency and introduced DOTS (Directly Observed Treatment Short course) strategy for tuberculosis treatment. DOTS is a new strategy to treat the tuberculosis patient and get high compliance. Under DOTS a patient has to swallow the drugs in front of the health worker in order to confirm that the drug has been taken properly. But there may some lacking to implement DOTS properly and get high compliance of patient with treatment in different situations.

National tuberculosis control program in Nepal:

The National Tuberculosis Control Programme has been implemented with newly revised control strategy recommended by WHO, the Directly Observed Treatment Short course (DOTS) since 1996. It has given very encouraging achievement above 70% case finding rate and 89% treatment success[2] rate from some demonstration districts. It has been expanding all over the country with strengthening of the program by working experiences in DOTS and recommendation done by expert team for National tuberculosis program evaluation from WHO and IUALTD.

There is no such standard and uniform operational situation to get high compliance of tuberculosis patient with treatment even through DOTS, only thing is that patients have to take drugs under the supervision of trained health worker. But the health infrastructure, geographical condition, and socio-economic condition of the people and health service providers are different from one health institution to other. Therefore the patients compliance with treatment is differ from service centre to centre and districts and still low for TB control. Few studies had done on patients' compliance with treatment in rural health service Therefore this study was done on compliance of tuberculosis patients with treatment and its factors affecting in rural health services. The result obtained from this study can be utilized and benefited for tuberculosis control program. In mid west development region total relapse case were 109, among them 37 were in study areas similarly out of failure (13) and RAD cases (26), 7 and 16 cases were found in study areas.[5]

6. RESEARCH OBJECTIVES

General

To describe the compliance of tuberculosis patients with treatment in the different DOTS treatment centres in Surkhet Banke and Bardiya .

Specific objectives

1. To determine the compliance of tuberculosis patients with treatment.
2. To identify main factors *(knowledge/believes, availability an Accessibility of services)* affecting compliance of tuberculosis patients with treatment.

5. RESEARCH QUESTIONS:

1. What was the compliance of tuberculosis patients with treatment in the different DOTS treatment centres in Surkhet, Banke and Bardiya ?
2. What were the influncing factors to lead the non compliance of tuberculosis patients?

7. CONCEPTUAL FRAMEWIORK:

Independent variable   Dependent Variable

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1. Knowledge and believes factors:
 -About tuberculosis and treatment
2. Social Stigma
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2. Tuberculosis Service delivery factors:
2.1 Availability of services
- Time schedule for service
-   waiting time / visit
-   Cost ( pay in health facilities for tb)
-   Patients'   and   health   providers
    relationship
-   Satisfaction of the service
-   Information about TB and treatment
2.2 Accessibility of service
-   time for traveling (distance)
-   cost for traveling
-   mode of transportation
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Compliance of
Tuberculosis patients
with treatment
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1. RESEARCH METHODOLOGY:

8.1 Operational definitions:

Compliance with treatment: Compliance with treatment is a patient's obedience to a command or rule or instruction for tuberculosis treatment given by health service provider. Patient those who have missed one week or more treatment is noncompliance.

Tuberculosis: All type of diseases caused by Mycobacterium tubercle bacillus. In human being, the most common is Mycobacterium tuberculosis, which is also called Acid Fast Bacillus (AFB).

Knowledge: Knowledge refers to patients understanding about name of their disease, causative agent (just jibanu) of the disease, duration of treatment, side effect of drugs, and importance of regular treatment for complete cure of the disease.

Availability of services: The tuberculosis patients advocate on equity of access to the health care for all at a cost, and time the patients can afford.

Accessibility of services: The possibility of tuberculosis patients' obtaining services, easy to travel, waiting time, reasonable cost and receiving the service as wanted.

Attitudes of health service provider: Feelings expressed by patients about health service provider's intention towards the patients during service delivery, whether positive or negative.

Information about TB and treatment:
The information about tuberculosis and treatment (health education) given to the patient before starting anti-tuberculosis drugs and during the treatment.

Treatment: Taking anti-tuberculosis drugs.

8.2 Study Site and its Justification

Inspite of the difficult geography of the mid west region dots continue to expand up to the sub health post. There is high case load in Banke Bardiya and Surkhet which covers nearly 50% of total cases of this region.

8.3 Target population

The target population of the study will be the tuberculosis patients who already completed one month treatment and still under tuberculosis treatment and came for drug collection in DOTS treatment centre and Sub-centre.

8.4. Research design

This research was DOTS treatment centre based cross-sectional study of patients' compliance with tuberculosis treatment in Surkhet, Banke and Bardiya district. DHO treatment centre and Mehelkuna PHC treatment center were randomly selected out five treatment centres of Surkhet district. Similarly Rajapur PHC treatment centre and DHO treatment centre were selected out of four HMG treatment centres of Bardiya district. In the context of Banke, Bankuta PHC and Nepal Health Post were taken out of 5 treatment centers. The data was collected through the structured questionnaires by interviewing, covering the general information about tuberculosis patients on socio-economic factors, knowledge about tuberculosis and its treatment, received information from the health service provider and the service delivery factors (availability and accessibility of service) to patients' compliance with treatment. All together three hundred eighty patientents were interviewed. Among them one hundred thierty three patients were interviewed in Banke, which was 13% out of total under treatment patients at that period. One hundred fourty four patients' data was collected in Bardiya district. It was 24% of under treatment patients, similarly one hundred three patients' data was collected from Surkhet district, which covered about 20% of under treatment patients at that period.

8.5. Sampling technique

Surkhet, Banke and Bardiya districts' DOTS treatment centre and sub-centre had been selected area for this study. All tuberculosis patients, who completed one month or more treatment and came to collect drugs, were selected for interview in this study.

