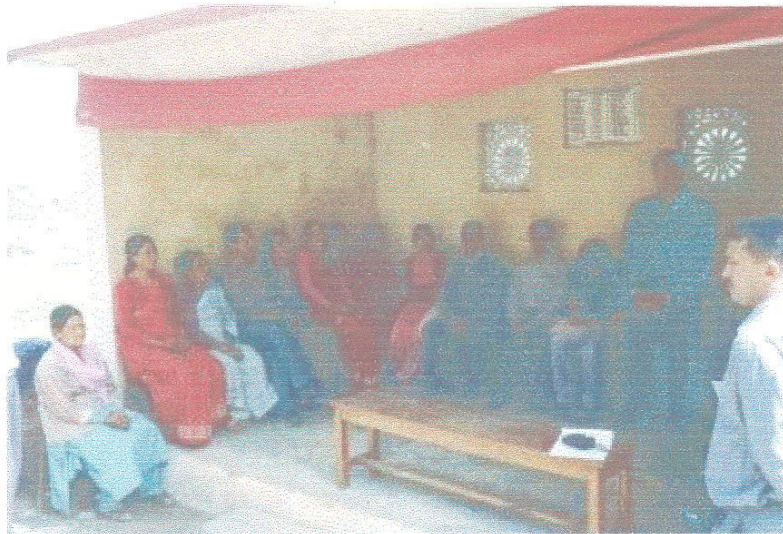




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NEPAL HEALTH RESEARCH COUNCIL
SOCIO-ECONOMIC IMPACT OF DOTS
STRATEGY ON TUBERCULOSIS CONTROL
(A case study of Bhaktapur district)



757



Study carried out by

Laxmi Prasad Subedi – Principal Investigator

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April 2003



EXECUTIVE SUMMARY

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The Directly Observed Treatment Short Course (DOTS) has considerable impacts on patients of tuberculosis in terms of knowledge, attitude and socio-economic condition. It is a cost effective strategy in tuberculosis control. DOTS has implemented in Nepal since 1995. Bhaktapur is the district from where DOTS has started. This study aimed to know the socio-economic impacts of DOTS on tuberculosis patients. The study was conducted from September 2002 - March 2003 at Bhaktapur district. In the study, 305 patients registered in 19 DOTS centers and sub-centers of Bhaktapur district from July 2002 - February 2003 was set as universe. Among these 120 patients from the nine different DOTS centers and sub-centers were considered for the study. A purposive sampling method was employed for the selection of respondents. Semi-structured interview, group discussion and key informant interview were performed to collect the primary information.

Tuberculosis affects all age groups, but it has greatest impact on adults. The most economically active (15-59 years) adults are under the high risk. Almost all caste/ethnic groups are infected with disease. The liquor (alcohol) using caste/ethnic groups are more vulnerable to the disease. Social and economic activities are accountable for difference in exposure of tuberculosis. The awareness level about the disease and its treatment rate correspond with the level of education. Case finding ratio was higher in literate than in illiterate.

Concerning land holding pattern, the respondents have poor economic condition and the land production is not sufficient for subsistence to their families' need. Tuberculosis has suffered more to those people who are facing food deficit and had low income. The majority of the tuberculosis cases were reported from wage earning group especially who were engaged in dust and germ producing work.

There is no significant change in occupation before and after the disease. Most of the patients absented and did less work during the treatment. DOTS helps to decrease the period of absenteeism (a week to two months). The treatment facility provided by the DOTS helped the patients to continue the occupation.

Majority of the respondents perceived tuberculosis as a completely curable disease. The motivation and education provided by the health workers and suggestion of the family member increased the awareness level of the patients about the treatment procedure and effect of the drugs. The drug irregularity period was found to be very short i.e. maximum 7 days. Strikes, side effect of the drugs, improvement of the symptoms, economic problem and somehow social stigma attached to the disease were reported as the major reasons for irregularity of drug consumption.



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The treatment facility of DOTS is accessible to all levels of the people. The people of all level were equally benefiting from the facility of free drug supply. The regularity was slightly higher among those who had distance less than 15-30 minute walk as compared to long walking duration to the DOTS centers. The perception and attitude of the patients family and social member about the tuberculosis has changed.

Most of the patients were informed that tuberculosis is communicable disease and referral practice found to be influenced by the educational status. The educated patients were practicing referral to family member for check up. Social status attached to the patients occupation and social stigma plays an important role in the acceptance of disease. The patients who were in high status in the society and jobholder were interested to keep secret about disease in them.

After treating with DOTS, majority of the patients can explain the symptoms of the tuberculosis and started to suggest other for the tuberculosis treatment when cough continues for two week or more with fever in the evening. Cough, fever, and chest pain were the commonest symptoms developed in the patients. Besides these, weakness, loss of appetite, headache, breathlessness, and blood in sputum reported as early symptoms developed in the patients. Transmission, alcoholism, smoking, physical stress, germs, dusts were mentioned as the important causes of tuberculosis. The perception and attitude of the patients family and social member about the tuberculosis has changed. Family and social support to the patients was found to be extended. Family and social members provide informative, advisory, economic and logistic support.

Expenditure for investigation, travel and nutritious diet was higher among the patients. The illness increased the expenditure (for medical treatment, transport and food) and loss of productivity, which reduced the income. Loss of workdays was highest among the wage labours. The cost incurred seeking diagnosis in private hospitals is higher than that in government hospitals. However, DOTS decreases the period of work loss due to its strong follow up and regular drug consumption provision, which ultimately helped to the patients to recover their income.

The curability of disease increases the level of confidence of patients and community members and plays an important role in the reduction of social stigma attached to the disease. The study concludes that DOTS is available and accessible to all level of the people and plays a significant role in reducing social stigma attached to the disease by curing the patient through regular supervision and observation. The case detection and treatment completion rates for the tuberculosis patients in the country may partly be influenced due to the inability of poor patients to cope with the socio-economic consequences of diagnosis and treatment.

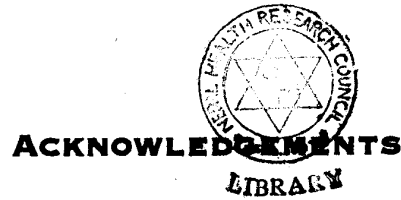


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From the result of the study, it is found that there is more significant role of the society to complete treatment and control tuberculosis. To improve the case finding, compliance and prevent the people from infection, it is necessary to develop strategic planning and implementation programme focusing the target groups. Health education is the most crucial. Especially the older ages, labour, farmer and illiterate patients should provide health education. Active use of mass media like television and radio should be made to educate people on preventive aspects and on information regarding tuberculosis.

Interaction and orientation activities about DOTS should be carried out involving family members together with the patients, and community volunteers at the DOTS centers. Cured tuberculosis patients should use as the advocator and educator to encourage to get the DOTS treatment in full course. DOTS committees should activate to provide informational and emotional support to the patients.

DOTS services need to expand near to the patient home using and mobilizing the family member and community volunteers, social organization. Investment in health research and development should be carried out on tuberculosis disease by both government and private sectors. The government for controlling the tuberculosis should conduct massive social mobilization campaign, public awareness and education program for tuberculosis.



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The completion of the present study is product of help and support of several hands. Special thanks go to all those respondents and the villagers visited during the study who shared their valuable comments, observations and feelings openly on the issues raised in this study.

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The study team

2003

CONTENTS



Acknowledgements
Acronyms
Contents
List of table
List of figure

I.	INTRODUCTION	1-5
1.1	Background	1
1.2	Statement of the problem	3
1.3	Objective	4
1.4	Justification of the study	5
II.	LITERATURE REVIEW	6-12
2.1	Brief history of tuberculosis	6
2.2	History of tuberculosis in Nepal	7
2.3	Tuberculosis as a social Disease	9
III.	METHODOLOGY	13-17
3.1	Study site and its justification	13
3.2	Nature and source of data	14
3.3	Sampling procedure	14
	3.3.1 Study population	14
	3.3.2 Sampling method	14
	3.3.3 Sample size and sample selection	14
3.4	Tools and Techniques for data collection	15
	3.4.1 Semi-structured interview schedule	15
	3.4.2 Focus Group discussion	15
	3.4.3 Key Informant Interview	16
3.5	Data management	16
	3.5.1 Validity and Reliability of data	16
	3.5.2 Data analysis	16
3.6	Limitations of the study	17
IV.	INTRODUCTION OF THE STUDY AREA	18-21
4.1	Brief Introduction of the District	18
4.2	Health institution and human resources	18
4.3	Information management	18
4.4	DOTS centers/ sub-centers in the district	19
4.5	Treatment registration and outcome under DOTS	19
4.6	Patients registered in DOTS treatment centers	20



V.	RESULT AND DISCUSSION	22-46
5.1	Distribution of respondents by age and sex	22
5.1.1	Distribution of respondents by age when tuberculosis diagnosed	23
5.2	Distribution of the respondents by caste/ethnicity	24
5.3	Educational status of the respondents	25
5.4	Marital status of the respondents	25
5.5	Land holding size of the respondents	26
	5.5.1 Food sufficiency	27
	5.5.2 Monthly expenses for food	28
5.6	Occupational status of the respondents	28
5.7	Curability of drugs	29
5.8	Perception on duration of treatment and regularity	30
5.9	Reason behind the irregularity or interruption	31
5.10	Health seeking and treatment behaviour	31
5.11	Distribution of the respondents by source of information	33
5.12	Symptoms develop in the patients	33
5.13	Accessibility of DOTS	35
5.14	Family care and support	36
5.15	Refer to family for checkup	38
5.16	Perception about tuberculosis	39
5.17	Gap between knowledge and practice	40
5.18	Economic impact	41
	5.18.1 Monthly income of the respondents	41
	5.18.2 Financial repercussion of the tuberculosis	42
	5.18.2.1 Additional expenditure incurred due to tuberculosis	43
5.19	Expenses of the patients for diagnosis and treatment	45
VI.	SUMMARY, CONCLUSION AND RECOMMENDATION	47-54
6.1	Summary	47
6.2	Conclusion	51
6.3	Recommendation	52

References

Annexes

LIST OF TABLE

Table No.		Page
1(a)	Distribution of respondents by age and sex	22
1(b)	Distribution of respondents by age of first attack	23
2	Caste of respondents by sex	24
3	Educational status of respondents by sex	25
4	Marital status of the respondents	25
5	Distribution of respondents by land holding size	26
6	Food sufficiency from the land production	27
7	Monthly expenses of the respondents for food	28
8	Occupation of respondents before and after with tuberculosis	29
9	Perception about the curability of drugs	29
10	Consequences of irregular treatment	30
11	Reason behind the discontinuing drug	31
12	Health seeking and diagnosis of tuberculosis	32
13	Source of advice to go for treatment	33
14	Symptoms developed in the patients	35
15	Accessibility of DOTS in poor people	36
16	Family care and support	37
17	Referral practice to family check up by sex and literacy	38
18	Wish to let other know about disease by sex and literacy	39
19	Monthly income of the patients' family	41
20	Yearly income of the patients' family	42
21	Additional expenditure incurred	43
22	Reason for loss of income	44
23	Sources of raising money to support additional expenditure and loss of income	45
24	Diagnosis cost for the disease (In Rupees)	45
25	Expenses during treatment	46

LIST OF FIGURES

Figure No.		
1	New and re-treatment cases by registration category	20
2	Treatment outcome rate since last three years under DOTS	20
3	Bacteriological status of the patients registered during July 2002-Feb 2003	21
4	Treatment regimen of tuberculosis cases registered during July 2002-Feb 2003	21
5	Distribution of patients by caste and ethnicity	24
6	Health seeking behaviour and diagnosis of tuberculosis	32

ACRONYMS

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BCG	=	Bacillus Calmette Guerin
CBS	=	Central Bureau of Statistics
DoHS	=	Department of Health Services
DOTS	=	Directly Observed Treatment Course
ESRC	=	East south Asian Region
EP	=	Extra Pulmonary
GH	=	Government Hospital
HMG	=	His Majesty's Government
INGO	=	International Non-governmental Organization
MOH	=	Ministry of Health
NATA	=	Nepal Anti Tuberculosis Association
NGO	=	Non-governmental Organization
NHRC	=	Nepal Health Research council
NTP	=	National Tuberculosis Programme
OPD	=	Out Patients Department
PPD	=	Purified Protein Derivative
PVT	=	Private Hospital and Clinic
SAARC	=	South Asian Association for Regional Co- operation
SCC	=	Short Course Chemotherapy
STC	=	SAARC Tuberculosis Center
T B	=	Tuberculosis
UNICEF	=	United Nations Children's fund
VDC	=	Village Development Committee
WHO	=	World Health Organizations

CHAPTER ONE

INTRODUCTION

1.1 Background

Tuberculosis is the world's most serious public health problem in spite of the availability of effective diagnostic and treatment measures. It is disease of great antiquity and is still a cause of mere suffering and death than any other bacterial infections. Tuberculosis is an infectious bacterial disease caused by *Mycobacterium tuberculosis*. Tuberculosis affects mainly lungs (pulmonary tuberculosis). 80 percent of the tuberculosis cases are pulmonary tuberculosis. It also affects the organs other than lungs, called as extra pulmonary tuberculosis. The important organs that are affected include bones, intestine, female pelvic organs (ovaries, tubes, endometrium), skin, brain and glands. Tuberculosis is the world's leading cause of death from a single agent (Goodle, 1993). Tuberculosis has become the number one infectious and killer disease globally (Key stone, 1993). One third of the world's population is infected with *M. tuberculosis*. There are 16 million people living with active tuberculosis. Every year 8 million new cases appeared and two million deaths occur due to tuberculosis in the world (STC, 2000a).

It has the greatest impact on youth and adults between the ages of 15-59 and has become the most common cause of death among adults (STC, 2000b). This population includes the most economically productive population in the society and parents on whom survival and development of the children depend. Therefore, social and economic burden of tuberculosis is great and it affects directly the future of people and nation. On the other hand, we have very effective anti-tuberculosis drugs to cure this disease. However, our experience with tuberculosis shows that the availability of drug is a necessary condition but not sufficient one. Despite the availability of effective drugs, the number of deaths due to tuberculosis is huge in the world and it has become an epidemic. Considering the

problem, World Health Organization (WHO) declared tuberculosis as a global emergency in 1993 and it advocated one of the most cost effective strategies available for tuberculosis control (ESAR, 1999). In 1995, WHO recommended Directly Observed Treatment Short-Course (DOTS) as a new method of treating tuberculosis (HOWE, 1999). DOTS is the strategy for improving treatment outcome to control tuberculosis by giving drugs to the patients under direct observation of health workers. DOTS has been found 100 percent effective to cure tuberculosis (STC, 2000).

