

## **CHAPTER II**

### **ESSAY**

#### **Low Accessibility to Directly Observed Treatment Short-Course (DOTS) for Tuberculosis Patients in the Hilly Area of Lalitpur District, Nepal**

##### **2.1. INTRODUCTION**

###### **2.1.1. Tuberculosis (TB) situation**

###### **2.1.1.1. Global situation of TB**

TB is a global public health problem. There is high infection rate of tuberculosis in the whole population of the world. One third of the world's population is infected with TB bacteria out of which about 10% develop active TB once in their lifetime (WHO, 1997). Among the infected ones, 60% of the people are in the productive age of 15-55, which has a significant socio-economic impact on the society and countries (WHO, 1999). The global incidence and prevalence rates of TB are high. There are 80 million people living with TB in the world and every year, 8 million people get newly diseased with TB. TB is the single biggest killer of people among infectious diseases in the world. TB kills 5,000 people everyday and 2-3 million each year. More young women die of TB than any other causes and more than 10,000 children die of TB each year. TB is the cause of 25% of all avoidable deaths

in the world (WHO, 1998). These figures demonstrate an alarming situation of TB in the world.

Although there is TB control going on at a global scale, the TB problem is getting worse and it is expected to continue grow in the next two decades if TB is not controlled effectively (WHO, 1999). The spread of HIV-related and multi-drug resistant strains of TB is the emerging problem. Considering this global situation, WHO declared TB as a “global emergency” in 1993.

However, the TB problem is not uniformly distributed over the world. TB is mainly concentrated in the developing countries. 95% of all the TB cases and 98% of all deaths from TB in the world are in developing countries (WHO, 1998).

#### **2.1.1.2. TB in South East Asia Region (SEAR)**

The SEAR bears the heaviest burden of the TB problem in the world (WHO, 1998). 42% of the global incidence of TB occurs in this Region (WHO, 1998). 95% of those cases are concentrated primarily in five countries: India, Bangladesh, Myanmar, Thailand and Indonesia (WHO, 1998). TB is the biggest killer disease in the SEAR countries. More than 1,500 people die of TB every day and one million deaths occur every year, which comprises one third of the deaths in the world from TB (WHO, 1998). Moreover, the situation is likely to be further complicated with the rapid spread of HIV and an increase of multi-drug resistant strains in the region (WHO, 1998). Although there are TB control programs functioning in all countries, the efforts

to control the TB epidemic are still inadequate in this region (WHO, 1998). Therefore, TB is a more serious problem in this region compared to other regions.

### **2.1.1.3. The current situation of TB in Nepal**

Tuberculosis is a major public health problem in Nepal (DHS, 1998/99). Forty five percent of the total population in the country is infected with TB bacilli among which 10% develop active TB once in their lifetime. Nepal has the second highest incidence rate of TB among the SEAR countries. About 90,000 people are living with TB in the country. 45,000 people develop TB every year and 22,000 of them have pulmonary TB and are thus able to transmit the disease to other people (DHS, 1998/99). TB is one of the main five killer infectious diseases in Nepal. Sixteen thousand people die of TB every year in Nepal. Since 60% of all the infected people are in the productive age group of 15-45 years, it has enormous impact on socio-economic aspects of the family, community, and the nation (DHS, 1998/99). Because of the seriousness of the TB problem, it is imperative to conduct the TB program effectively in Nepal.

Table 2.1. TB incidence rate in SEAR countries.

Country	Incidence per 100,000 pop.
Bangladesh	57.9
Bhutan	64.5
Democratic People's Republic of Korea	4.9
India	115.0
Indonesia	19.6
Maldives	64.6
Myanmar	33.2
Nepal	105.6
Sri Lanka	38.1
Thailand	26.3
SEAR	88.0

Source: WHO, 2000.

### **2.1.2. DOTS program for TB**

#### **2.1.2.1. DOTS: A definition and concept**

DOTS stands for Directly Observed Treatment Short-Course. It is the strategy of TB control recommended by WHO in which TB patients are detected by microscopy examination of their sputum and treatment is provided under the direct observation of a trained person. Along with the treatment, the patients are provided counseling

support and follow up throughout the treatment period so that the patients will complete the treatment. DOTS is a technical and management package of a TB control program which comprises five elements: political commitment, microscopy center, short-course chemotherapy with direct observation, uninterrupted drug supply, and monitoring and supervision (WHO, 1999).

#### **2.1.2.2. DOTS: A strategy to control TB**

Realizing the devastating problem of an increasing incidence and prevalence of TB, and development of multi-drug resistance in the world, WHO declared TB as the “Global Emergency” in 1993. Since then, WHO recommended the DOTS strategy to address the problem of the global emergency of TB in the world. It is the only strategy to date that can ensure the WHO target of 70% case detection and 85% cure rate in the world (WHO, 1998). Any strategy of TB treatment, which doesn't achieve this target, cannot control the problem of TB at present. This strategy has been proven effective achieving a high success rate in some countries like Peru, Vietnam, Bangladesh and China. It is also the most cost-effective intervention and can be implemented in the existing Primary Health Care (PHC) system (WHO, 1997). That's why, it is necessary that the strategy should be implemented effectively.