Sample size:: Sample size was determined by using the following statistical formula.

$$n = [(z)^2 pq] / d^2$$

Where, n = estimated sample size

z = level of statistical significant is set at 0.05 = 1.96

p = treatment success rate (cured and complete) = 80 % *

q = 1- p

d = degree of accuracy desired setting at 20% of "p"

$$n = \frac{(1.96)^2 \times 0.8 \times 0.2}{(0.04)^2} = 384$$

8.6   Tools and Techniques for Data Collection:

The structured questionnaire used as research instrument for data collection by trained interviewers. The patients' disease and treatment information part collected from the patients' Treatment card. Initially questionnaire was prepared in English and then translated into Nepali. The questionnaire was pre-tested , and revised accordingly. It was divided into four parts as following:

1. Socio-economic factors : This part included questions related age, gender, family members, marital status, ethnic group, educational status, occupation, and income of the respondents.

2. Disease and treatment information: This part consisted of information such as type of cases, type of tuberculosis, and treatment started date.

3. Knowledge about tuberculosis and treatment: This part included questions related name of their disease, cause of disease, belief on treatment, duration of treatment, already missed drug or not, duration of missing treatment, **cause of missing**, suffered drug side effects, impact of irregular drug taking, and respondents' past history of tuberculosis.

4. Service delivery factors: This part was divided into two components, availability of the service and accessibility of the service. Availability of the services included question related waiting time per visit.

Accessibility of service included question about traveling time (distance), and cost of traveling from respondents' house to DOTS centre, mode of transportation and relationship of patients and health service provider, and given information to patients for treatment.

8.7. Data Collection:

Data was collected by interview using structured questionnaire with patients who completed one month or more treatment and still under tuberculosis treatment by trained interviewers in the health facility and some home visited. The data was collected from 6th Sept to 7th Dec 2003. The researcher stayed with the interviewers to monitor and control proper quality of data collection. Defaulter tracing (home visit) was made for some of the patients in Surkhet and Banke districts.

8.8. Data Analysis:

Collected data were processed and analyzed on computer. Frequency and relative percentage were used to show the distribution of variables. The association of dependent variable (compliance with treatment) and service delivery factors were computed by the chi-square test.

8.9. Limitation of the study

The study was conducted in different treatment center and sub-center of Banke, Bardiya and Surkhet districts. The study covered about 20 percent of under treatment of three different districts, which may not be true representative of the situation for compliance of tuberculosis patients with treatment throughout out country, Nepal. The study didn't represent the non-governmental organization treating TB patients under the National Tuberculosis Control Programme.

The prepared questionnaire for the interview was limited to get the information from the patients; therefore further necessary information could not be obtained. The face-to-face interview, using questionnaire (with one month treatment completed and still under treatment patients) and the patents identity card kept by patients and treatment card kept in health institution were the main source of the information. Since sampling unit ware selected from the DOTS treatment center attended Pts of the particular area in Surkhet, Bardiya and Banke which may not be country representative. Interview was taken at the DOTS treatment center so socio-culture profile may not be accurate as much as household level interview. Sample population was selected from the DOTS treatment center attended patient rather than community based.

9. RESEARCH FINDING

It was divided into four main categories; first socio-economic factors were used to describe respondents' age, sex, marital status, family members, educational status, employment status, and economic status. Second, information about disease and treatment part included type of TB, Type of cases (new & re-treat) and treatment started date. Third was about knowledge and beliefs factors were used to describe tuberculosis causes and its treatment. Mostly, knowledge part focused on the information given by the health service providers to respondents. Fourthly, service delivery factors like availability of service, and accessibility of services for good compliance of patients were focused to reduce the high magnitude of tuberculosis problem.

9.1. Socio- demographic characteristics:

The study included certain background of socio-economic characteristic considered in this study like, Age, sex, Marital status, Ethnic group, Education status, Family size, Employment status, Monthly family income of the tuberculosis patients.

The frequency distribution and cross tabulation was performed to check the homogeneity of the background characteristic between compliance and noncompliance of patients with treatment.

The range of age of patient was from 1 to 77 yrs. and average age was 33 yrs. It was divided into four groups for data analysis as shown in Table no 1.1 In the age group, majority patients were found under the productive age group (15 – 49 yrs), and the most non compliance patients were also found in productive age group however it was not statistically significant result, means that the age of respondents had no impact on compliance of patients with treatment.

Regarding the sex group, the male and female ratio was found 2:1. There was no sex wise significantly different between compliance and noncompliance group.

Regarding marital status, the result shown 81% of cases were married, one fifth (19 %) cases were single and either widowed or separated / divorced. It was found that the more than three fourth (78 percent) out of 23 noncompliance belonged to the married group. However, there was not statistically significant difference in compliance and non-compliance of patients with treatment among the different marital status groups.

Regarding educational status of the respondents for analysis purpose, it was divided into four groups as illiterate, literate, primary school, and secondary or higher education level. The analysis of education of respondents showed that 46.6 percent were illitrate, 25.3 present had secondary and higher education status and 16.3 present literate with out formal education and rest of 11.8 present had primary school level education status. About compliance status compare to education status, the highest non-compliance (8.5 percent) belongs the illeterate group, means higher education status the higher comliance but which was not statistically not significant with 0.148 p value.

Regarding number of family, about less then half (40 present %) of respondents had seven or more family members, 33.2 percent had 5 - 6 family members and the rest of 26.8 percent had less than 4 members. The result showed the low number of family members had higher compliance or respondents who had large family members (<_7), they had higher non-compliance and the result is statistically significant with p vale 0.015.

Regarding ethnic group, the respondents divided into three groups based on their cultural and living behavior (1. Brahaman & Chhetry 2. Magar, Gurung, Chaudhary & schedule cast and 3. Yadev, Muslium, and other terrain group) Among the respondents, more than half (51.3 percent) were Magar, Gurung, Chaudhary, and schedule cast, the lowest percentage (16.1) were terrain people, however considering the compliance of TB patients with treatment lower compliance (85.2 percent) was found in Yadav, Muslim, and other terrain group compare to other cast above 95 percent, which is statically significant with P value 0.00073

Concerning employment status, the respondents were categorized into five groups and analyzed. The analysis on the employment status (Table no 1.2) showed that, about more than two third (68.7) were farmer and rest of one third were labour(13.2 precent), house wife(6.8 precentage) service holder (table work)(6.1 precentage), businessman (merchant & vender) (5.3 precent) of out of total 380 respondents. The result indicated statistically significant differencue in between compliance and non compliance among the different employment status with P value 0.004. The respondents whom have permanent nature of job (own farm and merchant), they have higher compliance. The labors (skilled, wages) have lower compliance with treatment.