Nepal is not the exception to this global health problem. Tuberculosis is also an alarming public health problem in Nepal. About 45 percent of the total population is infected with tuberculosis, out of which 60 percent are of productive age group (DoHS, 2002). Every year, approximately 44,000 people develop active tuberculosis, among them approximately 20,000 have infectious (smear) positive cases (Bam, 2000). Although the tuberculosis is a curable disease, mortality rate due to it is high. Tuberculosis is the commonest cause of adult death in Nepal and it kills approximately 10,000 people every year, 4000 of whom are women of age group 15-49 years. The tragedy is that most of these deaths are preventable (Malla, 1999).

Among the total infectious cases registered with the National Tuberculosis Program (NTP), only one-third have been reported to complete treatments (Malla, 1999). It is one of the important facts accountable for high mortality due to tuberculosis. Other factors contributing for high mortality are lack of awareness among people about tuberculosis and other socio-economic causes. National Tuberculosis Programme was launched in 1962 and DOTS strategy was adopted in 1995 under NTP with the main aim of reducing mortality, morbidity and breaking the chain of transmission of tuberculosis (NTP, 2001). In the beginning (1996), DOTS was initiated by establishing four demonstration centers in Bhaktapur, Kailali, Nawalparasi and Parsa. DOTS has been successfully implemented throughout the country by April 2001. By July 2001, DOTS has been expanded to 227 treatment centers and 684 sub-centers in the country, which is in the reach of 84 percent of population. Now in Bhaktapur, DOTS has approximately 90 percent treatment success rate, and the national treatment success rate has now reached to nearly 85 percent (DoHS, 2002).

Bhaktapur district is one of them from where DOTS strategy was rooted. In the district, 803 cases were registered from July 1999 to June 2002 (2056/57- 239 cases, 2057/58- 321 cases and 2058/59- 243 cases) and 305 patients were registered from July 2002 to Feb 2003 in 21 DOTS centers and sub-centers. Until 2001, case detection rate of 80 percent and cure rate of 85 percent was there at Bhaktapur (Annual report, DoHS, 2002). Though Bhaktapur is the nearest district from capital city of the country, it is one of the socially and economically backward districts. The people of the district have negative attitude to tuberculosis, and it is attached with social stigma about tuberculosis. From the beginning, DOTS is successful in leaving many positive impacts on patients and community. Obviously, DOTS has changed the awareness level of the people and attitude of the community to tuberculosis. The present study was carried out to find the socio-economic impact of DOTS over tuberculosis patients at Bhaktapur district.

1.2 Statement of the problem

WHO has declared tuberculosis as a global emergency and main stress has been given to improve case findings and cure rate. Ninety five percent of tuberculosis patients are the inhabitant of developing countries so these countries are main sufferer of the burden of tuberculosis. Tuberculosis is the leading cause of adult death in Nepal. It kills thousands of people in a year but most of the deaths are preventable. Therefore, tuberculosis is a growing problem in Nepal and case detection rate is largely limited by pre-existing socio-economic condition of the people in the country. It is important to understand the social and cultural determinants of patients' behavior in tuberculosis. A large number of patients with tuberculosis are inclined to hide that they are suffering from tuberculosis. Hence, social stigma as well as awareness level, peoples' status, interrelation of societies' members, cultural aspects and community participation plays an important role in the acceptance of disease and adherence to its treatment. These issues also increase the default rate. The default rate with SCC (Short Course Chemotherapy) was high. Therefore, to solve the problem DOTS was introduced. DOTS has very effectively reduced the default rate and defined as highly successful strategy for tuberculosis control. In spite of good cure rate, it has not achieved the target of case findings and default rate set by NTP. One of the

main factors behind this problem seems to be ignorance of socio-economic and socio-cultural determinants of society. Only epidemiological and clinical aspect of treatment will not be enough to deal with disease. The problem should be viewed in socio-economic and socio-cultural aspect as well. The success of DOTS strategy depends on the changing attitude and behavior toward treatment. So far, we lack information on perception/attitude and awareness level of the patients towards tuberculosis and DOTS. Therefore, it needs a lot of research and study about the impact of DOTS. It is essential to search access of DOTS to the poor people. The reciprocal action of the individual and the community towards the disease has to be accounted. The present study is carried out to find the attitude and awareness level towards certain aspects of tuberculosis and impacts of DOTS in Nepalese context. The present study on impact of DOTS is directed in finding the answers of following questions.

To what extent DOTS has changed the opinion of patients about tuberculosis.

How far is DOTS economically viable for poor people?

Are DOTS centers in access of patients?

Is there any social stigma attached to tuberculosis?

Has socio-economic condition played any role in case findings?

Do all the people understand and explain about DOTS?

How socio-economic condition is related with treatment?

What is the situation of default rate?

1.3 Objectives

The general objective of the study is to find out the socio-economic impact of DOTS strategy in tuberculosis patients registered for treatment in DOTS at Bhaktapur district. The specific objectives of the study are:

- To assess the access of DOTS in pro-poor people in the study area.
- To analyze the awareness level of patients about tuberculosis after introduction of DOTS.
- To identify the causes behind irregularity in treatment.

1.4 Justification of the Study

Tuberculosis is the biggest infectious killer of youth and adult causing more than one million deaths per month. DOTS is the most effective strategy available today for tuberculosis control (Jai, 1998). It has been suggested that DOTS works better in certain situation/countries, perhaps not at all in others, depending on local conditions and the level of public administration (Dixit, 1998). Population predominantly rural, prevailing superstitions, the social stigma attached to the tuberculosis and low community participation limited the betterment of treatment and control of tuberculosis. Only very limited studies have been conducted yet by focusing DOTS and its impacts. Moreover, the studies related to DOTS are concentrated mainly on clinical and epidemiological aspect. These studies are not accounting the socio-economic aspect of tuberculosis treatment, which could be very crucial for the improvement of treatment outcome. Considering all these facts, the present study on revealing the role of local condition and social institution on effective implementation of DOTS, will be valuable feedback for finding the effectiveness of DOTS on tuberculosis control. Moreover, it is expected that this would be the basis for the further research works in the subject. Findings of the study could be informative reference for the policy planners and researchers.

CHAPTER TWO

LITERATURE REVIEW

2.1 History of tuberculosis

The history of tuberculosis is as old as the human history. The traces of tuberculosis lesions have been reported in lungs of 3000 years old Egyptian mummies. The Greek physician Hippocrates (459-377 BC), "Father of medicine", wrote a description of the disease. In classic Greek times, it was known as phthisis, which is derived from the verb phthinein, means to waste away. It was in 17th century, that a Dutchman, Franciscus Sylvius of Leydebn, first used the term "tubercle" to describe the knobby lesions found in the lungs of the people who had died of the wasting disease (Kandel, 2000).

In 1882, German Physician Dr. Robert Koch announced the discovery of tubercle bacilli and published an article on "Etiology of tuberculosis". Within eight years, he had succeeded to prepare an extract of dead bacilli to form tuberculin purified protein derivative (PPD), which could be used as a diagnostic test of tuberculosis infection. French bacteriologists Calmette and Guerin developed a vaccine against tuberculosis from an attenuated form of the bovine bacillus in 1921. It is the only vaccine for the prevention of tuberculosis. Initially it was given orally during 1921-1925. Intra-dermal vaccination in human was made first in 1927. Tuberculosis workers from all over the world recognized importance of BCG in 1948 accepting it as a safe preventive measure. Afterwards the use of BCG became worldwide. Now developed countries have discontinued the use of BCG considering that, the tuberculosis has shifted in older age group but developing countries still have widespread use of BCG (Park, 1994).

With demonstration of efficiency of streptomycin (first tuberculosis antibiotic isolated by S.A. Wahsman from the soil fungi *Streptomyces griseus*) in 1944, the modern era of tuberculosis control began. A rapid succession of anti-tuberculosis drugs appeared in the following years: PAS in 1949, isoniazid in 1952, rifampicin in 1965. Despite the discovery

of tuberculosis bacillus in 1882, and of anti-tuberculosis drugs since 1944, efforts to control tuberculosis globally so far failed. The main reasons for failure include inadequate political commitment and funding, inadequate organization of services, inadequate case management and over-reliance on BCG (WHO, 1997). The most important break through of tuberculosis control came in 1977 after the impressive success of SCC. The SCC is the most effective way of curing every infectious patient and preventing the spread of tuberculosis in community (STC booklet). Several other studies afterwards have proved the DOTS strategy as one of the most cost effective health interventions of the 1990s.

The high burden of tuberculosis in many developing countries made tuberculosis control a priority public health concern that must be addressed through the primary health care network. Many developing countries, however, lack the systems and funding necessary to ensure the widespread effective application of anti-tuberculosis chemotherapy. The low cost and strong managerial approach of the DOTS strategy enable the effective use of available technologies (Sputum smear microscopy and anti-tuberculosis drugs) for tuberculosis control within existing health systems. Implementation of the DOTS strategy could be important in reducing the annual infection rate in the developing countries. Developing countries (such as Nigeria, Chile, Cuba and Uruguay) which have instituted efficient case finding with high cure rates since 1970s, have demonstrated the same effect. The consensus is that high cure rate supplemented by efficient case finding has an impact in decreasing the transmission of infection and the incidence of the disease (Narain, 2002)

2.2 History of Tuberculosis in Nepal

Tuberculosis is one of the major public health problems in Nepal. About 45% of the total population is infected with tuberculosis, out of which 60% are of the productive ages (NTC, 2002). Then Rana Prime Minister Chandra Samsher established a Sanatorium with 50 beds at Tokha, in Kathmandu in 1934. With the hard efforts of Dr. K. R. Joshi, the central chest clinic started functioning in 1951 at Mahabauddha, Kathmandu. Simultaneously from the community side, Nepal Anti-tuberculosis Association was established in 1953 as a NGO providing chest clinic services. In the same year, a Shining Hospital in Pokhara started treating tuberculosis patients by international Nepal fellowship.

In 1960, Sheer Memorial Hospital at Banepa started anti tuberculosis activities (Bam, 2003). National Tuberculosis Programme was launched in 1962 (NTP, 2001). In 1965, a tuberculosis control project established. HMG, WHO and UNICEF jointly started BCG vaccination in Kathmandu valley under the tuberculosis control pilot project in 1968. In 1969, the Shanta Bhavan opened the tuberculosis clinic at Patan. First, the integration of health services was started in Bara and Kaski district under the name of integrated community Health project in 1973. In the same year, INF started treatment of tuberculosis and Leprosy at Gorahi, Dang of mid western region. In 1975, tuberculosis control project expanded its activities to active case finding programme through sputum microscopy. The first National tuberculosis control seminar was held in Kathmandu in 1978, second in Biratnagar in 1980 and third in Pokhara in 1981. Based on the seminars, a tuberculosis co-ordinating committee was constituted to advise the ministry of health (MoH) for the formulation of the National tuberculosis control programme. In 1986, German Nepal tuberculosis project started OPD services in Kalimati under NATA. The short course intermittent chemotherapy started along with the culture and sensitivity tests (Bam, 2003).

With the help of Japanese Government, the HMG Nepal constructed National tuberculosis center in 1989. After the establishment of NTC, both the chest clinic and tuberculosis project merged into one organization under the name of NTC to strengthen the National tuberculosis control programme. The technical support in the areas of implementation of DOTS, planning, monitoring, programming, training, supervision, logistic, laboratory services, health information education, communication, and research related activities were made by the NTC (Bam, 2002b).

HMG and WHO jointly evaluated the tuberculosis control program. With the recommendations, DOTS was adopted as a policy in 1995 to formulate the five-year plan. DOTS was introduced in April 1996 covering 1.7% of population in the four demonstration sites of the country. The treatment success rate in the first cohort was above 89%. The encouraging results in holding tuberculosis patients by DOTS lead to expansion of DOTS. Gradually in 1997 DOTS had been expanded to 29 treatment centers and in the reach of 14 percent of population. In 1998, it was implemented in 41 treatment centers of 35 districts

with the coverage of 19 percent people. Similarly, in 1999, DOTS services had been provided to 53 percent of population of 48 districts implementing DOTS in 122 health institutions as the treatment centers. Likewise, in 2000, 75 percent of the population had access to DOTS of 66 districts from 178 treatment centers. By 2001, the programme had been expanded to 229 treatment centers with 843 sub centers and covers nearly 85 percent of population. (Bam, 2002b)

Community participation is one of the key elements of the success of the programme. In this programme, people from various institutions and levels are actively involved. One DOTS committee was formulated in each treatment centre involving local leaders, private practitioners, medical colleges, industries, volunteers, teachers, students, media people, social workers, tuberculosis patients, local NGOs and other organizations. The key role of DOTS committee was to solve local problems regarding tuberculosis. The other responsibilities of DOTS committee were preparing the plans for DOTS expansion, tracing late patients, coordinating with and supporting government health institutions and promoting the involvement of the community. (DoHS, 2001)

Expansion of this cost effective and highly successful treatment strategy, which already has proven its efficacy in Nepal, will have a profound impact on mortality and morbidity. By achieving the global targets of diagnosing 70% of new infectious cases and curing 85% of these patients, we will save 60,000 deaths over the next five year. High cure rates will reduce the transmission of tuberculosis and lead to a decline in the incidence of this disease, which would ultimately help us to achieve objective of tuberculosis control. (Bam, 2002b)

2.3 Tuberculosis as a Social Disease

Tuberculosis is a social disease as it also affects the socio-economic condition of the individual and society. The social factors include the non-medical factors such as quality of life, poor housing and over crowding, population explosion, smoking, drinking, under nutrition, lack of education, large families, early marriage and lack of awareness. All these factors contribute to the occurrence and spread of tuberculosis (Park, 1994).

The social and economic consequences of tuberculosis for individual and for society as a whole are huge in terms of human suffering, economic loss and decreased productivity (WHO, 1997). Awareness among people about the disease is the first step for the success of tuberculosis control programmes (Shakya, 1993). Incidence of tuberculosis is higher in men than in women. This apparent discrepancy may be explained by a combination of three possibilities: women do not get the disease, do not get treatment and get the treatment outside the formal health system (Smith, 1996).

The risk of tuberculosis varies according to the nature of the work and occupation. Risk of tuberculosis is highest in heavy drinkers, those living with someone who had a history of tuberculosis, cleaners and drivers (Rosenman and Hall, 1999).

A study conducted by the World Bank entitled "voice of the poor" highlighted the multi-dimension nature of poverty. Poverty includes a lack of material, well being, absence of infrastructure, lack of power and voice, and an unraveling of social structures. The Bank is collaborating with many more countries in supporting DOTS expansion, including tuberculosis financing in health projects in at least 14 of the 22 countries that carries 80% of the world's tuberculosis burden. In this way, WHO has committed to eliminate tuberculosis as a global public health problem by 2050 (Bam, 2002c).

The incidence of tuberculosis varies according to ethnic origin and socio-economic status and sex of people within a community; the major factors are overcrowding, standard of living and health care (Topely and Wilson, 1990). Tuberculosis was formally considered as a disease of the crowded, economically deprived and urban neighborhoods. However, it is now as much, if not more, a problem in the rural areas as in the cities (Juvekar *et. al.* 1995).