#### **2.1.2.3. Treatment strategy in DOTS**

In the DOTS strategy, TB patients are diagnosed by microscopy examination of sputum. This is considered to be the most reliable and effective method for case

detection. If the patient is negative by the sputum examination, other secondary tests such as x-ray can be performed. DOTS follows a passive-case finding strategy. It does not however stress active case finding and it mainly addresses pulmonary TB, which is the serious and main type of TB. After the diagnosis, treatment is provided as per treatment guideline for 6 or 8 months depending upon the regimen adopted in a country. The first 2-3 months of the treatment, which is called the intensive phase, must be under the direct observation of a trained person. Swallowing the TB medicine in front of the observer is the key strategy of DOTS. Along with the treatment, the patient has to be monitored by periodic sputum test after two and five months and at end of the treatment. For every sputum test, three sputum samples are required-the first sample on the spot, the second from the early morning cough the next day, and the third, on the spot the next day.

#### **2.1.2.4. DOTS and treatment compliance**

Promoting patient compliance is the key to treatment success in the DOTS strategy. Many TB patients stop treatment before they complete the course for various reasons. It is not possible to predict who will or will not comply with the treatment (WHO, 1997). Non-compliance has been seen among patients of all ages, genders, education levels, ethnicity and all social groups. Many of the patients receiving self-administered treatment will not adhere to the treatment (WHO, 1997). It has been documented that 30% of the patients receiving self-administered treatment in the initial phase do not adhere to treatment (WHO, 1998). The only way of ensuring adherence is through direct observation of the treatment (WHO, 1997). Therefore, it is

very essential to directly observe the treatment for at least the first two months to ensure adherence.

### **2.1.3. Global situation of DOTS**

Despite the availability of effective strategy of DOTS, not many people in the world can get DOTS for TB. WHO TB Report (2000) states that 45% of world's population have been covered by DOTS program but only 21% of the pulmonary sputum positive patients have been treated under DOTS and the rest are under other treatment programs. Only one hundred nine out of two hundred and two WHO member countries have adopted DOTS in their national health program (WHO, 2000). But within the countries using DOTS, implementation is uneven (WHO, 1999). The access to DOTS is increasing every year but it is increasing at a slower rate than it should be. In SEAR countries where there are 42% of all TB cases in the world, the greatest number of TB patients are without access to DOTS (WHO, 2000). Only 10% of the population in SEAR countries have access to DOTS (WHO, 1998). Therefore, it is a critical situation that even though the effective package of TB control is available, the majority of the TB patients in the world are not having access to DOTS. Because of this, the TB epidemic is remaining in the same condition in the world despite the availability of DOTS.

#### **2.1.4. Situation of DOTS in Nepal**

Following the review of National Tuberculosis Program (NTP) jointly by His Majesty's Government (HMG) of Nepal and WHO in 1994, the DOTS program was adopted in the national health policy in the five-year plan (1995-1999). The first DOTS program was started in four districts of Nepal as a demonstration project in 1996. The five-year plan also had set the target to cover 100% of the country population by the end of 1999 (DHS, 1998/99).

The demonstration projects achieved excellent results with a cure rate of 89% which is higher than the WHO target (DHS, 1998/99). This achievement encouraged the NTP to expand the program to other parts of the country covering 68% of the country population in 2000 (NTC, 2000). The reports on the DOTS program show that the program is successful meeting the WHO target of 85% cure rate.

However, access to DOTS in the hilly region has been a major challenge for the NTP in Nepal (DHS, 1998/99). Even though the national coverage of 68% is much higher than the global and SEAR figures, the coverage is low in the hilly region of the country. DOTS has been implemented mainly in the Terai belt, cities, and accessible district centers (WHO, 1998). The hilly region of the country, which occupies 44% of the total population and 45% of land area, has low access to DOTS.



### **2.1.5. DOTS situation in Lalitpur District**

Access to DOTS in Lalitpur District is the focus of my essay. Lalitpur is one of the hilly districts in Nepal facing a high TB prevalence. The current prevalence rate of TB in the district is 15/1000 (DHO, Lalitpur, 2000) which is three times higher than the national average rate of 4-5/1000 (RECPHEC, 1997). Further, the average cure rate of TB in the district is 67% (DHS, 1998/99), significantly lower than the WHO target of 85%.

In terms of coverage of DOTS program, there are eleven DOTS centers functioning in the district at present (DHO, Lalitpur, 2000). However, all the existing DOTS centers are located inside the accessible valley in the urban and semi-urban area of the district whereas two third of the district area and 55% of its population is in the rural hilly area (DDC, Lalitpur, 2000). Reflecting on the DOTS situation in the district, the question is how many TB patients from the hills have access to DOTS services in this district?

On one hand, there are areas facing a complete lack of access to DOTS. Even in the area where there is a DOTS program in the district, not all TB patients have access to DOTS. The poor and disadvantaged population in the hilly area must not be ignored for getting access to DOTS services in TB control. Therefore, I will focus on the accessibility of DOTS program in the hilly area of this district.

#### 2.1.6. Definition of accessibility

WHO defines **accessibility** as a “continuous supply of care that is geographically, financially, culturally and functionally within the easy reach of the whole community. The care has to be appropriate and adequate in content and in amount to satisfy the essential health need of the people and it has to be provided by the methods acceptable to them” (WHO, 1978).

WHO further defines each of those four components of accessibility as follows:

“**Geographical** accessibility means the distance, travel time and means of transportation are acceptable to the people. **Financial** accessibility means whatever the methods of payment used, the services are affordable for the community and the country. **Cultural** accessibility means that the technical and managerial methods used are in line with the cultural patterns of the community. **Functional** accessibility means that the right kind of care is available on a continuous basis to those who need it, whenever they need it, and that it is provided by the health team required for its proper delivery” (WHO, 1978).