Monthly family income, as mentioned by the respondents, was divided into four groups showed in Table no. 1.2. the average monthly family income was Rs. 2560 and income ranged was from Rs

400.00 To Rs 12000.00. According to result showed in table no 1.2, respondent with low monthly family income have low compliance with treatment and result is statistically significant (P value 0.035).This indicate the difference in complaince and non compliance and noncompliance with relation to the different family income groups.

Regarding the habit of the respondent, nearly two third (60.3 percent) has not any habit of taking alcohol, tobacco, and smoke. About one fifth respondents (21.6) have all three (alcohol, tobacco, and alcohol.) habits and the rest of have habit of taking either tobacco or smoke or alcohol. High percentage of non-compliance was found among drinking group but result is not statically significant.

Table No. 5: Number and percentage of compliance classified by socio economic factors (N=380)

Characteristics	Frequency		Compliance		Non compliance		P value
	No	%	No	%	No	%	
< 5yrs	31	8.2	30	96.8	1	3.2	.182
6-14	16	4.2	16	100	0	0	
15-49	252	66.3	232	92.1	20	7.9	
> 50	81	21.3	79	97.5	2	2.5	
Gender							
Male	251	66.1	237	94.4	14	5.6	.588
Female	129	33.9	120	93	9	7	
Marital Status							
Single	58	15	56	97	2	3	.205
Married	309	81	191	94	18	6	
Others (widowed/divorces)	13	4	10	77	3	23	
Educational Status							
Illiterate	177	46.6	162	91.5	15	8.5	.148
Literate	62	16.3	58	93.5	4	6.5	
Primary School	45	11.8	45	100	0	0	
Secondary and higher	96	25.3	92	95.8	4	4.2	
Family Size							
Small (≤4)	102	26.8	98	96.1	4	3.8	.015
Medium (5-6)	126	33.2	123	97.6	3	2.4	
Large (≥7)	152	40	136	89.5	16	10.5	
Ethnic Group							
Brahman / Chhetry	124	32.6	120	96.8	4	3.2	.00073
Magar/ gurung/ Chaudhary/ Marginal group	195	51.3	185	94.9	10	5.1	
Yadav/ Muslim /Other Tarain	61	16.1	52	85.2	9	14.8	

Table no. 6: Number and percentage of compliance classified by socio demographic factors

Socio- economic factors	Frequency		Compliance		Noncompliance		P-value
	No.	(%)	No.	(%)	No.	(%)	
Employment status							
Farming	261	68.7	249	95.4	12	4.6	0.004
Labor (skill/wage)	50	13.2	41	82	9	18.0	
Business (Merchant/venders)	20	5.3	19	95	1	5	
Service (gov./ priv.)	23	6.1	23	100	0	0	
Others (H. wife, stud, unemp)	26	6.8	25	96.2	1	3.8	
Family monthly income							
≤ 1,000	129	33.9	115	89.1	14	10.9	0.035
1,001 – 3,000	107	28.2	103	96.3	4	3.7	
3,001 – 6,000	114	30.0	111	97.4	3	2.6	
> 6,001	30	7.9	28	93.3	2	6.7	
Habit of the respondent:							
Drinking alcohol	19	5.0	17	89.5	2	10.5	0.572
Tobacco	32	8.4	30	93.8	2	6.3	
Smoker	18	4.7	17	94.4	1	5.6	
All (Alcohol, Tobacco &Smoke)	82	21.6	80	97.6	2	2.4	
Not any	229	60.3	213	93	16	7	

9.2. Type of tuberculosis:

Regarding type of tuberculosis shown in table no. 2.1. Almost all (94 percentage) case was new and more than half (54 percentage) were sputum negative and extra pulmonary cases. The ratio of sputum positive was comparatively low than negative cases. The relation in between type of tuberculosis cases with compliance of TB patients with treatment is not significant.

Table no. 7: Types of tuberculosis and cases

Characteristics	Frequency		Compliance		Noncompliance		P-value
	No.	(%)	No.	(%)	No.	(%)	
Type of cases							
New	358	94	336	93.9	22	6.1	0.609
Old (Re-treat)	22	6	21	95.5	1	4.5	
Type of Tuberculosis							
Sputum positive	176	46	165	93.7	11	6.3	0.524
Sputum negative	204	54	192	94.1	12	5.9	

9.3.   Knowledge about disease (TB) and its treatment:

To asses the knowledge of respondents about tuberculosis, some questions were asked to the respondents. Those questions were divided into three groups for data analysis. First one was knowledge about cause of disease, second one was duration of treatment and third one was impact of irregular treatment. It was multiple answer questions. About two third knew the cause of TB, However 37 Percent mentioned that some organism is the cause of tuberculosis while other mentioned smoking and alcohol (32 percent), 16 percent unknown, 7 percent heredity and rest of other mentioned witch and spiritual and hard work. Most of the respondent (83 percent) knew the duration of treatment and in the same way almost all respondents (91.84) knew the impact of irregular treatment. Who knew the impact of irregular treatment had high compliance with treatment and who did not know the impact of irregular TB treatment had low compliance. The association between impact of irregular treatment and compliance was statically significant with P value 0.043.

To assess the given information for TB treatment, there was open-ended question. All answers were categorized into six groups i.e. about disease, taking regular medicine, self-protection, separate utensil, proper sputum disposal, and others. Answers were based on perception of respondents.

Information about disease: Three fourth (75.8) did not receive information. The given information about disease and compliance of patients with treatment had statistically significant association with P value 0.0015. Given information about taking regular medicine: about less than half (45 percentage) respondent are given information. Among the information not given group had eighty-seven percentage of non-compliance, which was statically significant with P value 0.0014. It means

who got information had higher compliance and who had not received information had lower compliance.

Given information about self-protection: more than two third (70.5 percent) respondents were not given information about self-protection and for all (100 percent) non-compliance were given the information, which was statistically significant with P value 0.00138.