People with tuberculosis live in families and communities. These communities, in villages, town, cities, slums and factories provide valuable support to the member of the community. A basic principle of tuberculosis control is provision of care as close as possible to the patients' home. This may be in community to which the patient belongs. Indeed, in Nepal, experience has taught us that DOTS is most successful when local people

get involved with the DOTS committees. DOTS committees are able to solve local problems more effectively than that at NTC. In particular, DOTS committees have been involved in advertising tuberculosis and DOTS, in organizing home visits for patients who fails to attain for treatment and even accommodation for patients unable to travel from their homes to clinic (DoHS, 2001).

Tuberculosis is leading single infectious cause of female deaths in the world. Tuberculosis kills more women each year than all causes of maternal mortality combined, tuberculosis also deserves a place on the women's health agenda. Women in their productive ages have a higher risk of developing active tuberculosis than men of same age. It is estimated that the approximately six million women sick with tuberculosis at any given time, at least one third die because they are not diagnosed or received proper treatment. There are a number of reasons for this neglect, but money, time and transportation present the most significant barriers. Women often find it more difficult to access the health care services, because transport, time and cost are greater for women when viewed in light of their dual responsibilities at work and at home. In addition, some women have limited access to money, living in households where men control the purse strings and women are viewed as little more than property. Some women try to ignore their tuberculosis symptoms because they fear rejection or stigmatization from friends and family. Others simply lack basic information about disease and their bodies. (WHO, 1996)

Tuberculosis undermines economies in a number of ways. When breadwinners are too sick with tuberculosis and fail to work, they and their families become ruined. Additionally, family members most often have to take care of the sick person. Therefore, family loses other income opportunities. In all of these ways, tuberculosis can reduce self-sustaining family to beggar or welfare recipients. A person who is sick with tuberculosis often stop earning money, which they would have spent and fed back into the economy (WHO, 1996).

Medical (direct cost) and non-medical (cost incurred in travel and food) expenditure impose a disproportionate burden on poor household. Beside these, with tuberculosis, there is a loss of productivity and increase in debts. Care giving facilities of female patients decreased significantly, and both rural and urban female patients were reported to face rejection by their families. A fifth of schoolchildren discontinued their studies; an additional 8% took up employment to support their family (Rajeswari *et al.*, 1999).

Tuberculosis in women effected childcare more than other household activities such as cooking, cleaning, washing, and serving food. Childcare fell from 64% to 35% for rural mothers and from 74% to 33% for urban mothers. The study documented the impact of parental tuberculosis on their children, especially on their education and the income loss of patients needing their children to take up employment (Geetharamani *et al.*, 2001).

The verbal communication was the main source of information in rural, urban and metropolitan areas. The basic understanding of tuberculosis can be improved by means of health education. It is reported that there was an overall increase of knowledge on various aspects of tuberculosis, ranging from 18% to 58% (Subramanian *et al.*, 1999).

Juvekar *et al.* (1995) reported that tuberculosis was found mostly in young, married and people of lower socio-economic class. According to the study, patients have enough knowledge about the disease to recognize the symptoms and take action when they get the symptoms. However, inability to adhere to and complete the entire course of treatment is due to social, economic and health service related problems.

The distance to the health center has greatest significance for the treatment completion and case finding. The additional expenditure was incurred in 81% of the patients to supplement their diet. The stopping work, less work or frequent absenteeism etc. incurred loss of income among the 52.4% patients. Nearly half of the patients had managed their expenditure increment by raising money through different sources. Among them, 93% had managed by taking debts (Sophia *et al.*, 1999).

The economic consequence of tuberculosis is devastating among the households with below the poverty line. In this group, annual income is too low to meet regular demands. Either more than 20% patients' household in all income groups reported income reductions due to the patients' or their caregivers' decreased ability to work. The patients managed their increased financial demands through reduction in expenditure for items that are not vitally important. To cope with the illness related expenditure and income reductions, patients most frequently used transfer payments from relatives and their own saving. Particularly in the lower income groups, patients also reported the sale of household assets and the use of bank loans (Kamolratanakul *et al.*, 1999).

A study in Pakistan noted that the stigma of tuberculosis on women was particularly harsh. Women with tuberculosis were likely to be divorced, and husband often took a second wife. Unmarried women with tuberculosis were likely to have more difficulty finding a marriage partner than those without tuberculosis (as cited in Hudelson, 1996). The compliance rate depends on the particular socio-economic and cultural context. Barriers to compliance especially relevant for women include lack of time, cash, transportation and replacement labour. Stigma associated with tuberculosis and its appropriate treatment is important influence on compliance (Hudelson, 1996).

Compliance with DOTS in the Kathmandu urban areas is affected by the knowledge about disease and its treatment, health education, directly observed treatment, traveling time, perception to susceptibility and benefits, and social support from family members and friends. DOTS provides the valuable opportunity to control the tuberculosis epidemic, to reduce unnecessary deaths, and to prevent the spread of drug resistance (Bam, 2003).

CHAPTER THREE

METHODOLOGY

This chapter contains a brief description of methodology used by the researcher to fulfill the research objectives at various stages of research. Both qualitative and quantitative methods are employed in this descriptive, analytical study. The study was carried out with the application of field survey by face-to-face interview, focus group discussion and key informant interview.

3.1 Study site and its justification.

The study was conducted in Bhaktapur district of Bagmati zone, located in central region of Nepal. Bhaktapur district is one of the first demonstration and training centers where the DOTS strategy was implemented in 1996. In the district, there are 21 DOTS center and sub-centers, where nearly 800 patients are under treatment. All the patients registered in DOTS center were selected for the study. Tuberculosis control after implementation of DOTS is also satisfactory. Even though the DOTS is implemented from the beginning, case detection rate is very low as compared to NTP objectives (70 percent). Majority of the people in Bhaktapur are illiterate and backward. Newars and other caste people are the major inhabitants of study area. Their main profession was agriculture in the past. Now the situation is changed in terms of ethnic composition and subsistence activities. Most of the brick factories and carpet industries are centered at Bhaktapur. Majority of the workers in these industries were migrants having low economic condition.

The incidence of tuberculosis varies according to ethnic origin and socio-economic factors such as overcrowding, density of population and the general standard of living and health care (Bhatta, 1996). In Bhaktapur, these factors are the hindrances to overcome this problem. Thus, the discussion on socio-economic facets of the disease could be liable. Therefore, Bhaktapur district is selected as the study area.

3.2 Nature and source of data

Both qualitative and quantitative data were collected through two types of sources viz. primary and secondary. The study tools for quantitative method were individual face-to-face semi-structured interview, document review and analysis. For the qualitative methods, focus group and non focus group interviews and key informants interviews were used as the study tools. In order to get balanced opinions of the people, formal and informal discussions were done with the local people, patients, health workers and health professionals in terms of disease, level of awareness, their satisfaction and further steps to be taken.

3.3 Sampling procedure

The study was conducted among the tuberculosis patients registered in DOTS centers of Bhaktapur district.

3.3.1 Study population

Patients registered for treatment with one DOTS center, 19 sub-centers and one private sub-center at Bhaktapur district formed the study population. A total of 305 patients registered (from July 2002-Feb 2003) in DOTS centers of Bhaktapur district was set as universe.

3.3.2 Sampling method

Nine, out of 21 DOTS centers and sub-centers in Bhaktapur district were selected by stratifying sampling technique to find a mix of DOTS center, sub-centers, rural areas, urban areas and private centers with varying caseload. After reviewing the registration list of the patients it is decided to interview with those patients who were came to the center for drugs. Purposive sampling method was used for the semi-structured interview with the patients. Patients who are willing to talk with us and can provide information about our queries are included in the study.

3.3.3 Sample size and sample selection

The record available in the district DOTS center of Bhaktapur was reviewed. A name list of patients registered in the DOTS centers from July 2002 to Feb 2003 was prepared. Out of them, 120 patients (40% of the total) were selected for the study.

3.4 Tools and Techniques for data collection

The following techniques were used to collect the information in the study. A semi-structured interview, focus group discussion and key informants interview were the major tools of data collection.

3.4.1 Semi-structured interview schedule

A semi-structured interview schedule was developed based on information collected during the focus group discussion with health professional and review of the relevant literatures.

Preparation of questionnaire from proposal

After reviewing the literature on tuberculosis, a group discussion consisting of health worker was conducted over the similar draft of the interview schedule at district public health office. A set of questionnaire was prepared including the comments and advice obtained from the discussion. Initially the questionnaire was prepared in English and later translated into Nepali language.

Pre-test and results

Pre-test was carried out in the different DOTS centers and for which 12 patients were interviewed. After analyzing the result of pre-test and further discussion with health workers involved in DOTS, the necessary arrangement was made for the betterment of interview schedule.

3.4.2 Focus group discussion

Focus group discussions were conducted during the study period in different nine places/ VDCs. The participants in the group discussion were health professionals, social workers, health volunteers, community leaders, DOTS committee members, patients and villagers. A semi-structured checklist based on the study objectives was used for the group discussion.

Among all focus group discussions, three were conducted with patients, health workers and DOTS committee members, one with health post in-charge, four with local peoples and one with health workers specially involved in DOTS programme.

3.4.2 Key Informant Interview

To obtain in-depth information that is not covered by the interview schedule, some key informant interviews were performed during the study. For the key informant interview, a semi-structured checklist was developed in order to comprehend the development of tuberculosis and its treatment strategies, impact of DOTS in the patients and treatment outcome. Key informants were selected purposively as the individuals, who were familiar with the issue related to tuberculosis and its treatment strategies. The interviewed informants comprised of health workers-- working in community level and in the health center--, health assistants, health professionals and community health volunteers.

3.5 Data management

3.5.1 Validity and Reliability of data

The entire completed questionnaires were checked daily for completeness and error. Discussion was made with interviewer for reviewing if there is any missing information and additions needed. Repetition or double entry of data, collection of background information about patients and a cross check was done for validity of data. A combination of interview schedule, group interviews and key informant interviews helped to enhance the quality of information and the study.

3.5.2 Data analysis

The entire completed questionnaires were brought to the office for data entry and processing. The data entry operation consisted of office editing, coding, data entry. Although, all completed questionnaires edited in the field, for the quantitative information, SPSS was used for data entry, processing and analysis. For continuous variables, their mean was calculated. For the categorical variables, frequency and percentage were calculated.

For qualitative information, analysis was started from the beginning of the field study and field notes collected from the group discussion, key informant interview, observation and then questionnaires were categorized based on similarities of information. The analyzed data were presented in different topics and chapters in tables, charts and diagrams.

3.6 Limitations of the study

The study was conducted among registered patients in DOTS centers in Bhaktapur district. Therefore, the findings of the study may not be generalized to the all patients of tuberculosis.

As the mother tongue of all the team members was Nepali, it became an obstacle to them for the collection of information from Newari speakers. However, the problem was minimized by taking some interviewers capable to speak Newari. This situation has created little bit problem in correct interpretation because the researcher had to rely on interviewer. It was difficult to define the socio-economic status because most respondents were farmers who could not estimate their earnings and some were reluctant to answer their income level. In addition, significant percentage of respondents was youths who were unfamiliar with income and expenditure pattern of the family.

CHAPTER FOUR

INTRODUCTION OF THE STUDY AREA

This chapter deals with the brief introduction of the district, location of the study area and provides information about DOTS centers and their activities in the district.

4.1 Brief Introduction of the District

Bhaktapur is one of the districts of Bagmati zone situated in the central development region. This district is situated in 27°36' to 27°44' with latitude and 85°21' to 85°32' east longitude. It is surrounded by Kavrepalanchok district to the east, Kathmandu and Lalitpur to the west, Kathmandu and Kavre to the north and Lalitpur to the south. There are 16 VDCs, 2 municipalities and 2 constituencies. The total population of this district is 2,25,461 where male is 1,14,798 and female is 1,10,633 (CBS, 2001). Agriculture is main occupation and literacy rate is 59.15% (male: 69.20% & female: 49.00%) of the people (CBS, 2001).

4.2 Health institution and human resources

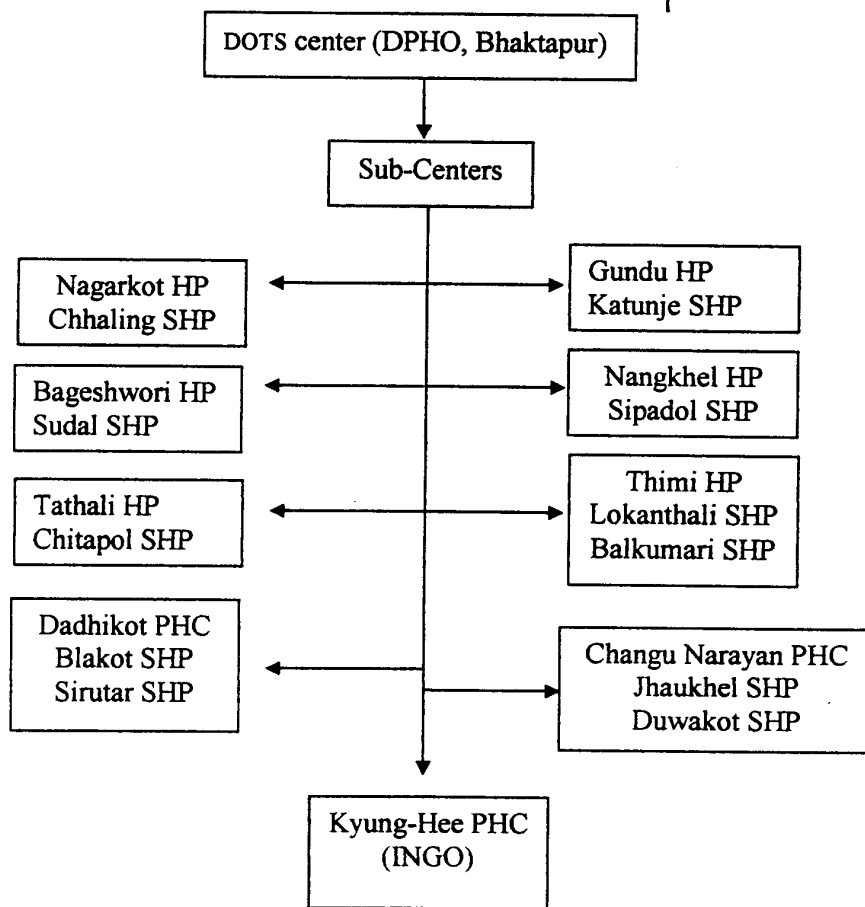
There is one district health hospital, two primary health care centers, seven health posts and twelve sub-health posts. Besides sanctioned governmental staffs, there are 189 female community health workers and 135 TBAs working in the community.

4.3 Information management

The information related to public health activities are collected from sub-health posts, health posts and concerned NGOs and INGOs on monthly basis in HIMS formats. The information related to tuberculosis control programme reporting format has recently revised. The format is designed based on cohort report but most of the DOTS sub-centers do not mentioned cohort report on monthly basis.