#### 2.1.7. DOTS and accessibility

The main purpose of the DOTS program is to increase patient compliance to TB treatment. To have patient compliance and achieve a high cure rate in DOTS, accessibility is most important. If there is access to DOTS, three TB patients out of

four will get definitely cured (WHO, 1998). But a patient is less likely to adhere to the treatment if the service is not accessible (WHO, 1997). In fact non-adherence to treatment is common in all the age groups, genders, races, educational levels, social and religious groups. “A patient’s knowledge about the disease has minimum effect on drug taking behavior” (WHO, 1997). If the DOTS service is not close enough to the patient, the patient may not adhere to the treatment throughout the duration of treatment duration leading to adverse treatment outcome.

Therefore, it is very necessary that DOTS services are convenient enough for TB patients so that they will complete treatment. And it is the health system that has to make the TB treatment accessible to patients so that they can adhere to it.

## **2.2. PROBLEM STATEMENT**

Despite the apparent high success rate of DOTS in Nepal, access to DOTS for TB patients is a serious problem in the most parts of the hilly region in the country. NTP has highlighted this problem as the greatest challenge (DHS, 1998/99). The hilly region is the major part of the country most of which has difficult terrain, lack of transportation and inadequately developed health infrastructure. In this situation, it is difficult for TB patients to receive DOTS services.

DOTS as a strategy itself, causes geographic inaccessibility to delivery of the services in the region. The long treatment regime of TB is a major obstacle for effective TB control program (WHO, 1999). Moreover, DOTS is a strategy where TB

patients have to get diagnosed at a microscopy center by passive case detection and take daily medication under direct observation by a trained person. Maintaining patient compliance to the treatment is the key purpose of the DOTS strategy. Because of this strategy, many TB patients from the hilly area cannot utilize the services at the DOTS centers.

Situation of access to primary health care services also implies to accessibility of DOTS as they are integrated. In fact access to PHC is a serious problem in Nepal. Only 15% of the total population have access to modern health care services in the country (MOH, 1995). The health sector review mentioned that two third of the country area, the hilly and mountainous regions where much of the population is located, are largely inaccessible for the health services (MOH, 1995). The problems and constraints in the health care system inevitably affect the DOTS program. In the same way, low access to the health services limit the potential effectiveness of the NTP (WHO, 1998). Therefore, access to TB DOTS is affected by the low accessibility of PHC especially in the hills.

In Nepal, almost all DOTS programs are based in the public health services. But, health services are usually not easy to reach in the hilly region (HMG, 1999). In terms of distance and travel time, one hour by walking or by usual means of transportation are considered as limits for accessible locations for health services (WHO, 1998). In the hilly area of the country, like Lalitpur, the distance is much greater for most of the people. Geographical problems, and lack of transportation to reach the health services in the hilly area compound the situation (WB, 1998). In addition to these obstacles, the weak physical condition of TB patients in general,

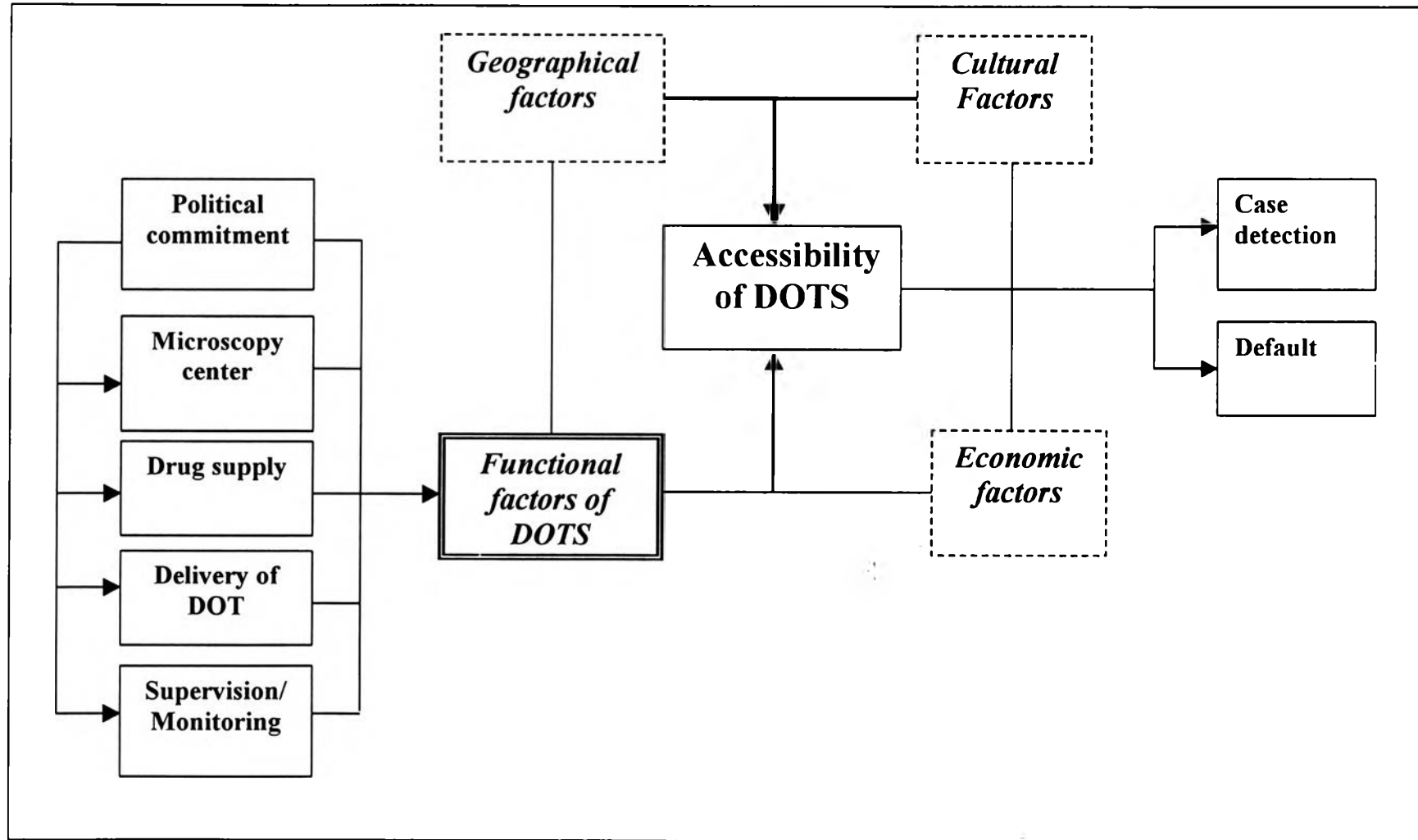
makes travelling to the DOTS centers difficult. Based on these factors, there is an operational estimation in the NTP that only about 10% of the total TB patients can attend the DOTS center everyday.