Regarding separate utensil: information was not given for all non-compliance, however it was not statistically significant. About proper sputum disposal: all non compliance respondents were not given information even though other not given group had also eighty percent compliance with treatment. Information was not given for non-compliance group on Proper sputum disposal was statistically significant with P value 0.0341. Even information not given group had some compliance; it might be impact of means of other media (radio, TV), general education and arose of self-social awareness.

Table no. 8: Knowledge about tuberculosis and treatment

Characteristics	Knowledge	Frequency		Compliance		Non compliance		P value
		No	%	No	%	No	%	.814
Cause of tuberculosis	Know	140	37	131	94	9	6	
	Don't know	240	63	226	95	14	6	
Duration of treatment	Know	316	83	301	95.3	15	4.7	.850
	Don't know	64	17	60	94	4	6	
Impact of irregular or defaulter treatment	Know	351	91.84	331	94	20	6	.043
	Don't know	29	8.16	26	83	5	17	

Table no. 9: Given information about Tuberculosis and treatment to the respondent

Content of information	Knowledge	Frequency		Compliance		Non compliance		P value
		N0	%	No	%	No	%	
About Disease	Given	92	24.2	92	100	0	0	.0015
	Not given	288	75.8	265	92	23	8	
Taking regular medicine	Given	171	45	168	98	3	2	.0014
	Not given	209	55	189	90.5	20	9.5	
Self protection	Given	112	29.5	112	100	0	0	.00138
	Not given	268	70.5	245	91.4	23	8.6	
Separate utensil	Given	34	9	34	100	0	0	.265
	Not given	346	91	323	93.4	23	6.6	
Proper sputum Disposal	Given	72	20	72	100	0	0	.0341
	Not given	308	80	285	92.54	23	7.46	
Others (boil water, (nutious diet)	Given	16	4.2	14	87.5	2	12.5	
	Not given	364	95.8	343	94.2	21	5.8	

9.4. Availability of services:

Availability of services were assessed by frequency of drug collection, drugs collection time, convenient or not drug collection time, waiting time per visit and waiting time reasonable or not and relationship in between health service provider and patients.

Regarding frequency of drug collection, two third respondents collected the drug once a week and about 28.7 percentage collected the drugs daily and rest of others once a month. Result showed the more the frequency (Daily) of drug collection, higher compliance, which was statically significant with 0.006 P value.

About drug collection time, all most all respondents (91.8 percentages) collected the drugs after 10 o'clock and rest of other had collected before 10 o'clock or any time. Who collected drugs in fixed time had higher compliance compare to any time. The result was statically significant with P value 0.046.

Almost respondents had felt the drug distribution time was convenient, however all non-compliance respondent also felt convenient time. Regarding waiting time most of patients (94.7 percentages) had not waited for drug collection and rest of other had waited half an hour to one hour. There was no statically significant association between compliance with waiting time.

The service accessibility was assessed by relationship in between service provider and respondents. The information related to relationship was categories into three groups for data analysis, i.e. service provider question to patient, patients question to service provider, and patients' perception on willingness of service providers. Al most all (95.3 percentage) respondent mentioned that the service provider asked frequently to the patients but all noncompliance belong in this group and the relation was not statistically significant. Regarding patients question to the service provider was also almost same as service provider question to the patient and not statistically significant. The patients' perception on willingness of provider, almost all respondent (97.6 percent) felt that the service providers were willing to give service but there was adverse relationship with compliance of treatment.

Table no. 10: Status of Drugs Collection

Characteristics	Frequency		Complaince		Non complance		P value
	No	%	No	%	No	%	
Frequency of drugs Collection							
Daily take at health institution	109	28.7	107	98.2	2	1.8	.006
Once a week	243	63.9	227	93.4	16	6.6	
Once a month or others	28	7.4	23	82.1	5	17.9	
Drugs collection Time							
Before 10 o'clock	20	5.3	17	85	3	15	.046
After 10 o'clock	349	91.8	331	94.8	18	5.2	
Any time	11	2.9	9	81.8	2	18.2	
Time of drugs Collection							
Convenient	376	98.9	353	93.9	23	6.1	.778
Not convenient	4	1.1	4	100			
Waiting time for drugs							
Don't have to wait	360	94.7	340	94.4	20	5.6	.084
30 minute to one hour	16	4.2	13	81.2	3	18.8	
More than one hour	4	1.1	4	100			
Waiting time							
Reasonable	5	28	4	80	1	20	
Not reasonable	13	72	13	100	0	0	

Table no. 11:Relationship between health service provider and patient

Characteristics	Frequency		Complaince		Non complance		P value
	No	%	No	%	No	%	
Service provider's question to patient							
Often	362	95.3	339	93.6	23	6.4	.316
Not at all	18	4.7	18	100	0	0	
Patient question to Provider							
Often	337	88.7	315	93.47	22	6.53	.239
Not all	43	11.3	42	97.7	1	2.3	
Patient Perception on willingness of provider							
Willing	371	97.6	349	94.1	22	5.9	.433
Not willing	9	2.4	8	88.9	1	11.1	

9.5.   Accessible of the services:

As shown in table number 4.1 and 4.2, Accessibility of the service was assessed by traveling time for drug collection, mode of transportation, traveling cost and perception on traveling whether convenient or not for drug collection. In the same way relationship between patients and health

service providers during the treatment period was analyzed to assess the accessibility of the services. Regarding traveling time, three fourth (86.3 percentage) respondents walked less than one hour for drug collection and rest of other more than one hour. The respondents who walked longer time had the lower compliance but not statistically not significant.

The service accessibility was assessed by mode of transportation. About three fourth (73.7 percentage) of respondent had gone on foot to the health facility. Twenty percentages used own vehicle (bicycle) to go to the health facility and rest of other about 6.3 percentage used public bus and other means of transportation. Who used on foot means of transportation had lower compliance but the relation was not statistically significant.

Regarding traveling cost who used public transportation (6.3 percentages), half of them paid less than Rs 10.00. As shown in Table no 4.1, there was no any relationship in between mode of transportation up to health facility and patients' compliance with treatment. About half of respondent felt that the provided health service was convenient but had lower compliance compare to the felt inconvenient group, which was not statistically significant.