4.4 DOTS centers/sub-centers in the district

In 1995, the ministry of health (MoH) adopted policy of DOTS. After one year (in 1996), four DOTS demonstration centers were established. Bhaktapur is one of the demonstration districts. Twenty-one DOTS treatment center are functioning in the Bhaktapur district. There is 1 DOTS center, 1 sub center (run by INGO) and 19 sub centers, which cover the whole district.



4.5 Treatment registration and outcome under DOTS

Total 21 DOTS centers and sub centers carried out tuberculosis control programme in Bhaktapur district. The number of patients registered for treatment in these centers and sub centers and treatment outcome is shown in the figure 1 and 2. The detail statistics of case findings, sputum conversion and treatment outcome of tuberculosis patients registered (as provided by district treatment unit Bhaktapur) in last three years is given in annex 3.

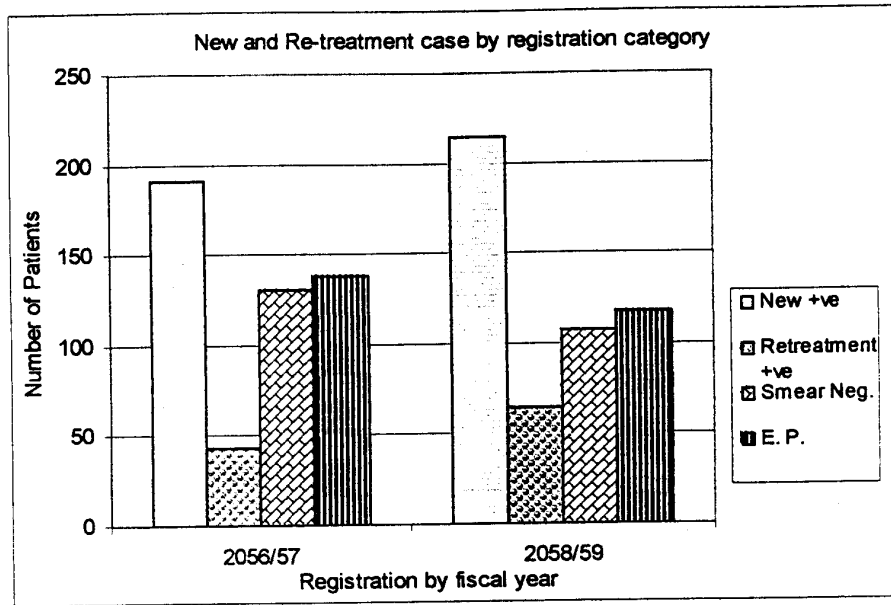


Figure1. New and re-treatment cases by registration category

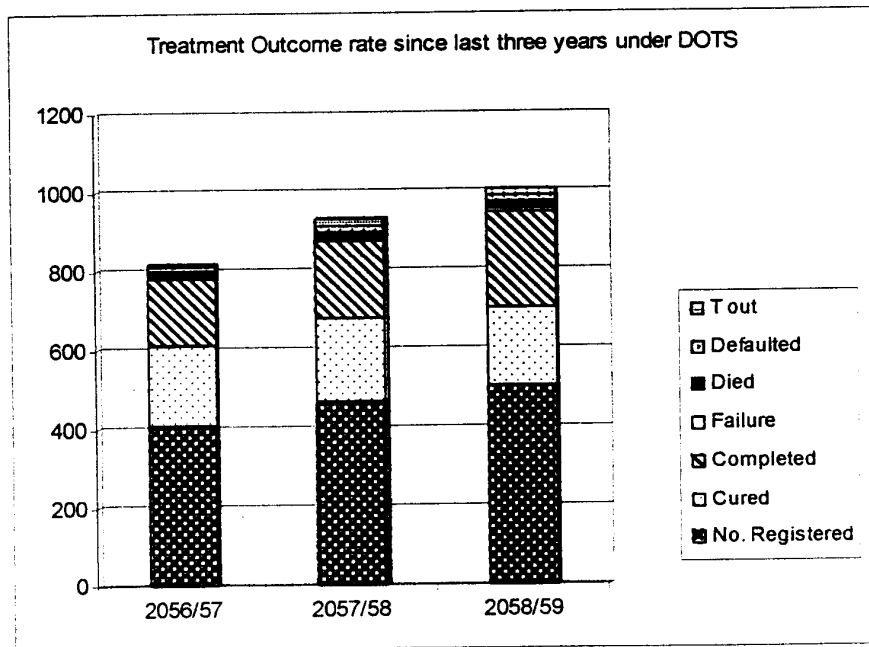


Figure2. Treatment outcome rate since last three years under DOTS

4.6 Patients registered in DOTS Treatment centers

Three hundred five patients were registered in the DOTS centers of the Bhaktapur district from July 2002 to February 2003. Among them 58.4% (178 patients) were male and 41.6%

(127 patients) were female. Among the total patients registered, 11 (3.6%) were reported dead, and 12 (3.9%) were transferred out during the treatment period. In terms of bacteriological status, 153 (50.2%), 68 (22.2%) and 84 (27.6%) patients were found to be smear positive, negative and extra pulmonary cases respectively (Figure 3). Twenty (6.5%) relapse cases were under treatment during this period whereas only two cases were found to be failure. Among the patients, 149 (48.8%) were in category first, 40 (13.2%) were in category second, and 116 (38%) were in category third (Figure 4). Distribution of the patients by case types and categories is given in annex 4.

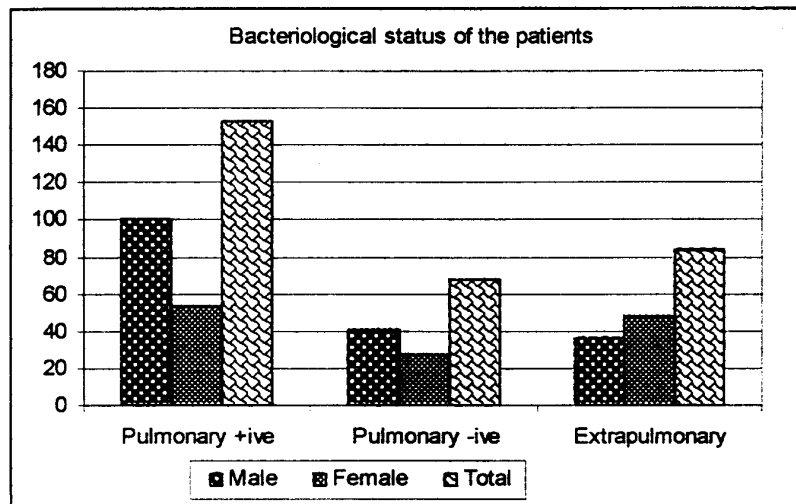


Figure3. Bacteriological status of the patients registered during July 2002 - Feb 2003

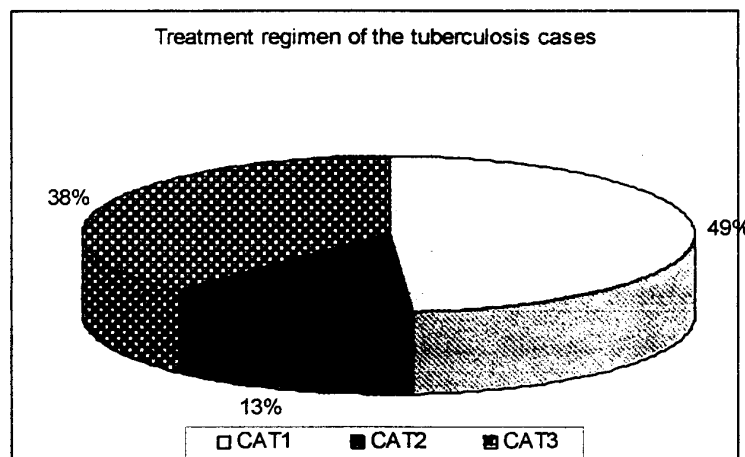


Figure 4. Treatment regimen of the tuberculosis cases registered during July 2002- Feb 2003

CHAPTER FIVE

RESULT AND DISCUSSION

The information collected from the patients of tuberculosis having their treatment in the different DOTS centers of Bhaktapur district are presented, analyzed and discussed under this chapter. This chapter mainly deals with socio-demographic characteristics of the patients, impacts of DOTS on patients regarding their socio-economic status, attitude and perception about disease and its treatment.

5.1 Distribution of respondents by age and sex

The age of respondents ranged from 10 to 88 years. The patients were categorized into three age groups (10-14 years, 15-59 years, 60 and above). The most affected age group was 15-59 years, which constituted 88.3% of total respondents. The study showed that the people of age group 15-59 years are under high risk. It is well known that adults aged 15-59 years are most economically productive individuals; they are also the parents on whom the survival and development of children depend. Thus, tuberculosis has potential to hamper the development of both individual and society. Regarding the sex, male patients constituted two third of total respondents whereas female accounted only about one third. The reasons behind less number of women respondents are their heavy workload, lack of mobility, independence and access to cash; all act as deterrents to seeking care from tuberculosis treatment services. Some women try to ignore their tuberculosis symptoms.

Table 1 (a)
Distribution of respondents by age and sex

S.N.	Age of the respondents	Male		Female		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
1.	10-14	1	1.3	3	7.5	4	3.3
2.	15-59	69	86.3	37	92.5	106	88.3
3.	60 +	10	12.5	-	-	10	8.3
Total		80	66.7	40	33.3	120	100

Source: Field Survey, 2003

In economically active age groups of male and female, the large proportion of female was found to be infected. About 92 percent female of active age groups were infected among total female respondents while this data for the male was about 86 percent. Thus, the women in their productive ages (15-59 years) have a higher risk of infection than men of the same age group have.

5.1.1 Distribution of respondents by age when tuberculosis diagnosed

The distribution of the respondents by age when tuberculosis diagnosed first is given in the table 1(b).

Table 1 (b)
Distribution of respondents by age of first attack

S.N.	Age of the respondents	Male		Female		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
1.	5-14	1	1.3	4	10.0	5	4.2
2.	15-19	8	10.0	12	30.0	20	16.7
3.	20-24	24	30.0	7	17.5	31	25.8
4.	25-29	11	13.8	7	17.5	18	15.0
5.	30-34	7	8.8	3	7.5	10	8.3
6.	35-39	4	5.0	3	7.5	7	5.8
7.	40-44	3	3.8	2	5.0	5	4.2
8.	45-49	6	7.5	1	2.5	7	5.8
9.	50-54	4	5.0	1	2.5	5	4.2
10.	55-59	2	2.5	-	-	2	1.7
11.	60+	10	12.5	-	-	10	8.3
Total		80	100	40	100	120	100

Source: Field Survey, 2003

The majority of respondents were of the age between 15-59 years. However, first tuberculosis attack rate was more in youth of age between 15-30 years, which accounted 57.5 percent of the total patients. The study revealed that the total 23 were the relapse cases. Majority (65.2%) of the respondents were unknown about the causes of relapse on them even they are following all precautions. Four patients (17.4%) were of the opinion that the cause of relapse might be discontinuity of the drug. Four (17.4%) thought that relapse of the disease on them may be due to the negligence in feeding habit.

5.2 Distribution of the respondents by caste/ethnicity

The study population includes most of the castes/ethnic groups like Newars, Brahmins, Chhetris and ethnic people. People of all of these castes/ethnic groups were found to be infected. Amongst, the Newars are in majority with 46.7 percent of total respondents. They constitute a dominant population of the district. The proportion of caste-wise infected people roughly coincides with the caste-wise distribution of population in the district. The ethnic people (Rai 3.3%, Magar 2.5%, Lama 4% and Tamang 12.6%) stands second major group with 22.5 percent followed by Brahmin (14.2%), Chhetri (13.3%) and Dalits (3.3%).

Table 2
Caste of respondents by sex

S.N.	Caste of the respondents	Male		Female		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
1.	Newar	34	42.5	22	55.0	56	46.7
2.	Mongoloid	18	22.5	9	22.5	27	22.5
3.	Brahmin	14	17.5	3	7.5	17	14.2
4.	Chhetri	10	12.5	6	15.0	16	13.3
5.	Dalits	4	5.0	-	-	4	3.3
Total		80	66.7	40	33.3	120	100

Source: Field Survey, 2003

Most of the Mongoloids such as Tamang, Lama, Rai, Sherpa and Limbu, working as wage labour in low-income job, are more susceptible to tuberculosis. Dalits may also be more susceptible to the disease but the case-finding rate in dalits is very low. Low case finding rate among them may be due to ignorance and poverty.

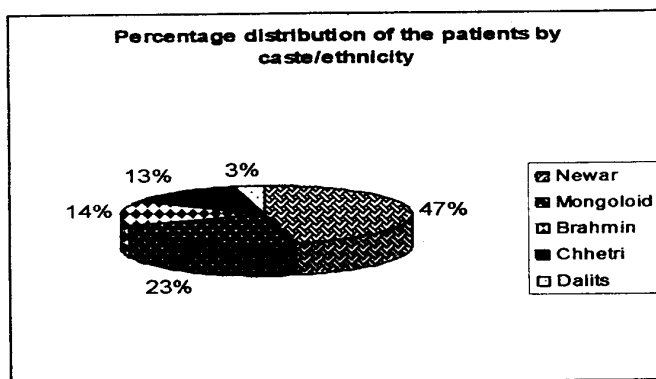


Figure 5. Distribution of patients by caste and ethnicity

5.3 Educational Status of the respondents

In Nepal, rate of school enrollment in higher level of studies is low as it is also determined by the economic factor. Education is the key factor that creates awareness in the people about disease. Therefore, it has direct influence in case findings and treatment.

Table 3
Educational status of respondents by sex

S.N.	Educational status	Male		Female		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
1.	Illiterate	26	32.5	16	40.0	42	35.0
2.	Primary	28	35.0	8	20.0	36	30.0
3.	Lower secondary	6	7.5	5	12.5	11	9.2
4.	Secondary	13	16.3	4	10.0	17	14.2
5.	College education	7	8.8	7	17.5	14	11.7
Total		80	66.7	40	33.3	120	100

Source: Field Survey, 2003

Sixty five percent respondents were found to be literate and 35 percent patients were illiterate. Among the literate patients majority were passed secondary education and nearly equal percent attend the college education. The study revealed that the level of awareness about the disease and its treatment was high according to the level of education. The case-finding ratio was higher in literate than illiterate.

5.4 Marital status of the respondents

The married couples have to rear children, when they got sick it also hampered the rearing pattern of the children. It may create the serious consequences in the physical and mental development of the children. On the other hand, married couple may be the major sources of transmission of tuberculosis.