A study in Tanahu, a hilly district of Nepal shows that 61% of the TB patients who were registered under DOTS were taking self-administered treatment (Parajuli, 2000). This indicates that the majority of TB patients in the district do not have access to DOTS and are compelled to have self-administered treatment which has a low success rate. Although it may vary in districts, but this is the reality on access to DOTS in many of the hilly areas in the country. Therefore, the geographical and health service situation in the hilly region of the country, limit the people in having easy access to DOTS services as per strategy.

### **2.2.1. Factors affecting accessibility to DOTS**

According to WHO (1978), geographical, functional, financial and cultural factors are the key factors that affect accessibility of PHC and these can be applied to DOTS program as well. The diagram in the figure no. 2.1 summarizes the key factors affecting access to DOTS and the relationship among these factors. The functional factor, which is the focus of this essay, has been further conceptualized in the diagram. These factors are explained below in the general context of the hilly region of Nepal.

Figure 2.1. Factors affecting accessibility to DOTS



### **2.2.1. 1. Geographical factors**

The geographical situation of the country is a major obstacle to access health services in Nepal especially in the hilly region (WB, 1998). It affects the DOTS program even more. The National Tuberculosis program has taken the geographical situation in the hilly region as the greatest challenge for implementing DOTS (DHS, 1998/99).

One of the main geographical problems for TB patients is the distance to the DOTS services. The Living Standard Survey in Nepal (1996) shows that the average distance to the nearest HP is about 4-5 kilometers but the actual distance in the hilly region is much more. Travel time to go to the DOTS services is another constraint in the hilly area. The same survey report shows that an average of 70% of people can reach the nearest health service within one-hour, 18% in 1-2 hour and 12% of people more than two hours. However, for most of the hilly region, it takes at least a few hours to get to the nearest HP for people.

Lack of transportation is another problem in the hilly region. The Living Standard Survey (1996) also shows that it takes more than three hours for 32% of people to reach the nearest road in Nepal. But in the hilly region, access to means of transportation is even worse and most often the only means of transportation is walking. This makes it even more difficult for TB patients to come to the DOTS services.

These geographical factors also affect the functioning of health care services for conducting DOTS. These also factors make transportation of supplies, communication and coordination and supervision of the program difficult. Therefore, geographical constraints are the main challenges for the TB patients to access to DOTS services and for the NTP in implementing the DOTS.

#### **2.2.1.2. Functional factors**

Functional factors comprise of all the management aspects of DOTS which are essential for making the DOTS services available for TB patients. Access to DOTS has been interpreted as a management problem rather than a bio-medical problem nowadays. The TB problem is still there, not because of a lack of ways to detect and cure patients but because of the lack of organization of the services to control it (WHO, 1999). The DOTS program puts more responsibility on the health care system than on TB patients to complete the treatment (WHO, 1997). The aim of a TB control program is to organize TB services so that patients can easily reach the services. If the management is unable to provide accessible DOTS to TB patients, there is less likelihood of completing the treatment. Managing a DOTS program improperly will lead to a worsening of the TB problem in the community (WHO, 1997) That's why, proper management of DOTS is a must to control TB.

In Nepal, the health care system is not efficiently managed. World Bank (WB) has indicated shortage of resources, poor drug supplies and shortage or absenteeism of health workers in health institutions as the main problem of health services in rural



areas (WB, 1998). The problem of effective management of the health care system also affects the DOTS program since it is integrated. WHO has defined the following five elements as the management components of DOTS. Lack of any of these element leads to poor management of DOTS thereby contributing to low accessibility of DOTS.

- **Political commitment**

Political commitment is the first element of DOTS program, which is essential for the other four components to be implemented and sustained. Political commitment must start from the government level deciding to make TB control a high priority and to implement it in the primary health care system. Then the government commitment must be translated into policy formulation, resources mobilization, and program implementation (WHO, 1999). After that, planning and implementation of the program should be done at each level of the health system with mobilization of resources.