Table no. 12: Acessibility of Services

Characteristics	Frequency		Compliance		Non compliance		P value
	No	%	No	%	No	%	
Traveling Time							
≤ one hour	328	86.3	309	94.2	19	5.8	0.594
> one hour	52	13.7	48	92.3	4	7.7	
Mode of transportation							
Public bus	16	4.2	15	9.8	1	6.2	0.712
Own vehicle	76	20	73	96.1	3	3.9	
On foot	280	73.7	261	93.2	19	6.8	
Others	8	2.1	8	100	0	0	
Traveling Cost in Rs							
10 or below 10	14	48.27	13	92.85	1	7.14	
11-25	7	24.13	7	100	0	0	
Above Rs 26	8	27.58	7	87.5	1	12.05	
Convenience on travel							
Convenient	240	63.	128	91.4	12	8.6	.090
Inconvient	140	37	229	95.4	11	4.6	

9.6. Drugs side effects:

Serious side effect was not appared. Some of the common side effect appared, is shown in Table no. 5. Common side effect was joint pain in this study in which 27 percentage were suffered from joint pain, 26 percentage diziness, 19 percentage suffered from nausea, 18 skin itching, and vomiting, 5 percentage jundice and 2- 5 percentage peripherial nuropathey and others.

Table no. 13: Drugs side effects

Side effect of drugs	Yes		No	
	No	%	No	%
Jaundice	19	5	361	95
Joint Pain	102	27	278	73
Nausea and Vomiting	74	19	306	79
Peripheral neuropathy	9	2	367	98
Skin itching	67	18	309	78
Diziness	100	26	276	74
Others	22	6	354	94

9.7. Compliance of TB patients with treatment:

Three hundred eighty patents were interviewed during the study period, which was about 26 percent of under treatment patients during that period. Out of 380 patients 23 (6 percent) had missed the drug means became noncompliance with treatment. Main cause for missing the drug was about 30 percent due to physically unability to collect the drugs, rest of causes were forgotten, night halt out side house, drug side effect, absence of health worker in health facility, drug not avilable in health facility and drug distribution time was not convinent due job.

Table no. 14: Compliance of TB patients with treatment

Characteristic	Frequency		Noncompliance)		Compliance		P Value
	No	%	No	%	No	%	
Bake	133	35	14	10.52	119	89.48	
Bardiya	144	38	7	5	137	95	0.017
Surkhet	103	17	2	2	101	98	
Total	380	100%	23	6	357	94	

10. DISCUSSION:

This was the cross sectional study with main objective to determine the compliance of tuberculosis patients with treatment and specific objectives to identify main factors affecting the compliance, and relationship between different factors (tuberculosis knowledge, and beliefs on its treatment, availability and accessibility of services) with the compliance of TB patients with treatment in different treatment centre of Banke, Bardiya and Surkhet districts. Three hundred eighty patients were interviewed using structured and semi-structured questionnaire. The results of study showed in Table 6, indicated the compliance of tuberculosis patients with treatment was in 94% the study districts (Banke, Bardiya and Surkhet). The Results are discussed as follows.

10.1. Socio-demographic factors

The socio-economic characteristics of the respondents were found to be homogenous in both group compliance and noncompliance. Two third of the age group involved in the study but two third belonged to the economically productive age group (15 – 49 yrs). It indicates that the tuberculosis is big health problem in the society. It has direct impact to the family, society and national economy also. The productive age group had lower compliance compared to the other age group. It might be due to the number of productive age group were higher and busy comparing to the other ages.

Regarding educational status, higher education status of respondents had higher compliance compare to lower education status group. It is a kind of usual things, who had higher education; they can assess to the new information and ideas and use it in their daily life also.

Who had small number of family size had higher compliance with treatment compare to large family size with statistically significant result in the study. Study showed large family had low educational statues (49 percent illiterate) means they could not approach information which help to create the health awareness, and support to get compliance in the TB treatment also.

Tarain ethnic group (Yadav/Muslium) had lower compliance compare to Brahman Chhetry with statistically significant result. A Tarain society is quite close and not exchanged their information and shares the experiences in the society. Our study showed the educational status also lower which has direct impact to arise the health awareness also. Study showed they had low level of knowledge of TB compare to other ethnic group.

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Concerning the sex, the male and female ratio of respondent was 2:1 which was almost similar to the NTP report 2002.[2] The female TB patients are not coming in the health facility and transmitting the disease to kids, family member and in the society. The males are still at higher risk of tuberculosis infection. This is possible because most of the males are responsible for the support and protection of the family as "bread winners ". They are even engaged in hard physical labor in factories as daily wage and physical work. The women remained at home and did the household chores.

This study showed that the occupation of 68.7 percent of respondents were farmer, 13.2 percent labor and rest of other were merchants and street venders. Farmer and housewife had higher compliance compare to labor with statistically significant (P value 0.004). This study finding co-related with the result "of the patients for whom therapy was prescribed completed at least six month of treatment with good compliance. Patients compliance was lowest among the labor (worker) group." [12]

The result of the study showed that the average monthly family income of respondent was 2560 Rs. About 33.9 percent of respondents had monthly family income Rs. ≤ 1,000 had low compliance with statistically significant result (P value 0.035). From the reports of Castillo in 1990 mentioned in her report that "tuberculosis was a disease of poverty and it was a useful indicator of development". The poverty leads to bad and overcrowded housing or poor work conditions, hard life. These may lower defense mechanism of the body as well as making infection more likely [14].

The study conducted on "Economic Impact of Tuberculosis at Household Level" revealed that "there is a predisposing for the disease among the population with lower socio-economic status" the result of our study add weight to the argument especially among the house hold with income below the poverty line (≤ 1000 Rs), the economic consequence of tuberculosis can be debasing. The study on Non Adherence to medication regimen mentioned that the standard demographic variables such as patients' age, sex, educational level, and marital status do not consistently predict adherence level. However on patients related characteristic that does appear to be consistently related to improved adherence is the presence of a supportive family member.[15]

10.2. Knowledge Factors

Regarding knowledge in this study focused on the knowledge of patients and given information to patients were properly given for all, appropriate and enough or not to complain the patient with treatment. Thirty seven percent had knowledge about disease, eighty three percentage had knowledge about duration of treatment but there was not found any relation in between disease, its duration of treatment and compliance of the patients with treatment. However knowledge about impact of irregular or defaulter treatment, 91.8 percent knew the impact or the irregular treatment and had higher compliance with stastically significan p value 0.043. It is uasal practice among the defaulter patients, after completing about one month of treatment and subside main symptoms and weight gain after that they felt became cured after that they used ignore regular full course of treatment.