Table 4
Marital status of the respondents

S.N.	Status	Frequency	Percent
1.	Married	80	66.7
2.	Unmarried	38	31.7
3.	Divorcees/ widows	2	1.6
Total		120	100

Source: Field Survey, 2003

Regarding the marital status of the patients majority of the respondents (66.7%) were married, followed by the unmarried (31.7%) and Divorcees/widows (1.6%). The study showed that the majority of the respondents were married and lives in a same place with their family and had to work hard for their subsistence. Married couples could be the major source of transmission. Hence, the infection in married people appeared as more serious problem.

5.5 Land holding size of the respondents

Land is the primary source of income for people rely on agriculture, which is also associated with socio-economic status, and has a connection with accessibility of food grains. The land holding pattern displays the economic condition of the patients. In this study, land is categorized into *Pakho-Bari* and *Khet*. The present land holding pattern among the sampled patients is given in the table 5.

Table 5
Distribution of respondents by land holding size

S.N.	Land size (in Ropani)	Khet		Bari	
		Frequency	Percent	Frequency	Percent
1.	0-1	14	15.6	16	33.3
2.	2-5	32	35.6	23	47.9
3.	6-10	14	15.6	3	6.3
4.	11+	30	33.3	6	12.5
	Total	90	100	48	100

Source: Field Survey, 2003

Majority of the respondents (85.5%) had either *Khet* or *Bari* or both. Out of the respondents' land holding, three fourth (75%) had *Khet* and 40 percent had *Bari*. Out of *Khet* holder respondents, above one-third (35.6%) had 2-5 ropani and 33.3 percent had more than 10 ropani *Khet*. Similarly, 15.6 percent had 0-1 ropani and the same number had 6-10 ropani *Khet*. While among the *Bari* holder respondents, 47.9 percent had 2-5 ropani and 33.3 percent had 0-1 ropani, 12.5 percent had more than 10 ropani and least of them (6.3%) had 6-10 ropani. According to the respondents, normally the production of more than five ropani land can afford yearly subsistence need but only 36.7 and 18.3 percent of them hold required amount of *khet* and *bari* respectively.

The study revealed that the economic condition of the respondents on the basis of land holding size is poor and they have to subsist upon their own labour. They could get no food if they did not work even a single day. These conditions limited their timely check up and ability to pay for the drugs. Due to this weak economic condition, they have to choose either drug or food. In this chaotic condition, DOTS created the treatment access to poor people as it offers free treatment facilities to the patients.

5.5.1 Food sufficiency

For most of the respondents, their land production is not sufficient to meet their families' need of food. However, 21.6 percent respondents' households have access to sufficient food (for 12 month in a year) from their own land production. Majority of the inhabitants of urban area had only *Bari*, which is sufficient only for building house. They have to depend upon off-farm earnings for subsistence. 6.7 percent of the respondents those came from neighbouring districts, had land in their birthplace, also have to depend upon wage labour for subsistence.

Table 6
Food sufficiency from the land production

S.N.	sufficiency duration	Frequency	Percent
1.	0-3 months	28	27.2
2.	3-6 months	20	19.4
3.	6-11 months	21	20.4
4.	12 months and above	26	25.2
Total		120	100

Source: Field Survey, 2003

Among the total patients interviewed, 85.6 percent (103 patients) had their own land. Out of them, only 25.2 percent respondents' land production could meet their food grain demand for a year. While for majority of them (74.8%), land production could not meet their food demand so they are suffering from food deficit. The study revealed that 27.2 percent respondents' land production could meet the food demand for three months, 19.4 percent for 3-6 months and 20.4 percent for 6-11 months.

5.5.2 Monthly expenses for food

Among 103 landowner respondents, 92.2 percent used the land to cultivate for their own consumption. The annual production of the land could not meet regular demands of food for majority of the respondents, among them only 25.2 percent could meet the food demand from their land. Being landowner 7.8 percent respondents did not use their land for production and they bought food for 12 months. Monthly expenses made by the respondents to buy food grain are given in the table 7.

Table 7
Monthly expenses of the respondents for food

S.N.	Expenses per month (in Rs.)	Frequency	Percent
1.	1000-2000	49	52.1
2.	2001-2500	28	29.8
3.	25001-6000	17	18.1
Total		94	100

Source: Field Survey, 2003

25.1 percent of the respondents expend 1000-2000 rupees for food per month. 29.8 percent expend 2001-2500 rupees and 18.1% expend 2501-6000 rupees per month for food. The result revealed that tuberculosis has attacked more to those people who are suffered from food deficit and have low-income rate.

5.6 Occupational status of the respondents

The respondents have been categorized under seven different occupational groups according to the main source of income for the subsistence. In terms of main occupation, nearly one third of the respondents (33.8%) were involved in wage labour. It is followed by farm work (22.5%), business like teashop, vegetable shop, jewelry, carpet and kinara shops etc (10%), private and government service (5%), other groups 21.7% (including students 13%, hair cutting, teaching, driving and housewife etc.). Among the wage labour, the majority of the respondents (35.2%) are working in carpet factory in piece purchase, 24.3 % in masonry, 8.1 % in agriculture labour, garment and knitting each and 16.2 percent in others (Thanka painting, pottery, carpentry and in brick factory). The distribution of the respondents by occupation before and after tuberculosis is given in the table 8.

Table 8
Occupation of respondents before and after with tuberculosis

S.N.	Occupation	Before tuberculosis		After tuberculosis	
		Frequency	Percent	Frequency	Percent
1.	Wage labour	39	32.5	37	30.8
2.	Farm work	26	21.7	27	22.5
3.	Students	22	18.3	18	15.0
4.	Business	9	7.5	12	10.0
5.	Service	8	6.7	6	5.0
6.	None	3	2.5	6	5.0
7.	Others	13	10.8	14	11.7
Total		120	100	120	100

Source: Field Survey, 2003

5-7 Curability of drugs

A question was asked to the patients to know the perception of the mode of transmission of the disease. The data revealed that majority of the patients felt that tuberculosis developed upon them due to malnutrition and their nature of works. Some expressed that the disease transmitted from their family members and others. It is reported that the disease infected 35.8% (43) respondents' family members earlier. Use of common utensils, towel and living with the patients in the same congested room were also the mode of the transmissions reported.

Table 9
Perception about the curability of drugs

S.N.	Perception about curability of tuberculosis	Frequency	Percent
1.	Completely curable	109	90.8
2.	Not curable	5	4.2
3.	Don't know	6	5.0
Total		120	100

Source: Field Survey, 2003

The majority (90%) of the respondents believed that TB is curable. The belief on cure of the disease with drugs is being increased with the intervention of DOTS programme. They felt the improvement such as increase in weight, improve in appetite, stop bleeding and prevent cough etc. after the use of drug. These improvement experiences and already cured cases with drugs are the major reasons for their belief on drugs. Only 4% denied curability because of their experience of persistence of symptoms, not getting any relief from drug,

suffering from side effects and relapse (recurrence of the disease) cases. DOTS has proved to be the appropriate methodology for the treatment of tuberculosis and is the main thrust of the study.

5.8 Perception on duration of treatment and regularity

Majority (90%) of the respondents could tell correct duration of the treatment. They mentioned that the drugs should not be irregular. Out of total, 93% of the respondents were well informed about that the drugs should not be discontinued. The motivation and education provided by the health worker and suggestion of the family members are the major sources of information. More than 60 percent of the respondents knew that they could stop treatment after 8 months. During the treatment, the sputum conversion result should be negative. If the result is positive, they did not know how long drug should be continued. In response to the opinion about the consequences of irregular treatment, multiple responses were reported. The consequences mentioned by the respondents are given in the following table 10.

Table 10
Consequences of irregular treatment

S.N.	Consequences of irregular treatment	Frequency	Percent
1.	Disease will worsen	49	57.7
2.	Drug should take extra dose	33	27.5
3.	Disease may attack again	26	21.7
4.	Drug should repeat	11	9.2
5.	Develop drug resistance	7	5.8
6.	Person will die	6	5.0
7.	Don't know	17	14.2

Source: Field Survey, 2003

Majority (51.1%) of the respondents were of opinion that health deteriorates or disease will not be cured by irregular/intermittent treatment. 27.5 percent of the respondents reported that extra dose of drug should be taken if it is discontinued. This opinion is followed by disease may attack again (27.7%), the whole course of drug should repeat (9.2), unaware about its result (14.2%). Few of them (5%) perceived the consequences of irregularity results in death. The result revealed that people are taking tuberculosis as a normal disease

and there is very little chance of death due to tuberculosis. They believed on the cure of disease by drug in time if the drugs are taken regularly.

5.9 Reason behind the irregularity or interruption

Out of the total patients interviewed, most of them are aware about drug should be used regularly. Though the patients were well informed about the regular use of drugs, 18% of them interrupted drug use because of different circumstances. However, the interruption period was very short which was less than or equal to 7 days except one case which was 1 and 1/2 month interruption. The frequency of interruption was found greater in continuation phase than intensive phase. The reason given by the respondents about the irregularity of drug are given in the table 11.

Table 11
Reason behind the discontinuing drug

S.N.	Reasons	Frequency	Percent
1.	Due to the strike	6	33.3
2.	Too unwell to attend the clinic	4	22.2
3.	Due to the side effects of drugs	3	16.7
4.	Thought cured	1	5.6
5.	Others	4	22.2
Total		18	100

Source: Field Survey, 2003

One-third (33.3%) of the drug interrupted cases were due to the strike (Nepal Banda). Other reasons for interruption according to the patients were the side effect of the drug (here majority of side effect for drug interruption is jaundice) (16.7), inability to go to the clinic (weakness) (22.2%) and others 27.8% like being out of the town, thought to be relieved completely, lack of motivation etc.)

5.10 Health seeking and treatment behaviour

Patients used to go to the government (Public) hospital primarily after the appearance of the symptoms of cough, fever and apathy. Some of them also go to nearby clinic, private hospitals or nursing homes. According to data, most of the patients (60%) were found to go to government hospitals like Patan, Bhaktapur, Bir & Teaching hospital. In those families where the members are previously also suffered with tuberculosis were found to go to

NTC directly. Only few among these families were reported to visit nursing homes / clinics for the examination. In the early stages, most of the patients were found to use medicine against gastric, cough, fever etc. However, later on due to several reasons, they were found to change the health institution for check up. The reasons are the appearance of no symptoms of improvement, relapse of the similar symptoms, expensive medicines and service charges in the private clinics/ hospitals. This may be the reason for the vast difference in tuberculosis diagnosis data from early check up report.

Table 12
Health seeking and diagnosis of tuberculosis

S.N.	Health center	First contacted		Diagnosis of tuberculosis	
		Frequency	Percent	Frequency	Percent
1.	Public Hospitals	73	60.8	59	49.2
2.	National tuberculosis center	27	22.5	54	45
3.	Nursing home/Private hospital	9	7.5	4	3.3
4.	Private doctor / clinic	11	9.2	3	2.5
Total		120	100	120	100

Source: Field Survey, 2003

About 50% tuberculosis cases were found to be diagnosed in public hospitals. The data is about 10% less than first approach cases to these hospitals. Failure in the diagnosis of all the cases in public hospitals is due to the lack of access to all the facilities for diagnosis. Tuberculosis diagnosis cases are highly significant in NTC though the first approach of the patients is not so high. The rate of diagnosis in private hospital is low in comparison to the first approach cases.

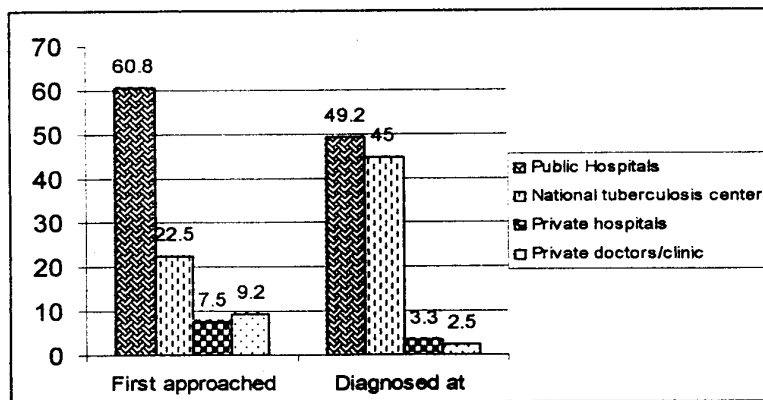


Figure 6. Health seeking behaviour and diagnosis of tuberculosis

5.11 Distribution of the respondents by sources of information

Communication is the key to disseminate knowledge and information from one person to another. There are different media influencing the patients to go for tuberculosis check up. The family member advised the patients go for treatment suspecting tuberculosis. Out of the total, 45 percent of the patients went for tuberculosis check up on the advice of family member. While 15.8 percent patients went for tuberculosis check up on the health workers' advise. The informal source (i.e. family member, friends, and boss) frequently advised for tuberculosis check up than formal source. The teachers in the school, head of the office also referred for tuberculosis diagnosis. The study revealed that social networking is more significant than formal sources for case finding and tuberculosis control.

Table 13
Source of advice to go for treatment

S.N.	Sources	Frequency	Percent
1.	Family members	54	45.0
2.	Friends	26	21.7
3.	Health workers	19	15.8
4.	Relatives	8	6.7
5.	Others	13	10.8
Total		120	100

Source: Field Survey, 2003

Members of community (family, neighbours and relatives) and other sources (radio, T.V., course books etc.) are the appropriate means for creating awareness among the public. In our society, the people went for check up only when the disease worsen them. Today we are practicing passive case finding. The role of the community found to be more important (influential) for the passive case finding. For this, if family and community member were aware and mobilized, the case-finding rate will increase.

5.12 Symptoms Developed in the patients

Majority of the patients came to know that they are suffered from tuberculosis after approaching private doctors. Majority (60.8%) of the respondents were found to go to public hospitals for treatment first, which is followed by NTC (22.5%), Nursing homes and

private clinics (16.7%). However, the diagnosis situation by health center was found different. The diagnosis rate of tuberculosis is high in NTC, which was double (45%) in comparison to the number of first visit cases of patients on developing symptoms.

Perception about the causes of tuberculosis of the respondents was assessed by using a question related to cause of tuberculosis upon them. Transmission, alcoholism, smoking, physical stress (heavy workload), germ/dusts were mentioned as the important causes of tuberculosis.

The respondents expressed that the maximum use of alcohol and smoke (cigarette) developed the disease. Some respondents viewed that tuberculosis was developed upon them by transmission from their family members who were infected by the disease previously. Some felt that being tuberculosis hospital in the main way (route) to Bhaktapur is source of transmission because they may be contaminated with patients during travel. Another significant cause was heavy work load (physical labour) 23.3 percent. The wage labours said that either they have to feed little or they should leave the food for the day they failed to go to work. Thus hardworking is must for their survival, which causes weakness and this weakness, ultimately influence the disease.