In Nepal, there seems to be political commitment at the national level in terms of developing policy and plans. However there is less political commitment at the implementing levels within the health system. WHO indicated lack of political commitment in terms of involvement of medical opinion leaders in the health system for the TB control program in the country (WHO, 1998). The World Bank concluded that there is poor government commitment in the general health system, especially in resource allocation, planning and coordination (WB, 1998). Therefore, lack of

political commitment in each level of the health system affects the TB control program, especially at the rural and remote areas of the country.

- **Microscopy center**

TB case detection is done by the microscopic examination of sputum smear. A sputum examination is the most reliable and cost-effective method of detecting pulmonary cases. These services require trained staff, equipment and supplies and a quality control system. Further, the microscopy center should also be accessible for people to use it.

In Nepal, there is a lack of microscopy services because of shortage of equipment and supplies, trained manpower, and a quality control system (WHO, 1998). This shortage of accessible microscopy services for the DOTS program is especially true in the rural areas of the country.

- **Providing DOT**

Directly Observed Treatment is the key element of the DOTS strategy where a trained observer watches TB patients taking their medicines. This is to make sure that patients take the right drugs, with the right dose, in a right interval of time to assure that the patients are compliant to treatment for the entire period of time. If DOT observers are not accessible for patients, it is less likely that patients will be compliant to the treatment (WHO, 1997).

In the context of the hilly region of Nepal, observers are not accessible for most cases. Firstly, DOT is mainly provided in health institutions, which are sparsely distributed and cannot be easily reached because of the difficult terrain and lack of transportation. Secondly, there are no alternative approaches for DOT adopted so far, where TB patients can have observers close to their homes or working places. Therefore, DOT, as it is delivered at present is not convenient for patients in the hilly region of Nepal.

- **Drug supply**

Uninterrupted and reliable drug supply is one of the essential elements of DOTS program management (NTC, 1997). Quality drugs need to be available in the DOTS centers or sub-centers in adequate stocks. However, in Nepal, the drug supply system is seriously affected by geographical constraints in the hilly region of the country. The World Bank study (1998) indicated that the drug supply system is one of the deficient aspects in the health care system in Nepal, especially, in the rural parts of the country. The drug supply system in the general health care system also affects the DOTS program. The WHO Consultation Report (1998) also indicated the problem of a poor drug supply system in the DOTS program of Nepal.

- **Training, supervision and monitoring**

Training and supervision is essential to provide knowledge and skills and to motivate health workers for quality performance. Training and supervision is needed

at all levels of the health care service. Lack of training and supervision affects the quality of the DOTS service. Shortage of trained staff and inadequate supervision are some of the problems in Nepal (WHO, 1998). Supervision is even weaker in the hilly region because of the geographical constraints. Reporting and feed back is another poor aspect of the NTP as indicated by WHO (1998).

### **2.2.1.3. Economic factors of TB patients**

Despite the free services for DOTS in Nepal, the TB patients or the family still bear a financial burden to access DOTS. The patients lose a significant amount of work time to get treatment and in some cases have to spend for travel expenses. Handly and Maher (2000) state that DOTS results in a considerable social cost to TB patients, and are an economic burden to the family. A study done in Thailand economic impact of TB indicated that the illness related costs mainly affect the patients with incomes below poverty lines. The study showed that the low-income group spent more than 15% of their annual household income from out of pocket despite the free diagnosis and treatment while the income reduced by 5% due to illness (Kamolratanakul, et al, 1999). These facts show that there is an economic burden on patients and families.

Nepal is one of the least developed countries (UNDP, 2000) where 49% of the total population lives under the poverty line (HMG, 1995). 80% of the total population in Nepal survive on agriculture (NESAC, 1998). The households have

inadequate income to meet basic needs, and 62% of the household income is spent for food only (NHDR, 1998) leaving very little capacity for health care.

These financial circumstances, affect access to DOTS for TB patients. A study done in Pakistan showed the travel cost as one of the main factors not to comply with the DOT. This was true especially in the first two months of the treatment even though the cost was 10 rupees i.e. about 20 US cents per day (Nuffield, Institute).

Therefore, despite the free services in DOTS program, the poor financial situation of the patients and their families has significant affect on access to DOTS services.

#### **2.2.1.3. Cultural factors**

There are almost no studies done on the cultural aspects specifically related to DOTS in Nepal. The technical and managerial aspects of DOTS as defined in this context seem to be accepted in the Nepalese communities. However, there are varieties of traditional beliefs and misconceptions on health and disease in the Nepalese society that might have direct or indirect effect on access to a DOTS program. Some respondents in my rapid assessment pointed out that there were some traditional beliefs and superstitions among a particular tribe in the community, which cause delay in case detection and decreased treatment compliance. Depending on cultural beliefs, support or contrary advice from the significant others (traditional healers, leaders) is likely to have effect on the decision making and may reduce compliance (Smith, 1994). Gender inequality in Nepalese society also has some impact on TB control program. Generally, women in Nepal seem to have more

traditional beliefs and stigma and therefore, have less access to TB services (Smith, 1994).

However, these cultural constraints are decreasing over the time due to education and change in the society. Although these factors need to be considered for planning a program, they are not major factors causing low access to DOTS for NTP in Nepal.