Ninety one percent respondents had knowledge that the about disease that will not be cured by irregular or defaulter treatment, but they did not have enough concept about how the disease could become more serious or not curable (MDR) by irregular treatment. About irregular or defaulter treatment will not cure the disease and make it more serious or not curable (MDR) is a kind of warning factor to force to continue the treatment. After giving, all necessary information about disease and treatment, there is needed to tell some fact as a warning (up to moderate level) to avoid the ignorance of treatment.

Regarding contents of given information (health education) to the respondents, the result showed that there were given information about disease for twenty six percent, taking regular medicine for fourty seven percent, self protection for thiry one percent, proper sputum disposal for twenty percent. There was statistically significant association between information given and not given respondant with compliance of TB patients with treatment. (p-value = < 0.05).

Regarding given information about separate utensil was not statastically significantly between the compliance and non compliance respondent.

The study result showed that about average 25 to 30 percent respondants had given information about TB and its treatment prior to the treatment but according to the NTP policy every patients should received information about 1.cause of TB, infectious, 2. cured by eight month regular treatment, patients should come every day for treatment up to two month after that weely, 3.

patients' urine will became read after starting treatment but don't be worry, 4. have to do sputum follow up after 2 month, 5 month and at the end of treatment. 5. the irregular treatment will makes more serious and uncurable disease, which is more dengarous than HIV/AIDS. These are the basic information for TB patients prior to the treatment to make compliance the TB patients with treatment. But result showed about 25 percent had given such information. Excep impact of irregular medicine, hundred percent non compliance had not givent information regarding TB disease and its' treatment.

Study conducted in Vietnam showed that four category factor effecting compliance were identified; understanding of compliance, individual cost, staff attitude and stigma however in our study about hundred percent noncompliance had not received information about disease and treatment.[16]

10.3. Availability of service factors

Regarding availability of services, the study tried to assess frequency of drug collection, drug collection time, convenient time for drug collection, waiting time for drug collection, and reasonable waiting time. Same way relationship between health service provider and patient was analyzed from service providers' question to patients, patients question to service provider and patients' perception on willingness of service providers.

The study showed the short interval of drug collection day had higher compliance in compare to the long interval, which was statistically significant with P value 0.006.

Regarding drug collection time, who visited health institution at fixed time, had higher compliance in compare to visit any time with statistically significant result (P value 0.046)

In reference to waiting time, about ninety five percent of respondent had not to wait for drug collection and they had higher compliance compare to who waited but there was no statistically significant. This result was similar as the result of research Shan WJ done in 1988 (24). However there was higher compliance among the less waiting time for drug collection group. They might feel convenient to collect the drug and be encouraged take regular treatment by free drugs. Michael L. Russell (1986) mentioned that poor compliance was associated with increased waiting time in the clinic (27), which is found in this study also.

Regarding relationship between patients and health service provider, there were three questions asked to assess the relationship between the patients and health service provider. There was no

significant association between relationship of patients and health service provider, and compliance. Which result was similar the results of research done in 1991(24) and 2000 (25).

Ninety five percent of respondents mentioned that health service provider often asked about health condition of patients and treatment, about 89 percent of respondents asked the health service provider about their health and treatment, and 98 percent of respondents felt service provider were willing to help for their treatment. Concerning patients' question to the health service provider, the rest 11 percent of respondents did not ask any-thing to the service providers. The percentage of patients' question to health service provider was about less than ten percent compared to the health service provider's question. There is no reciprocal relationship of each other. It shows that patients did not feel friendly environment to get treatment. It might have been interviewed place in health institution.

The respondents might not be able to feel free to give real comments on behavior of health service providers. Otherwise patients should asked question to the health service provider as compare frequency of question asked by health service provider. However there was higher compliance among those who felt the health service providers were willing to help compare to those who felt not willing to help, but there was no statistically significant association between willingness and compliance of patients with treatment.[14] this result supported our study also that felt higher willingness of health worker to the patients had higher compliance compare to the low willingness to the patients.

Russel ML. (1986) mentioned " the patients relationship with the clinician and clinic also appears to influence adherence". Improved adherence tends to occur when the clinician and the clinic staff are perceived as understanding, concerned and empathetic. Adherence also is improved if the patient sees the same clinician in each visit" (27). Therefore health service provider should think how relationship with patients could be improved for better compliance of patients with treatment.

Research on attitude on compliance with tuberculosis treatment among women and men shown that interaction between health workers and patients appear central for compliance especially for women; similarly it has been shown in Nepal unfriendly health worker responded aggressively to both man and women especially toward those who presented late for treatment uncomfortable, un well-come and unwilling to returned. [9] This result also adds value in this study results.

10.4. Accessibility of service factors

The accessibility of services in term of traveling time, mode of transportation, traveling cost, convenience felt or not from patients' house to health institution was tried to assess the compliance of patients with treatment.

Result showed that the average traveling time for patients' residence to health institution was about half an hour and 94 percent of respondent traveled to health facility within one-hour time. About seventy four percent of respondent visited health institution on foot. The traveling cost needed for about four percent and forty eight percent paid less than Rs. 10.00. Three was no association among traveling time, traveling cost, mode of transportation, and compliance behavior with treatment in terms of frequency as well statistic.

During the study period, the late patient tracer traced 8 tuberculosis patients' house, which already missed the treatment. The late patient tracer succeeded to visit three patients out of 8 patients. Out of the two traced patients, two patients had developed jaundice and visited to private doctor, again started TB treatment based on private practitioner advice. Patients spent Rs. 1200.0 per month for drugs (PC. No 133 059/060, DHO Surkhet). Another was 14 months child, he had also developed jaundice and visited private practitioner and got advice to take drug from medical hall because of drug supplied from DOTS centre was not qualitative as compared private. PC no 143 (059/060 Rajapur TC, Bardiya). Third one was Riksa chalak, 20/M, PC no. 134 059/060, Rajapur PHC. He moved Nepalganj for job and started treatment from Nepalganj HP, with out informing to Rajpur PHC.