While concerning on their own symptoms, cough (79%), fever (65%) and chest pain (56%) were the most common. Beside these, weakness (48%), loss of appetite (27%), headache (26%) breathlessness (13%), idleness (10%), blood in sputum (6%), others (22.5%) were reported as early symptoms of tuberculosis. The patients suffering from aforementioned symptoms first take the general medicines of respective problems. Some patients get relief from the problems temporarily after taking the medicines but in long run effect of medicines is not encouraging. Majority of patients (2/3rd) could not get relief from the general medicines and remain suffered for 1-3 months. Afterwards, 50% of them suspect themselves as the patients of tuberculosis and went for treatment whereas rests of them (50%) were referred by health workers to go for tuberculosis checkup. The study revealed that some patients have knowledge about the symptoms of tuberculosis. Though they had idea about symptoms of tuberculosis, they were not found to practice it in the early checkup time.

Table 14
Symptoms developed in the patients

S.N.	Symptoms	Frequency	Percent
1.	Cough	95	79.17
2.	Fever	78	65
3.	Chest pain	67	55.83
4.	Weakness	58	48.33
5.	Loss of appetite	32	26.67
6.	Headache	31	25.83
7.	Breathlessness	16	13.33
8.	Blood in sputum	7	5.83
9.	Others	27	22.5

Source: Field Survey, 2003

Treating with DOTS, the health workers impart health education and now majority of the patients can explain the symptoms of tuberculosis and suggest others to go for the treatment when cough continues for two weeks or more with fever in the evening.

5.13 Accessibility of DOTS

The study revealed that majority (85%) of the respondents used to go to DOTS centers on foot. About 14 percent of respondents used public transportation to visit to DOTS centers followed by private vehicle (1.6 percent). There is no significant differences in expenditure for taking drugs, about 50% of the respondents have to pay house rent who came to DOTS centers on foot. By place of origin, 42.5% of the respondents came from different districts and they have to pay rent ranging from 500 - 1000 per month.

Table 15
Accessibility of DOTS in poor people

Modes of transportation	Frequency	Percentage
On foot	102	85.0
By bus	16	13.3
Own vehicle	2	1.6
Total	120	100
Traveling time (one way walking distance from place of residence to DOTS center)		
≤ 15	74	61.6
16-30	40	33.3
31-60	5	4.2
>60	1	0.8
Total	120	100
Travelling cost (Rs.)		
10-20	14	11.7
>20	4	3.3
Total	18	15
Place of origin		
Bhaktapur	69	57.5
Kavre	19	9.2
Dolakha	8	6.6
Sindhupalchock	9	7.5
Ramechhap	5	4.2
Solukhumbu	3	2.5
Sindhuli	4	3.3
Others	11	9.2
Total	120	100

Source: Field Survey, 2003

Regarding to traveling time, majority (61.6%) of the respondents spent less than or equal to 15 minutes to visit the DOTS centers followed by 16-30 minutes walk (33.3%), 31-60 minutes walk 4.2%. Considering traveling time, the DOTS centers were established within accessible distance. 93.3 percent respondents are convinced that the drugs should not be discontinued. In addition, the traveling time has significant relation with continuation of drugs. Therefore, 50% of the respondents live in rent nearby DOTS center for continuation of drugs and minimizing the traveling cost.

5.14 Family care and support

Concerning the family support to the tuberculosis patients, they are getting appreciable support from the family members. Family members played informative, advisory,

economic and logistic support roles. Other helps of the family member are reminding and supervising for drug consumption, collecting drugs if they are unable to collect drugs from DOTS center, assisting the works and advising to maintain food habit.

Table 16
Family care and support

S. No.	Family member response	Frequency	Percentage
1.	Supportive / No change	105	87.5
2.	Logistic /economic	37	30.8
3.	Reminding / supervising	45	37.5
4.	Take them uneasy	7	5.83
5.	Total Patients interviewed	120	100

Source: Field Survey, 2003

Majority (87.5) of the respondents' family members showed supportive attitude to the patients after tuberculosis attacked them. The relationship of the family members and the respondents was found as good as it was before they were attacked. Only 5.83 percent of the patients have faced no cooperation and felt rejection from the family members. 37.5% of the respondents got help from the family members by reminding and supervising to take medicine in time.

The family members of one-third patients used to provide logistic and economic support. These patients got better care from the family member during the treatment period in the way that they watch feeding habit and behaviour, give consolation. Besides these, the members of the family based on wage labour were also helped by taking extra responsibility of their work, they also provided enough money to buy tonic and drugs as well. One to two very interesting and heart-rending cases were also reported about the family support. The family member suffered from alcohol drinking habit showed very positive and exciting support to them because the disease released patients from that habit.

Some events of rejection and carelessness of the patients from the family member were also reported in the past. So they were compelled to live apart from the family and society. It was hard to establish marital relation with tuberculosis patients' family. Such type of social stigma was prevalent in Nepalese society. Now the situation is changed and the role of family and society became supportive. The curability of disease increases the level of

confidence that tuberculosis is also a disease like common cold and cough, which could be cured with regular use of drug.

5.15 Refer to family for checkup

Continuous health checkup system is not practicing in Nepal. Most of the Nepalese people are not aware about the early symptoms of the diseases. Generally, most of the people used to go health professionals or hospitals only after they are caught and become extremely suffered from the disease. The health workers working with DOTS provide minimum information about the effect and nature of tuberculosis transmission. Most of the patients were informed that tuberculosis is communicable disease and that could be transmitted to the family members. Health workers also advised the patients to send their family members for checkup. Out of total patients interviewed, only 21.7 percent patients advised (sent) their family member for checkup. This is not an encouraging number even though they were informed about the source of transmission of tuberculosis.

Out of total respondents, 18.3 percent considered that all the tuberculosis cases are communicable. Whereas 5.8 percent believed that the disease is not communicable which include the patients suffering from gland and skin tuberculosis. 58.3 percent respondents consider that tuberculosis cases may be both communicable and non-communicable and 17.5 percent could not tell about its communicability. Though they were informed about the communicability and referral to checkup, they were not found to practice it in life.

Table 17
Referral practice to family check up by sex and literacy

S.N.	Educational status	Male		Female		Total	
		F.	% of total male	F.	% of total female	F.	% of total patients
1.	Illiterate	2	7.7	3	18.8	5	11.9
2.	Primary	8	26.6	1	12.5	9	25
3.	L. secondary	1	16.7	3	60	4	36.4
4.	Secondary	3	23.1	-	-	3	17.6
5.	Above secondary	2	28.6	3	42.9	5	35.7
Total		16	20	10	25	26	21.7

Source: Field Survey, 2003

No significant difference was reported in referral practice for check up of their family members between male and female. Out of the total interviewed female, 25 percent of them referred to check their family member while the percentage of male was 20. The referral practice was found to be influenced by the educational status. The majority of educated patients were found to refer their family members for check up whereas this practice was not significant among illiterate. 18.8 percent of female patients referred their family for check up while 7.7 percent male were reported to do so.

5.16 Perception about tuberculosis

A question was administered to all the respondents whether they want to inform others about their disease. Majority (74.2%) of respondents believed that the disease should not be hidden and rest (25.8%) of them wanted to keep it secret. The major causes behind their interest of keeping it secret are the fear of being ridicule, laugh of friends and misbehave of the others on them, problem on job continuation etc.

Some of them said that no one provide them food, why it is necessary to inform others. The response about the secrecy of disease differed from people to people. Especially those who were of high status and jobholder were interested to keep secret about disease in them. However, the illiterate people, farmer and wagersworkers express that no matter for them whether other knows about it.

Table 18
Wish to let other know about disease by sex and literacy

S.N.	Educational status	Male		Female		Total	
		F.	% of total male	F.	% of total female	F.	% of total patients
1.	Illiterate	20	76.9	12	75	32	76.2
2.	Primary	22	78.6	5	62.5	27	75
3.	L. secondary	5	83.3	4	80	9	81.8
4.	Secondary	9	69.2	4	50	13	76.5
5.	College level	6	85.7	2	28.6	8	57.1
	Total	62	77.5	27	67.5	89	74.2

Source: Field Survey, 2003

About 67.4% of female respondents were found to be interested to keep secret about the disease while the data for male corresponds to 77.5%. Moreover, the more number of

literate patients want to keep secret about the disease than illiterate. With the increase in educational status, the percentage of the respondents willing to keep secret also increased. More than two third of the patients those attended only upto secondary level and illiterate patients had no hesitation to inform other about their disease. The attitude of these patients was that they did not want to be the cause of the disease for others by hiding it. They wish that the others would not be suffered from the same problem they faced. In addition, the information would encourage the others for taking precautions.

The patients those attended higher education and jobholders were not interested to inform others that they are the patient of tuberculosis. Some of them were of the opinion that what will others do if they knew about it, they had to face their problems themselves and it would not be cured if they informed others. Moreover, that information could create the problem of job confiscation. However, they were alert about transmission and own behaviour and made precautions while mixing with society.

5.17 Gap between knowledge and practice

A question put forwarded to know the level of awareness on which tuberculosis patients should be conscious. Study showed that the most of the patients were found to be well informed about what they need to do or not. Control in feeding habit (oily, sour and hot foods should be avoided), avoidance of alcohol and smoke, isolation of feeding dishes used by patients, taking care while sneezing and coughing, regular use of medicine as prescribed by the doctors, alertness while doing heavy work etc. were reported as the major conducts should follow by the patients during the course of treatment.

In spite of their knowledge on good conducts, they were not found to materialize these conducts in practice. Most of the patients believed that the sharing of the dishes and food used by the patients is the main cause of tuberculosis transmission. Among them, 39.2% (47 patients) were found to be using separate dishes and did not allow having the mourning meal. They were found to avoid alcohol, smoke and other restricted beverages in the intensive phase of treatment. However, after they feel a bit relief, they were found taking alcohol. Though they were familiar about high risk of transmission of disease from random

casting of sputum, majority of them did not pay attention for proper disposal of it. The study revealed that 11.7% (14 patients) buried sputum into the pit (ditch), 6.7 % (8 patients) flushed it into the toilet, 8.3% (10 patients) collected the sputum in polythene bag and cast it into the public container, 5.8 % (7 patients) spit in certain places where the movement of people is very rare. People with low economic status and living in rent are compelled to adjust whole family in a single room, could not be able to take care of them. These circumstances limited them to follow the safety measures. Yet few of them did not care while casting sputum. Though the people, living in rent, had knowledge about proper disposal of sputum in pit, they were failing to do so because of the lack of open land in a densely populated area.

5.18 Economic impact

The economic impact of DOTS / tuberculosis was assessed on the basis of the income reduction, additional expenditure incurred due to tuberculosis, financing method of such expenditure and treatment cost before and after diagnosis of tuberculosis. However, the tuberculosis patients get free treatment facilities under DOTS program, their economic condition is being affected directly or indirectly due to the disease.

5.18.1 Monthly income of the respondents

The economic mobility of the respondents mainly based on agrarian activities and wage labour. Some of them were operating own business. The level of income enables them to take initiatives in the health check-up. It also widens the vision of people in sharing perspectives and allows the individual to become conscious about health and nutrition. The monthly income of the patients' family is given in the following table.

Table 19
Monthly income of the patients' family

S. No.	Monthly income in Rs.	Frequency	Percentage
1.	100-2500	20	16.7
2.	2501-5000	46	38.3
3.	5001-10000	26	21.7
4.	10001-17000	11	9.2
5.	Don't know	17	14.2
Total		120	100

Source: Field Survey, 2003

The above table shows that patients' family earning is not very good. Majority of the patients' family (28.3%) earned only 2501-5000 rupees, next to it was 21.7 percent who make five to ten thousands. The patients' family income from the available resources (i.e. agricultural production, service, business, wage labour, remittance, rent etc.) was not sufficient to meet the various household cash needs, as they used to spend an average of 2220 rupees for food only.

The wage labours were reported to get payment in piece basis (especially, in carpet and thanka painting). This is a type of seasonal work. They could not find work throughout the year and no certainty exist their in getting work. This uncertainty reduced the yearly earning of the respondents' family. Besides, their inability to work during illness period is also responsible for the reduction in yearly income. The distribution of the yearly income of the respondents' family is given in table 20.

Table 20
Yearly income of the patients' family

S. No.	Yearly income in Rs.	Frequency	Percentage
1.	1200-10000	5	4.2
2.	10001-25000	15	12.5
3.	25001-50000	34	28.3
4.	50001-100000	14	11.7
5.	Don't know	17	14.2
Total		120	100

Source: Field Survey, 2003

5.18.2 Financial repercussion of the tuberculosis

Most of the respondents were wage labours and farmers. These respondents are failing to do their daily works because of the disease, which is the cause for the reduction in daily, and monthly earning. On the other hand, additional expenditure incurred due to tuberculosis. The increment in expenditure and reduction in earnings created a problem in their daily life. So they are compelled to search for alternative sources to compensate additional expenditure and income loss.

5.18.2.1 Additional expenditure incurred due to tuberculosis

Addition in the regular expenditure due to disease was reported from 67.5 percent of respondents. The most part of this additional expenditure centered on fruits, meat and vitamins. Normally the patients did not take the expenditure in fruits and meat as regular expenditure. Generally these items of food consumed in special occasion and the time of illness only in our poor society. The economic condition of the patients made them incapable of taking caloric diet in regular manner. Hence, the expenditure on nutritious diet was considered as additional expenditure. The additional expenditure of the patients due to tuberculosis is given in the table 21.

Table 21
Additional expenditure incurred

S. No.	Particular	Frequency (N=81 Patients)	Percentage
1.	Nutritious diet	73	90.1
2.	Other drugs	12	14.8
3.	Tonics	10	12.3
4.	Others	14	17.2

Source: Field Survey, 2003

Note: Total added due to multiple responses

90.1 percent respondents' additional expenditure was on nutritious diet. Majority of the respondents assumed that consumption of caloric food should be increased during the time of illness. This assumption was further strengthened by the advice of the health workers. 27.1 percent of the respondents spent money on tonics and other drugs to reduce side effect (weakness) of the drugs.

The study revealed that, 48.33 percent (58 patients) were facing problem of continuation of their job. Among these patients, 53.44 percent were in problem due to weakness and idleness, 13.97 percent were suffered by the disturbance in working hour due to the need of regular attendance in DOTS centers. Moreover, 6.1 percent patients were advised by the doctor not to continue their works, 3.44 percent confiscated from the job due to disease, and 22.41 percent were unable to attend the work regularly due to other reasons. Partial or complete inability to work during illness resulted income loss. The major reasons for income reduction are given in the table 22.

Table 22
Reason for loss of income

S. No.	Reasons	Frequency (N=48 Patients)	Percentage
1.	Less work	16	33.3
2.	Stopped work	12	25.0
3.	Absented	10	20.8
4.	Changed work	7	14.6
5.	Others	3	6.3
Total		48	100

Source: Field Survey, 2003

The major burden of the disease was observed as the reduction in income (financial burden). Overall 40 percent respondents (patients) stated that income loss had incurred due to disease indirectly. Among these, income loss was due to several reasons such as less work (33.33%), stop work (25%), change work (14%), and absenteeism (20.8%) etc. Specially, the patients in the intensive phase were affected significantly.