### **2.2.2. Consequences**

WHO recommended DOTS as a strategy to solve the global public health problem of TB. But if TB patients do not have convenient access to DOTS, TB epidemic will remain the same or even will get worse. In addition to the bio-medical problems of TB, there are alarming socio-economic effects of TB.

#### **2.2.2.1. Case detection**

Case detection rate is defined as the percentage of cases detected out of the estimated cases in the given population and estimated cases are calculated from the annual risk of getting TB infection in the area.

DOTS program has been proven effective for increasing case detection of TB. In Nepal, the case detection rate in the DOTS program is 62%, which is significantly higher than in non-DOTS program (50%). A DOTS program can increase case

detection because there are better facilities for the TB program including better-trained and mobilized staff, and involvement of community people, which helps to create awareness in the community. The TB patients can also disseminate information on services in the community.

If the DOTS program is not accessible, it cannot achieve a high case detection rate. A non-DOTS program lacks the above mentioned factors which contribute to a low case detection. If the services are not easily available, it is more likely that TB cases remain hidden in the community. According to WHO, a case detection rate lower than 70% is not helpful in controlling TB (WHO, 1998). The TB problem remains the same or it may even get worse if the case detection is lower than the WHO target. For this reason, it is critical that a DOTS program is accessible for increasing case detection.

#### **2.2.2.2. Defaulter rate**

A defaulter is a TB patient who is regularly absent from the treatment more than 60 days during his/her treatment (NTC, 1997). The defaulter rate is defined as the percentage of defaulters among the total TB cases detected.

One of the main objectives of a DOTS program is to increase patient compliance to treatment, thus decrease defaulters. But if a DOTS program is inaccessible, it is less likely that patients will adhere to treatment. The TB patients who cannot access DOTS are compelled to have treatment without DOTS. A study

report shows that patients treated without DOT have higher risk of adverse treatment outcome than those treated under DOT (Balsubrananian et.al, 1999). Decreased compliance of the patient could lead to defaulting and developing multi-drug resistance (MDR) TB. This will worsen the TB situation with transmission of MDR strains of TB bacteria, which is a very serious problem of TB in the world at present.

If TB patients do not have easy access to DOTS, they remain undetected and will continue to further transmit the disease in the community. On the other hand, diagnosed TB patients will not adhere to the treatment, leading to multi-drug resistance. These will increase TB morbidity and mortality in the community. If access to DOTS in the remote areas of the country is not considered adequately, the TB problems will remain and spread of the disease by migration of people will continue.

### **Impact**

On top of the bio-medical consequences of low access to DOTS, there are many other significant socio-economic consequences of TB in the society and the whole nation. Since the majority of TB patients are in the productive age group of 15-45, it attacks the labor force in the country. TB can cost 3-4 months of an individual's work time and 20-30% of family income (WHO, 1999). This ultimately affects to the growth of the nation. According to WHO (1999), TB costs an economic loss of 4-7% of GDP for a nation. Therefore, impact of poor access to DOTS is serious and goes beyond the bio-medical consequences of TB.



### **2.3. REVISITING THE PROBLEM**

Although the various factors discussed previously are all important, geographical factors are the main obstacles for accessibility of DOTS in the context of hilly area of Lalitpur District. But, the geographical structure cannot be changed and it is not possible to develop transportation system with limited resources. The economic status of people in the community can only be addressed with long-term development of the community and the country. It cannot be improved within a short period of time with limited resources.

However, the functional factors within the health care system can be improved and proper delivery of health care services can overcome the geographical and economic factors in the community. The TB control program puts responsibility on management of the services so that the patients living on these adverse situations can access to DOTS. Therefore, functional factors are the focus in this study.

Among the five elements of functional factors of DOTS discussed before, not all are major problems in the situation of Lalitpur. During a rapid assessment in the district, I learned that most management components of DOTS are present and seem to function in the existing district health system. The district health authority and HP and SHP staffs are willing to conduct DOTS with the resources they have. I also found in five of the DOTS centers I visited that they had adequate stocks of TB drugs. Logistics, supervision and monitoring are not problematic.

The difficult geographical situation and inadequate health infrastructures in the hilly area of the district, providing accessible microscopy services and directly observed treatment to TB patients, are the great challenge for NTP. Therefore, I will focus on these two elements of DOTS management as the main causes for low access in the context of the hilly area of the district.

### **2.3.1. Inconvenient DOT**

In the situation of the hilly region of Lalitpur, providing convenient delivery of DOT is the main problem. This is because almost all DOT is conducted in health institutions. The health institutions in the hills are usually inaccessible because of distance. One hour travel time (one way) by walking or other means of transportation is taken as an accessible distance by the NTP (WHO, 1997), but in the hilly region patients usually have to walk several hours or even days to reach the nearest health institution to obtain DOT (NTC, 1999). It is even more difficult for TB patients who are generally in a weak physical condition. Because of these problems, TB patients seek self-administered treatment or go to the non-DOTS treatment. The study done in Tanahu, mentioned, that 61% of the TB patients who were under DOTS were actually taking self-administered treatment (Parajuli, 2000). It shows that DOT is not convenient for most of the TB patients in the hills. Therefore, there needs to be an approach where DOT can be delivered conveniently in the situation of the hilly area.