Other 5 patients, one was died (PC no 121 059/06 Rajpur PHC), another one according the family member, he went India for job (PC no 42 059/060, DHO Bardiya, 35/m).

PC no. 063, 30/F, 059/06 DHO Surkhet, patients was transferred from Jumla and taken about one month treatment from Surkhet and went to India with her husband.

PC no. 23, 26/M 059/060 DHO treatment center Surkhet, he was not available at given address. PC no. 471, 45/F 059/060 DHO treatment center Khajura HP (Nepalgunj HP), he was negative and not attended health institution after 5 months. PC no. 383, 70/F 059/060 DHO treatment center Khajura HP (Nepalgunj HP), he was negative and not attended health institution after 5 months because he has been to India. PC no. 405, 22/M 059/060, Bankatawa PHC (Samsergunj HP), he was negative

and not attended health institution after 4 months because of side effect according to his family members. PC no. 14, 1/F 059/060, Bankatawa PHC (Kohalpur SHP), he was negative and not attended health institution after 4.5 months because he has been to India with her parent. PC no. 341, 6/M 059/060, Bankatawa PHC (Bankatawa PHC), he was negative and not attended health institution after 4.5 months and not found. PC no. 86, 6/M 059/060, Bankatawa PHC (Bankatawa PHC), he was negative and not attended health institution after 1 months and not found.

From the experiences on the tracing of non compliance patients, patients were trying to continue treatment in different ways but weak cooperation from private sector to adopt NTP policy and not enough information given to the patients during the treatment starting time by DOTS centre staff about what could be the alternative solution, if patients have to move some where from the treatment centre.

11. CONCLUSIONS AND RECOMMENDATION:

11.1. Conclusion

In conclusion, the study of compliance of tuberculosis patients with treatment was conducted with main objective to determine the compliance of tuberculosis patients with treatment. The result showed 94 percent compliance of tuberculosis patients with treatment.

In socio-economic characteristic, the male female ratio was 2:1, 66.3 percent economically productive age group (15-49), most of them had lower level of education and farmer or low income with no occupation. There was higher education status, higher compliance of TB patients with treatment but not statistically significant. Regarding family size of respondents, small family size had higher compliance of TB patients with treatment and statistically significant with P value 0.015. In reference to ethnic of group respondent Terrain origin had statistically significant lower compliance with treatment with P value 0.00073.

In terms of occupation, the respondent, who had permanent nature of job (farmer), they had high compliance with statistically significant result (P value 0.004). Regarding income status of respondent, the low-income status group had low compliance of TB patients with treatment with statistically significant result (P value 0.035)

In information communication part, which had given information regarding about disease, taking regular medicine, self-protection and proper sputum disposal had higher compliance with treatment with statistically significant result. (P value- 0.00516, 0.0014, 0.0014 and 0.0341 respectively.)

Proper information to the patients is the main NTP tool to get high compliance for the developing countries even the DOTS treatment strategy but about 25 percent respondents had given the information by the health worker. All non-compliance respondents had not given information was the remarkable points of the study. Compare to Surkhet and Bardiya districts, Banke district had lower compliance might be due to the high caseload, mobile population and majority of terrain ethnic group (Yadav, Muslium & other).

In general it could be concluded that giving knowledge about tuberculosis and its treatment and content of the given information were not given properly for all respondents. Low educational status, poverty and large family size are the reciprocal factor to the low compliance of TB patients with treatment. These are the practical factors that affected the compliance of patients with treatment in Banke, Bardiya and Surkhet.

11.2 Recommendations

On the basis of the results of study, finding through interview / observation of the health facility, health service provider and respondents in DOTS treatment centre and sub centre, and finding from the study, following are the recommendation for better compliance of patients with treatment.

1. TB IEC programme should be lunched in treatment and sub-centre routinely.
   - ➢ NTP should develop key information message, make available in each and every level for the uniformity in message, to make convenient and time saving.
   - ➢ Orientation programme for service provider regarding the use of key information and commitment.

2. Health worker should give the key information regarding to the preventative measures to the patient with one his/her responsible family member or social worker who can take the responsibility to support the patients and health facility until completing full course of treatment.

3. Focus to large family, lower economic status, labor group and terrain ethnic groups (Muslim, Yadav, Musahar and others) especial management for drug admin and collection to those patients who cannot attend the fixed centre and time.

4. During the visit, health worker should ask patient, how are you? Today you look better than yesterday? to develop relationship between the service provider and patients.

5. Private practitioners have not been adopting NTP policy, so NTP problems based study finding should be presented on Private Practitioner workshop, and training-like advising not to take drug given by DOTS center.

11.3. Recommendation for future study

Noncompliance of patients with treatment is the big issue in tuberculosis control program, and there is not enough available behavioral information for program to get high compliance. Thus further study is necessary in the following topics

1. *Impact of private health services in patients' compliance behavior.*
2. *Gender issue in tuberculosis control program.*
3. *Appropriateness of knowledge and communication skill of health personal with tuberculosis patients*

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13. APPENDIX: QUESTIONNAIRE

District:

Date of interview: / / / /   day/ month/ year/

Name of Treatment Center:

Full Name of patients:

Name of interviewer:...

Use treatment card for following information:

Treatment started date: / / /   day/ month/ year

Patient Identity code no: [ ] 1) New   [ ] 1) Old (relapse, failure)

Type of TB: [ ] 1) Sputum +ve   [ ] 2) Sputum –ve   [ ] 3) EP

Treatment categories: [ ] 1) Cat 1   [ ] 2) Cat 2   [ ] 3) Cat 3

Please make the answer with check (√) according to the respondent's responses.