Majority of the respondents were engaged in wage labour and agricultural works. Their major sources of income are limited by illness as these are based mainly on physical effort. Reduction in their income automatically affects the use of nutritious diet and thus they become more susceptible to the disease. Moreover, they used to go for check up only after attack become severe and they become unable to do normal work. However, they were compelled to work for the livelihood. The patients working only for livelihood accounted 33.33 percent of the income lost group. 14.6 percent changed the type of the work due to long-term disability to return to work. Mainly agriculture dependant aged people stopped their work due to the disease. Wage labours, teachers, businesspersons and jobholders were among them who could not attend in their duty for a day to 2 months due to the disease.

Most of the respondents involved in the agriculture work and wage labour were compelled to do less work than what can they do. Some the respondents had altered their occupation, which includes driver, masonry, carpenters and others (works where the people are more susceptible to dusts and smokes). They were taking less workload and were earning lesser amount. Aged people were not doing any works. According to the data, reduction in earnings by Rs. 300 to 20,000 per month was reported from the respondents. Most of the respondents said that they were return to work after two months of treatment.

Table 23
Sources of raising money to support additional expenditure and loss of income

S. No.	Reasons	Frequency (N=81 Patients)	Percentage
1.	Regular income	46	56.8
2.	Transfers from relatives	26	32.1
3.	Own saving	8	9.9
4.	Loans	6	7.4
5.	Others	7	8.6
Total		93	

Source: Field Survey, 2003

Note: Total added due to multiple responses

In addition, the expenditure has to be met from incomes that are often additionally reduced by the illness. While patients are able to cope with the increased financial demands through reductions in expenditure for vitally less important items. Among the respondents with additional expenditure, majority (56.8%) of them had managed their additional expenditure by their regular income source. To cope with illness related expenditure, patients most frequently used transfer payments from relatives (32.1%) and their own savings (9.9%). 7.4 percent had raised money by incurring debts. 8.6 percent of the respondents were solving their financial problem from extra works by family members, with the support of boss and friends as well as selling valuable goods.

5.19 Expenses of the patients for diagnosis and treatment

The total cost incurred to diagnose the disease in different health institutions differ according to their types. Three types of health institutions for the diagnosis are National Tuberculosis Center- NTC, Governmental Hospitals- GH and Private Hospital/clinics- PVT. The distribution of the costs in three health facilities is given in the table 23.

Table 23
Expenses in the diagnosis for the disease (In Rupees)

Health facility	<100	101-1000	1001-5000	5001-15000	15001-41500	Total patients
GH	12	24	19	7	6	68
NTC	5	11	8	1	1	26
PVT	-	1	10	5	2	18
Don't response	-	-	-	-	-	8
Total	18	38	37	10	9	120

Source: Field Survey, 2003

The cost incurred seeking diagnosis in private hospitals is higher than the government hospitals. The above table showed that in private hospitals amount up to 1000 rupees seems to be valueless for diagnosis. The patients spent from 1000 to 41,500 rupees for diagnosis in PVT. The number of patients preferring GH for diagnosis was in majority with 45.8% (55 patients) who spent their up to 5000 rupees for the purpose. The cost made by the patients for diagnosis in NTC was comparatively least. The total of mean amount rupees 4350 was spent by the patients for consultation and drugs before diagnosis. The amount spent on diagnosis prior to start of treatment was also least in NTC.

The total cost incurred due to disease after diagnosis was very low as compare to the diagnosis cost. The patients could get drugs and consultation free of cost under DOTS programme that decreased the treatment cost.

Table 24
Expenses during treatment

S. No.	Expenses (In rupees)	Frequency	Percentage
1.	<100	57	47.5
2.	101-1000	29	24.2
3.	1001-5000	9	7.5
4.	Can't say	25	20.8
Total		120	100

Source: Field Survey, 2003

The average expenditure incurred corresponds to average of 483 rupees in the whole course of treatment after being registered in DOTS centers. This amount includes the expenses for sputum test, X-ray, registration, tonics and extra drugs for side effects.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATION

6.1 Summary

This study aimed to know the socio-economic impacts of DOTS on tuberculosis patients. The study was conducted from September 2002 - March 2003 at Bhaktapur district. In the study, 305 patients registered in 21 DOTS centers and sub-centers of Bhaktapur district from July 2002 - February 2003 was set as universe. Among these 120 patients from the nine different DOTS centres and sub-centres were considered for the study. A purposive sampling method employed for the selection of respondents. Semi-structured interview, group discussion and key informant interview were performed to collect the primary information from the patients and other concerned personnel. DOTS had considerable impacts on patients of tuberculosis in terms of knowledge, attitude and socio-economic condition. The results are discussed in terms of socio-demographic factors, access of DOTS to the patients, economic impacts, social impacts and awareness level.

- Tuberculosis affects all age groups, but it has greatest impact on adults. The most economically active (15-59 years) adults are under the high risk. 92.5 % of the female respondents and 86.3 % male respondents belong to the economically productive age group.
- Almost all caste/ethnic groups are infected with disease. The liquor (alcohol) using caste/ethnic groups are more vulnerable to the disease. The caste differential may exist in terms of the barriers for the detection and successful treatment of tuberculosis. Social and economic activities are accountable for difference in exposure of tuberculosis. The upper caste people are in majority for case detection while that accounted only 5 percent for disadvantaged groups.
- Level of awareness plays a key role in case detection and treatment success. Sixty-five percent are literate while 35 percent are illiterate. The awareness level about the

disease and its treatment rate correspond with the level of education. Case finding ratio was higher in literate than in illiterate.

- Two thirds of the respondents were married and lived in a same place with their families and they were able to hold equal responsibility of family as the other members. DOTS is responsible for creating this situation, as during the course of treatment, the disease will not be transmitted. Family members were the best information source for check up and taking care.
- Concerning land holding pattern, the respondents have poor economic condition and the land production is not sufficient for subsistence to their families' need. They have to subsist upon their own labour.
- Tuberculosis has suffered more to those people who are facing food deficit and had low income. Two third of the patients families' regular income also was not sufficient to meet the various cash needs.
- Twenty percent of the patients were not engaged in income generating activities. Out of the remaining, the majority of the tuberculosis cases were reported from wage earning group especially who were engaged in dust and germ producing work.
- There is no significant change in occupation before and after the disease. Most of the patients absented and did less work during the treatment. Majority of the patients returned to the work from a week to two months long absent/rest. The treatment facility provided by the DOTS helped the patients to continue the occupation.
- Majority (40 %) of the respondents perceived tuberculosis as a completely curable disease. The DOTS strategy has significant coherence with this result because it provides drug without any interruption. They also well informed that if drug is taken regularly, the death rate due to tuberculosis decrease obviously.
- The motivation and education provided by the health workers and suggestion of the family member increased the awareness level of the patients about the treatment procedure and effect of the drugs.

- The interruption or irregularity of drug consumption is negligible as compare to default duration, 60 days, set by the NTP. The drug irregularity period was found to be very short i.e. maximum 7 days. Strikes, side effect of the drugs, improvement of the symptoms, economic problem and somehow social stigma attached to the disease were reported as the major reasons for irregularity of drug consumption.
- The treatment facility of DOTS is accessible to all levels of the people. The people of all level were equally benefiting from the facility of free drug supply.
- The regularity was slightly higher among those who had distance less than 15-30 minute walk as compared to long walking duration.
- The perception and attitude of the patients family and social member about the tuberculosis has changed.
- Most of the patients were informed that tuberculosis is communicable disease and that could be transmitted to the family members. Health workers have advised the patients to send their family members for checkup. Out of total patients interviewed, only 21.7 percent patients advised (sent) their family member for checkup. This is not an encouraging number even though they were informed about the source of transmission of tuberculosis. There is no significant difference in referral practice for check up of their family members between male and female. It was found to be influenced by the educational status. The educated patients were practicing referral to family member for check up.
- Social status attached to the patients occupation and social stigma plays an important role in the acceptance of disease. Large number (74.2%) of patients in the present study accepted that they are suffering from tuberculosis and (25.8%) of them wanted to keep it secret. The patients who were in high status in the society and jobholder were interested to keep secret about disease in them. However, there were a few instances of stigmatization.
- The study revealed that patients have idea about the disease but they did not familiar with throat cut symptoms of the tuberculosis. Therefore, they could diagnose the

disease only after taking medicine for other effects, which take certain time for diagnosis. After treating with DOTS, majority of the patients can explain the symptoms of the tuberculosis and started to suggest other for the tuberculosis treatment when cough continues for two week or more with fever in the evening.

- Cough, fever, and chest pain were the commonest symptoms developed in the patients. Besides these, weakness, loss of appetite, headache, breathlessness, and blood in sputum reported as early symptoms developed in the patients. Transmission, alcoholism, smoking, physical stress, germs, dusts were mentioned as the important causes of tuberculosis.
- Family and social support to the patients was found to be extended. Family and social members provide informative, advisory, economic and logistic support. The support provided by the family improved treatment outcome by helping in regular consumption of the drugs. The curability of disease increases the level of confidence that tuberculosis is also a disease like common cold and cough, which could be cured with regular use of drug.
- Expenditure for investigation, travel and nutritious diet was higher among the patients. Loss of productivity and increase in expenditure was clearly shown in this study. Loss of workdays was highest among the wage labours, as patients lost wages for a period of 10-60 days. The income level of the patients is poor i.e. annual income is already considered too low to meet their regular demands. On the one hand, illness reduced income; on the other hand, it significantly increased expenditure for medical treatment, transport and food (table 20). The financial problem created due to the disease, patients have to sell some of their property or have to take loan who are not supported by family and relatives.
- The cost incurred seeking diagnosis in private hospitals is higher than that in government hospitals. The patients spent from 1000 to 41,500 rupees for diagnosis in PVT. The number of patients preferring GH for diagnosis was in majority with 45.8%

(55 patients) who spent their up to 5000 rupees for the purpose. The amount spent on diagnosis prior to start of treatment was least in NTC.

6.2 Conclusion

- Tuberculosis was found among all age group, the patients interviewed were mostly young, some educated, married, were engaged in wage labour, and belonged to poor economic condition.
- The treatment facility of DOTS is accessible to the all levels of the people. Especially the vulnerable groups such as poor, wage labour and farmers, illiterate, rural dwellers were equally benefiting from the facility of free drug supply.
- The illiterate and people of lower strata in the society still have low access to the treatment facility as compare to the upper strata due to lack of information about DOTS.
- The interruption in drug consumption is negligible as compare to default duration, 60 days, set by the NTP. The drug irregularity period was found to be very short i.e. maximum 7 days. Strikes, side effect of the drugs, improvement of the symptoms, economic problem and somehow social stigma attached to the disease were reported as the major reasons for irregularity of drug consumption.
- The regularity was slightly higher among those who had distance less than 15-30 minute walk as compared to long walking duration to DOTS center.
- There is no significant change in occupation before and after the disease. Most of the patients absented and did less work during the treatment. DOTS helps to decrease the period of absenteeism (a week to two months). The treatment facility provided by the DOTS helped the patients to continue the occupation.
- The illness increased the expenditure (for medical treatment, transport and food) and loss of productivity, which reduced the income. However, DOTS decreases the period of work loss due to its strong follow up and regular drug consumption provision, which ultimately helped to the patients to recover their income.

- The curability of disease increases the level of confidence of patients and community members and plays an important role in the reduction of social stigma attached to the disease.
- The perception and attitude of the patients family and social member about the tuberculosis has changed.
- Family and social support to the patients has extended. Mostly they provide informative, advisory, economic and logistic support to the patients.
- Most of the people (even respondents) are unaware about the symptoms, causes, treatment methods of tuberculosis. In addition, they have no idea about the DOTS and its positive aspects.

The study concludes that DOTS is available and accessible to all level of the people and plays a significant role in reducing social stigma attached to the disease by curing the patient through regular supervision and observation. The case detection and treatment completion rates for the tuberculosis patients in the country may partly be influenced due to the inability of poor patients to cope with the socio-economic consequences of diagnosis and treatment.

6.3 Recommendation

From the result of the study, it is found that there is more significant role of the society to complete treatment and control tuberculosis. To improve the case finding, compliance and prevent the people from infection, it is necessary to develop strategic planning and implementation programme focusing the target groups. They are as follows:

- The advice and motivation provided by the health worker was found more effective to improve the confidence level of curability on the patients. Therefore, health education is the most crucial. Especially the older ages, labour, farmer and illiterate patients should provide health education focusing on causes of tuberculosis, its transmission, duration of treatment, side effects of drugs, and methods of diagnosis, provision of the health facilities and benefits of DOTS.

- Active use of mass media like television and radio should be made to educate people on preventive aspects and on information regarding tuberculosis, its treatment with DOTS, availability and accessibility of DOTS services, impact of irregular treatment and benefits of DOTS treatment facilities within their reach.
- It has been found that the informative, advisory, economic and logistic support to the patients from the family member and friends has been significant for good result in tuberculosis control. Therefore interaction and orientation activities about DOTS should be carried out involving family members together with the patients, and community volunteers at the DOTS centers. It enhances the cure rate with DOTS. It could help to minimize the social stigma and improve the family relationship during the treatment.
- Information from the cured tuberculosis patients may play the significant role for the tuberculosis control. Cured tuberculosis patients should use as the advocator and educator to encourage to get the DOTS treatment in full course.
- DOTS committees should be activated to provide informational and emotional support to the patients. Interaction activities should be carried out at the DOTS center focusing the benefit of DOTS targeting the tuberculosis patients through DOTS committees.
- DOTS services need to expand near to the patient home using and mobilizing the family member and community volunteers, social organization. It would minimize the traveling time, cost, and enhance the compliance. DOTS has to be expand to industries and factories using their existing health clinics.
- Political support must be needed to overcome the global burden of tuberculosis disease. Investment in health research and development to be focused on tuberculosis disease by both government and private sectors.
- The government for controlling the tuberculosis should conduct massive social mobilization campaign, public awareness and education program for tuberculosis.

- Establishment and maintenance of monitoring system to be used for both program supervision and evaluation by the government.
- The government should give adequate information and knowledge about tuberculosis and its control for the active participation of the community and to implement the DOTS program successfully.
- Advocating is most essential to create community awareness, community participation and ultimately for the community action which is crucial for tuberculosis control. Therefore, it should be done in the community time to time.

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Annex 1: Interview schedule used for patients of TB

A. General Information

1. Name of the respondent:
 3. Age:.....years.
 5. Marital status:

2. Sex: [] Male / [] Female
 4. Education:
 6. Occupation:

B. Demographic Profile

1. How many members do you have in your family (sharing same kitchen)? (Number.....)
 2. Please provide personal detail of your family members below.

SN.	Name	Sex	Age	Marital Status	Education	Occu. Maj.	Occu. Sec.	Remarks
1.	HHH							
2.								
3.								
4.								
5.								
6.								
7.								