### **2.3.2. Inconvenient microscopy center**

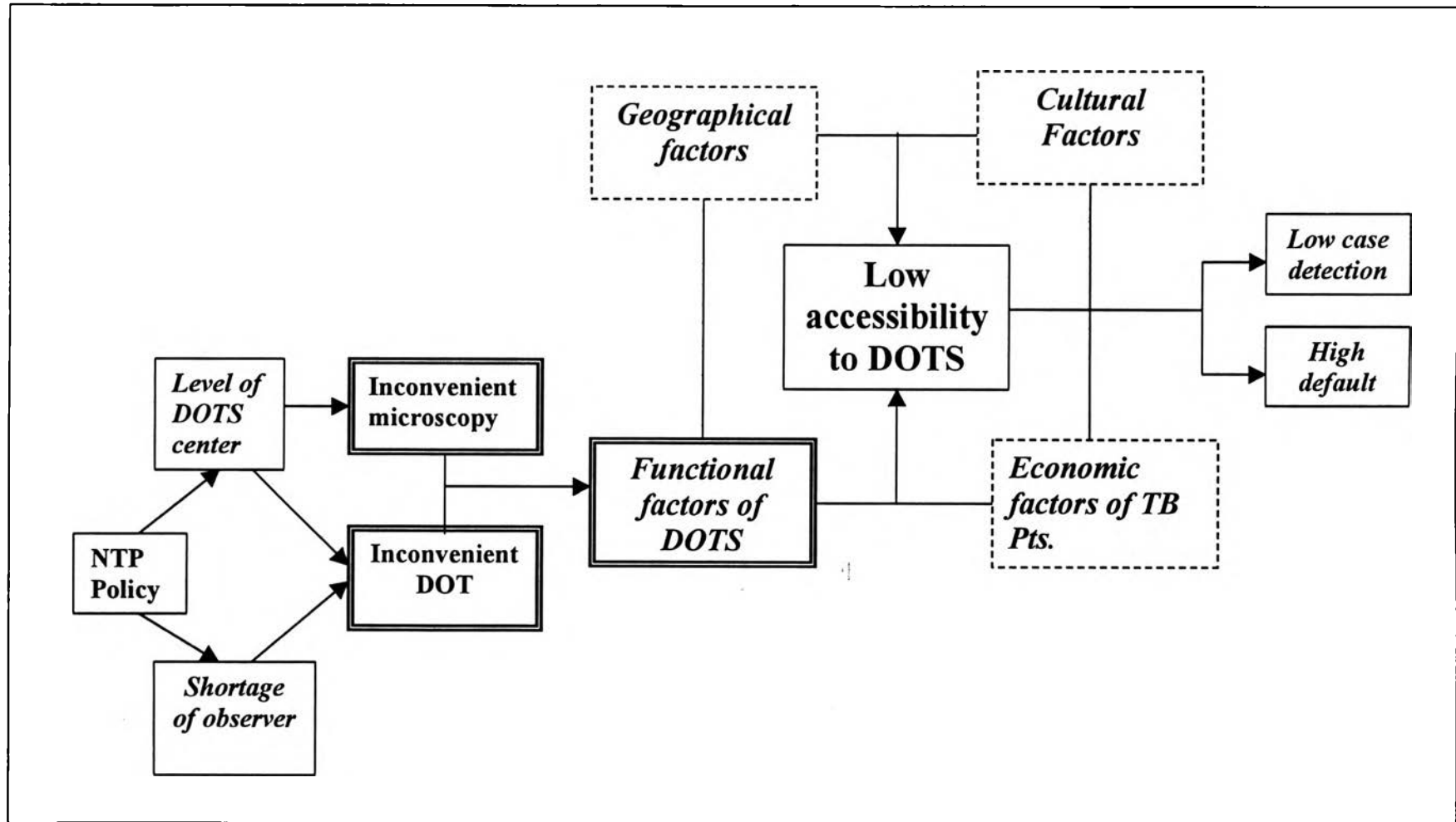
Microscopy examination of sputum is an effective tool for diagnosing TB and monitoring the effectiveness of the treatment. For the sputum test, patients have to visit the center for two days each time to provide three sputum samples according to the guidelines.

The microscopy services are not accessible for TB patients in the hilly area of the district. During my rapid assessment, I discovered that only one out of the five HPs, had microscopy services. However, they were recognized as DOTS center. The other four HPs, referred TB patients to the district center for sputum examination. During the same assessment at Ashrang HP, a typical rural HP, the staffs expressed that collecting all three-sputum smears from TB patients was a major problem. Further the HP had problems to receive the sputum examination results back from the district microscopy center in time, which delays the treatment decisions. The geographical situation and the organization of the health services including microscopic service, are not convenient for TB patients in the hilly area of the district.

### **2.3.3. The causes of the problem**

The literature indicates that the locations of DOTS centers/sub-centers are inaccessible, and there is shortage of trained observers (WHO, 1998, HMG, 1999). Both factors are mainly originated from the NTP policy and guidelines. The diagram in figure no. 2.2 shows the relationship of the various factors. A description of each factor is given below.

Figure no. 2.2. The problem of access to DOTS in hilly area of Lalitpur District.



### **2.3.3.1. Level of the DOTS center/sub center**

According to the NTP guidelines in Nepal, DOTS centers can be established in the district hospital and PHCs, which are not accessible from the rural parts of the district. The DOTS sub centers are established in health posts, which have a catchment area of 3-5 Village Development Committees (VDC). The health posts are not accessible for all the TB patients in the target area. A Sub-Health Post (SHP) is the basic level health institution, located in each VDC. SHPs are within easy reach of most people in the VDC except in the large and sparsely populated wards in the hilly area where the distance to SHP still remains significant. Unfortunately, the sub-health posts are mostly not mobilized for delivering DOT in the TB program (NTP, 1997).