Part I: Socio-demographic factors:

1. Age (years): ....

2. Sex: [ ] 1) Male   [ ] 2) Female

3. How many family members living together:.........

4. What is your marital status?

     [ ] 1) Single   [ ] 3) Widow

     [ ] 2) Married   [ ] 4) Separated / divorced

5. What is your educational status?

     [ ] 1) Illiterate   [ ] 4) Secondary school

     [ ] 2) No. School but literate   [ ] 5) College, university

     [ ] 3) Primary school

Part II: Economic information:

6. What is your occupation?

     [ ] 1) Farmer   [ ] 4) Government official

     [ ] 2) Labor   [ ] 5) Private official

     [ ] 3) Trading / Marketing   [ ] 6) Other (specify) ....

7. How much yours' monthly family income?   ....Rs

Part III: Knowledge about disease:

Have you some type of following habits?

[ ] 1) Drinking alcohol

[ ] 2) Tobacco   [ ] 4) All

[ ] 3) Smoking   [ ] 5) Non of the above

8. Do you know what disease you have? ……………………If yes

What kind of disease?-mention name of disease-----------------

Your disease is communicable?

      [ ] 1) Yes   [ ] 2) No [ ] 3) Don't know

      a)Sputum exam

      [ ] 1) start   [ ] 3) 5month

      [ ] 2) 2month   [ ] 4) 8 month

9. What do you think, cause of TB?

      [ ] 1) Heredity   [ ] 4) Witch/spiritual

      [ ] 2) Smoking and alcohol   [ ] 5) Hard work

      [ ] 3) Some kind of micro-organism [ ] 6) Other (specify)…….

10. Can TB be cured?

      [ ] 1) Yes   [ ] 2) Doubtful

      [ ] 3) Not cured   [ ] 4) Don't know

11. How long do you need to take drugs?

      ………………...

12. Have you missed any time of drugs? (if miss day 7or more than 7, write it down in yes)

[ ] Yes   [ ] No(if no move question no. 15)

13. if yes how many times? (Mention days in bracket)

      [ ] 1) Once ( )   [ ] 2) Twice( )

      [ ] 3) Thrice( )   [ ] 4) More than three times( )

14. Why do you miss the drugs (cause)?

[ ] 1) Forget   [ ] 2) Night halt out side the house

[ ] 3) Physically not able to go to collect the drugs

[ ] 4) No time to collect drug due to job

[ ] 5) Drug side effects

[ ] 6) Not available drug in health facility

[ ] 7) Not presence of Health worker in health facility

[ ] 6) Other causes a. ....

15. Have you had any following symptoms after starting anti-TB drugs?

[ ] 1) Jaundice   [ ] 2) Joint pain

[ ] 3) Nausea and vomiting   [ ] 4) Peripheral neuropathy

[ ] 5) Visual impairment   [ ] 6) Skin itching

[ ] 7) Dizziness   [ ] 8) No any symptom

[ ] 9) Others ....

16. What will happen if you take irregular drug or not complete full course?

[ ] 1) Disease will be cured   [ ] 3) Die

[ ] 2) Disease will become more serious   [ ] 4) Nothing will happened

[ ] 5) Other (specify).......

17. Had you taken anti-tuberculosis drugs before?

[ ] Yes   [ ] No.

Part IV: About Tuberculosis services:

18. Have you received information (health education) about your disease and treatment from staff?

[ ] Yes   [ ] No. if no move to question no 20 ....

19. if yes, What kind of information (health education) you received ?

----

20. Do you have to collect drug your self?

[ ] Yes   [ ] No

21. How often do you have to come to collect the drugs?

    [ ] 1)) Weekly   [ ] 2) Once in month

    [ ] 3) Once in two weeks   [ ] 4) Other (specify).....

    [ ] 5) Daily.

22. What time do you have to come to collect the drugs?

    [ ] 1) Before 10 o'clock   [ ] 4) Any time

    [ ] 2) 10 - 12 o'clock   [ ] 5) Other specific time ....

    [ ] 3) 13 - 16 o'clock

23. Do you fell the given time to you for drug collection is convenient?

    (Q. no. 22 mentioned time)

    [ ] 1) Very convenient   2) [ ] Convenient

    [ ] 3) Not convenient

if not convenient, give reason why?...(We want to know the schedule time is not convenient due to occupation or other causes)

24. How long do you wait to get drug in every visit?

    [ ] 1) Don't have to wait   [ ] 3) 30 minutes to one hour

    [ ] 4) 1 - 2 hours   [ ] 5) More than two hours

25. Did you fell that time spend waiting to be seen by a provider was reasonable?

    [ ] 1) Very reasonable   [ ] 2) Reasonable

    [ ] 3) Not reasonable

26. Did you pay to get tuberculosis treatment / visit?

    [ ] Yes   [ ] No

    if yes how much.............Rs.

27. Do the health service provider used to ask you about your health and treatment?

    [ ] 1) Very often   [ ] 2) Often

    [ ] 3) Not at all

28. Do you used to ask any question/discussion related to your health & treatment with health personal?

    [ ] 1) Very often   [ ] 2) Often

    [ ] 3) Not at all

29. Do you think that health personal willing to help you for your treatment?

    [ ] 1) Very willing   [ ] 2) Willing

    [ ] 3) Not willing

30. Do you belies, you will be cured by given drugs?

    [ ] 1) Very much sure   [ ] 2) Sure

    [ ] 3) Not sure   [ ] 4) Not believes at all

31. How do you come to the treatment centre?

    [ ] 1) On foot   [ ] 4) Bus

    [ ] 2) Taxi   [ ] 5) Riksa

    [ ] 3) Own vehicle   [ ] 6) Other

32. How much do you spend for travelling (two way)per visit?   …………………………….Rs

33. How long does it take to come in the treatment centre from your house?

    ………….. Minutes/hours

34. Is there any problem in transportation from your house to DOTS treatment centre?

    [ ] 1) No problem   [ ] 2) Problems

    [ ] 3) Very much Problems

    If problems (2&3) go Q.no.35

35. What kind of problems

    [ ] 1) Need to wait for long period.   [ ] 2) Take long time in bus.

    [ ] 3) Buses are over crowded.   [ ] 4) High transportation cost.

    [ ] 5) Others ………………..

Thank you