Coding System

Sex:

- 1 Male
 2 Female
Education:
 0 illiterate
 00 can read write

Marital Status:

- 1 Married
 2 Unmarried
 3 Divorcees
 4 widows

Occupation:

- 1 Farm work on own land
 2 Farm work on own land and sharecropping
 3 Sharecropping only
 4 Agricultural labourer
 5 off farm employment
 6 Seasonal migration
 7 Business
 8 Livestock raising
 9 Student
 10 other

C. Socio-Economic Profile

1. Do you have cultivated land? [] Yes. [] No.
 2. If yes, please provide the details below.

Land Type	Own land		Sharecropping others	Leased in	Remarks
	Own cultivated	Sharecropping			
1. Khetland * Irrigated * Rain fed					
2. Bariland					
3. Others					
Total					

3. How many months can the household provide it's own food?
 4. How much do you spend on food per month in those months when you have no own food?
 5. Sources of cash income

Agriculture	Month's earned		Annual income, in Rs.
• Cereal crops			
• Cash crops			
• Livestock			
• Milk products			
• Vegetable and fruits			
Horticulture / seeds			
Wage labour			
Formal employment			
Business			
Remittance/ rent			
Others.....			

D. Disease Aspects

1. What is the name of the place in which you usually live in?
2. Where do you go first for health services?
 Traditional healer Ayurvedic center Sub-health post health post Hospital
3. How long does it take to go to health centre?
 One way walking distance ... minutes.
4. How do you get there? And how many rupees do you spend? Rs.....
 Walking Bus bicycle motorbike other
5. Who told you to visit?
 Friend Family members relatives health workers community health volunteers
7. How long does it usually take to travel from your home to the DOTS center?.....minutes.
8. Is it easy or difficult to get there? If yes, how.....
 If no, how.....

E. TB confirmation

1. How long have you been suffering from disease?
2. Where did you go first to check up your problem?
3. When and where diagnosed as TB?
4. How old were you at the time of diagnosis? Years
5. Which method are you using for treatment?
6. For how many months have you been using drugs continuously?
7. Can you explain about the process of using drug?

8. Have you used the drugs of TB before this? Yes No
 If yes, When How long Months
9. Why the disease did not cure before? Give reason,

10. During the treatment period, how many times did you visit health professional?.....time.
11. Have you ever discontinued taking drugs?
 Yes No
12. What are the main reasons for discontinuing drug?

13. Total cost spent on drugs, travel, and visit to doctor and investigation for disease.

S.N.	Expenses in	Before diagnosis	After diagnosis
1.	Travel		
2.	Visit to Doctor		
3.	Investigation		
4.	Drugs		
	Total		

12. Any other expenses that have been introduced after you have started going for TB with DOTS?

13. How do you manage your expenses during treatment?

14. Do you usually work?
 throughout the year work seasonally part of the year, only once a week

F. Level of awareness

1. Have your any family member suffered by the tuberculosis?
 Yes No don't know
2. Did you know about the TB, before you are infected?
 Yes No
3. Is it possible for a healthy-looking person to have TB?
 Yes No don't know
4. Do you think that someone chances of getting TB is due to
 Heavy work load Smoking Use of alcohol work in dust and germs others
5. What type of work did you engaged before the disease?
.....
6. Do you think that "tuberculosis was developed in you due to your engagement in such type of work?"
If yes, How
7. How many types of TB do you heard?
 communicable Not communicable both don't know
8. Do you know about the feeding conduct of tuberculosis patient?
.....
9. Should drugs be discontinued?
If you forgot taking drug what should be done
What is the result of discontinuing drugs
10. Do you know about the side effects of the drugs?
Which effects were developed upon you?
11. How did you dispose the materials which were used by you?
12. Did you refer to your family for tuberculosis check up?
If yes, how many
13. Do you know about the DOTS committee working in your village?
14. Is it curable one?
 Yes, how..... No, how

G. Impact of DOTS

1. Has it hampered your job on going to treatment?
 Yes No
If yes, which one is the cause?
 confiscated from the work doctor advised for discontinue the work due to the provision of regular present in the DOTS center inability to do work others
2. How much earning has been lost due to need for going to treatment regularly?
.....
3. Has any side effects occurred due to treatment?
If yes,
4. How much extra cost has it needed to side effects?
Calculate the total amount,
5. Has side effects of drugs limited your working capacity?
If yes, what sort of limitation.....
.....

6. How long after starting treatment have you been able to go to your regular work?
.....
7. Has this regular routine affected your social participation?
.....
.....
8. Do you feel socially because of your regular routine for treatment?
.....
9. Has there been any change in attitude of other people on dealing with you after going to DOTS center regularly?
.....
10. Personally how do you feel after receiving treatment with DOTS?
.....
11. What do you feel bad about DOTS?
.....
12. Do you want to inform about your disease to others?
If not, Why
13. Has any body tried to influence on taking medicines by purchasing yourself?
If yes to what do they advocate for?
.....
14. How did you manage the cost for these?
.....
15. Any thing remains to say?
.....
.....

Thank you,

ANNEX 2

CHECKLIST USED IN FOCUS GROUP DISCUSSION AND KEY INFORMANTS INTERVIEWS

- Status of tuberculosis in Nepal.
- Treatment methods used in tuberculosis control.
- Status of patients treatment with DOTS.
- Condition of health service.
- Importance of communication. Regarding to case finding, treatment, follow up and control.
- Major techniques to be followed for the prevention of disease.
- Role of society to control tuberculosis.
- Default its causes and control.
- DOTS committee: committee formation, participation, activities, role and its effectiveness.
- Social stigma attached to the tuberculosis.
- Social mobilization and community participation.
- Perception and attitude about tuberculosis.
- Positive side and drawbacks of the DOTS.
- Consequences of DOTS. Social economic and cultural impacts.
- Symptoms, causes, and consequences of tuberculosis.
- Is tuberculosis is a disease causing sin.
- Process, duration and cost of treatment and drug consumption.
- Information sources about the tuberculosis.
- Role of family in case finding and tuberculosis control.
- The changes shown in the perception about tuberculosis.
- The precaution should made treating with tuberculosis patients.
- How the culture treat tuberculosis.
- What should be done to improve the tuberculosis control program in Nepal.

Annex 3

Case finding report by fiscal year (New and Re-treatment case by registration category)

Fiscal Year	New		Smear Positive						Smear Neg.			Extra pulmonary			Total	
	M	F	Relapse			Failure			M	F	M	F	M	F	M	F
			M	F	M	F	M	F								
2056/57	121	70	25	10	2	1	5	0	78	53	59	79	290	213		
2058/59	144	71	33	13	7	4	6	1	56	51	53	65	299	205		

Source: District Public Health Office, Bhaktapur

Treatment outcome of the tuberculosis cases registered in last three year in Bhaktapur district

Types of case	No. Registered	Cured	Completed	Failure	Died	Defaulted	Transferred out	No result
Fiscal year 2056/57								
New Smear positive SCC	180	163	0	3	7	5	2	6
New Smear Negative	85	0	79	0	2	3	1	0
New Extra pulmonary	97	0	90	0	2	3	2	0
Relapse	39	35	0	3	1	0	0	0
Failure	1	1	0	0	0	0	0	0
RAD (Note: P+ only)	5	4	0	0	1	0	0	0
Fiscal year 2057/58								
New Smear positive SCC	187	163	0	1	7	9	7	0
New Smear Negative	88	0	74	0	8	2	4	0
New Extra pulmonary	133	0	124	0	2	3	4	0
Relapse	46	42	0	0	1	1	2	0
Failure	3	2	0	0	1	0	0	0
RAD (Note: P+ only)	8	6	0	0	1	0	1	0
Fiscal year 2058/59								
New Smear positive SCC	191	166	0	8	3	8	6	0
New Smear Negative	131	0	115	0	6	5	4	1
New Extra pulmonary	138	0	125	0	4	5	4	0
Relapse	35	31	0	3	1	0	0	0
Failure	3	2	0	0	1	0	0	0
RAD (Note: P+ only)	5	4	0	0	1	0	0	0

Source: District Public Health Office, Bhaktapur

Sputum conversion of the tuberculosis cases registered in last three year in Bhaktapur district

Types of case	No. Registered	Negative	Positive	Died	Defaulted	Transferred out	No result
Fiscal year 2056/57							
New Smear positive SCC	185	157	16	7	0	2	3
Relapse	45	40	3	0	1	0	1
Failure	4	2	1	0	1	0	0
RAD (Note: P+ only)	5	5	0	0	0	0	0
Fiscal year 2057/58							
New Smear positive SCC	270	176	26	3	0	5	0
Relapse	40	36	2	0	0	2	0
Failure	3	2	0	0	0	1	0
RAD (Note: P+ only)	8	5	1	1	0	1	0
Fiscal year 2058/59							
New Smear positive SCC	191	167	18	4	0	0	2
Relapse	45	35	2	3	0	2	0
Failure	5	4	1	0	0	0	0
RAD (Note: P+ only)	5	4	0	1	0	0	0

Source: District Public Health Office, Bhaktapur

Annex 4

Number of patients registered in DOTS centers from July 2002 - February 2003 by case types and treatment regimen

DOTS center	Case types												Treatment regimen						Transfer in/out					
	P-ive		P-ive		EP		Total		R		F		Died		CAT1		CAT2		CAT3		T in		T out	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Bageshori																								
Balkot	4	2	3		1	7	3	2							1	2	3	1						
Changu	2			1		3									1	1								
Chitapol	1					1									1									
DPHO	45	36	24	16	16	29	85	81	3	2	1	5	3	45	42	8	6	32	33	9	1	10		
Duwakot	2						2	1	1							2			1					
Dadhikot			1				1												1					
Gundu							1													1				
Jhaukhel	1	1	1		3		5	1	1	1					1	2	1	2						
Katunje	2		1				3								2			1						
Kyung-Hee	16	2	5	6	3	27	10	3				2		9	5	6		10	5	2		1		
Nagarkot	2			1		3	2							1	1	2								
Nangkhel	2		2			4	1							1	1			3						
Sipadol	3					3								3									1	
Sinutar	1	1				1	1							1	1									
Sudal	3					1	3	1	1					2	1	1								
Tathali	1					1	2	1								1			2					
Thimi	15	11	4	3	9	11	28	25	1	2	1			15	11	4	3	8	12	2		1		
Total	100	53	41	27	36	48	178	127	15	5	1	7	4	85	64	30	10	61	55	14	1	12		

ANNEX 5: PARTICIPANTS OF FOCUS GROUP DISCUSSION AND INTERVIEWED KEY INFORMANTS

District level health workers interaction held in DPHO Bhaktapur

1	Maheshwor Shrestha	Senior public health officer, DPHO, Bhaktapur
2	Drupada Nepal	PHN, DPHO
3	Rajeshwori Sharma (Lamsal)	PHI, Nagarkot health post
4	Chandra Man Tamang	EPI supervisor, DPHO
5	Pashupati Bhakta Sitaula	PHI, Tathali health post
6	Mohan Jung Thapa	DPHO, Bhaktapur
7	Satya Kumar Duwal	HA, Bageshwori health post
8	Jaya Bahadur Bista	Senior AHW, DPHO
9	Bijaya Bahadur Shrestha	PHI, Gundu health post
10	Upendra Ghimire	PHI, Nangkhel health post
11	Dr. Jaya Prakash Shah	Medical officer, Primary health center, Dadhikot
12	Som Bahadur Panth	Lab Assistant, DPHO
13	Dev Bahadur Shrestha	DPHO, Bhaktapur
14	Phanindra Giri	Computer Assistant, DPHO
15	Dr. Bhaskar K.C.	Medical Officer, Changu-Narayan health post.
16	Pashupati Rana	Researcher
17	Bandana Sharma	Researcher
18	Rajendra Kumar Raut	Researcher
19	Laxmi Prasad Subedi	Principal investigator.

Thimi Health Post

1	Indraman Karanjit	Chairperson, DOTS Committee, Thimi.
2	Mrs. Ranjana Shah	AHW, Thimi health post
3	Mr. Binod Poudel	VHW, Thimi health post
4	Mrs. Sushila Shrestha	ANM, Thimi health post
5	Navaraj Phuyal	Thimi health post
6	Sunita Bajracharya	Thimi
7	Shiva Krishna Shrestha	Thimi
8	Aakash Tamang	Thimi
9	Anita Rana	Thimi

Nangkhel Health Post

1	Kumari Khadka	Teacher, Ram Lower Secondary School, Nangkhel
2	Saraswoti Khatri	Nangkhel-5
3	Tara Pariyar	Nangkhel-5
4	Indira Thapa	Nangkhel-9
5	Shyam Mohan Khatri	Nangkhel-5
6	Ramkrishna Khatri	Principal, Ram Lower Secondary School, Nangkhel

7	Basudev Karki	Nangkhel.
8	Shailising Rathor	Research officer, NHRC.
9	Shyamu Lama	Anthropologist.
10	Pashupati Rana	Resesrcher.
11	Ashesh Khanal	Researcher
12	Rajendra Kumar Raut	Researcher
13	Laxmi Prasad Subedi	Prinicipal Investigator

Nagarkot Health Post

1	Rajeshwori Sharma (Lamsal)	Public health inspector, Nagarkot
2	Lokendra Poudyal	AHW, Nagarkot health post
3	Purna Kumari Bhusal	ANM, Nagarkot health post
4	Ram Bahadur Lama	Village health worker, Nagarkot
5	Tsering Lama	Nagarkot

Balkot Health Post

1	Renuka Acharya	AHW, Balkot health post
2	Balaram Shrestha	Chair person, DOTS committee, Balkot
3	Bachchu Bhandari	Balkot
4	Shyamchandre Shrestha	Balkot
5	Rajkumar Thapa	Balkot
6	Indra Bahadur Shrestha	Balkot

DOTS Center, Bhaktapur

1	Gita Humagain	VCA, DPHO
2	Janak Kumari Dhakal	District TB Leprosy assistant
3	Narayan Devi Shrestha	ANM, DPHO
4	Urmila Acharya	Malaria Inspector
5	Bijaya Gnawali	Bhaktapur
6	Krishna Lama	Bhaktapur
7	Badri Shrestha	Bhaktapur
8	Ram Bhakta Manadhar	Bhaktapur

Key informants met

1	Vijaya Kranti Shakya	PHI, Changu Narayan primary health post
2	Bishworam Thapa	AHW, Jhaukhel sub health post
3	Narayan Krishna Nyayaju	AHW, Bageshwori health post
4	Bimalbabu Panta	AHW, Chhaling health post
5	Dilli Prasad Poudel	AHW, Sipadol health post
6	Jagat Lal Shrestha	VHW, Sirutar
7	Tara singh Bam	Stat Officer, STC, Thimi
8	Bhimsen Thapa	Director, Kyung-Hee international health center,
9	Janak Kumari Dhakal	District TB Leprosy Assistant, DPHO