The NTP policy also limits to establish microscopy centers at the district hospital and PHCs for a population of 40,000-100,000 (NTC, 1997). These locations for microscopy centers are not accessible for most TB patients. Therefore, the level of the DOTS center and sub-center itself is one of the main causes for both inconvenient diagnostic and DOT services in the hilly area of the district.

### **2.3.3.2. Shortage of trained and accessible observers**

For convenient delivery of DOT, a DOT observer must primarily be accessible. In Nepal, the WHO Consultation Report indicated a shortage of trained and accessible observers for DOTS program (WHO, 1998). This is mainly because of the NTP policy, which emphasizes on health institution based DOTS. According to

the NTP, usually, two staffs are provided training in each HP, whereas the SHP staffs are not involved in the DOTS training since they are not given any actual role for DOTS. Furthermore, there are no other approaches adopted so far for mobilizing volunteers for DOT. As a result, shortage of trained observers has been a problem obstructing convenient delivering of DOT.

In summary, at present, the locations of DOTS centers and sub centers for diagnosis and treatment are not easily accessible for most of the TB patients in the hilly area. This problem is compounded by shortage of accessible and trained observers so that DOT can be delivered closer to the TB patients. The NTP requires an approach, which can bridge those gaps so that accessible DOTS can be provided to the TB patients.

#### **2.4. ALTERNATIVE SOLUTIONS**

A single approach to DOTS cannot be suitable for different situations. WHO (1999) recommends to adapt appropriate approaches to different country situations. At the same time WHO ensures that the DOTS strategy can work in almost any situation with certain alternative approaches for specific situations. There are various approaches being adapted in different countries to deliver DOTS. All of those approaches have some advantages and disadvantages. The following could be alternatives for delivering DOTS.

#### **2.4.1. Decentralizing DOTS center/sub-center**

According to the present NTP guideline, the DOTS centers and sub-centers are not decentralized enough to the local level health institutions. The microscopy centers are limited to the level of district hospital and PHCs. DOTS sub-centers are located up to the level of HP (DHS, 1998/99). There is one district hospital and two PHCs in Lalitpur district and one health posts for three to five VDCs. The sub-health posts are located in every VDC but they have not been mobilized for DOTS program at present (1997). The level of DOTS centers and sub-centers at present do not address the need of TB patients in the hilly area.

The DOTS center could be decentralized to the health post level and sub-center to sub-health post level. This will increase access to DOTS to a large extent for TB patients in the rural areas. However decentralizing the DOTS centers and sub-centers is still not adequate to reach all the TB patients in the hilly area of the district. On the other hand, decentralizing the DOTS program requires more training, a good supply system along with extended supervision so that the program runs properly.

#### **2.4.2. Hospital/hostel based treatment of TB patients**

In Dhankuta district of Eastern Nepal, there are some hostel based DOTS programs where the TB patients are admitted for the first 2-3 months (NTC, 1999). These programs are run by an INGO. This is an ideal program, which can achieve high success rate, and can control the spread of TB in the community. Despite the free accommodation in the hostel, not all TB patients can stay in the hostel for two-three

months because of their family and work. Such a program may not be manageable in the most situations of Nepal and may not be sustainable in terms of resources.

In Scandinavian countries and Bhutan, the TB patients are admitted in a hospital for the first two months (WHO, 1998). Likewise, Ampipal Mission Hospital in Gorkha District of Nepal, TB patients are admitted for the intensive phase of the treatment (NTC, 1999). This is only possible in a health care system where there is adequate health infrastructure, but this is not possible in the context of Nepal. Usually, there is only one district hospital with a limited capacity of 15 beds for all types of patients. This system also requires many resources, which may not be manageable by the health system in Nepal. Therefore, although this is an ideal program for delivering DOTS, it is not realistic for public services in Nepal.

#### **2.4.3. Family based DOT**

Family based DOT has been used, in various countries including Thailand as a practical option when health institution based DOT is not possible. It is the most accessible way of providing DOT but the success rate in this approach is not encouraging in most of the countries. In Cholburi Regional TB Center, Thailand, 90% of the TB patients are under family DOT whereas the cure rate is only about 60% (Report from Cholburi TB Center, 2000). In Nepal, the cure rate in family based DOT is also 60% which is much lower than the WHO target (DHS, 1998/99). This is mainly because, the family members are less accountable to the health system compared to out of family person (WHO, 1997). Because of these reasons, the NTP in



Nepal stresses on health institution based DOT. Family based DOT may not be an appropriate alternative for Nepal.

#### **2.4.4. Community based DOT**

Community based DOT is defined as a TB control program where trained health volunteers in the community provide DOT to TB patients during the first two months of the treatment and maintain record of treatment.

Different types of community based DOT are increasingly being used in different rural settings in many countries where the health institution based DOT is not accessible. In the remote part of East Kalimantan, Indonesia, community cadres from the villages are trained and mobilized for detecting cases and supervising DOT at the community level. After adoption of the community based approach, the default rate dropped from 85% to 5% in the TB control program. The program has been successful in creating awareness and shows an inspiring example of how DOT can be delivered in remote areas (Bua and Sahat, 1999). Musthaque et al (1997) reports about the involvement of community health workers in delivering DOT in BRAC, Bangladesh resulting in a high success rate. There are several other examples of successful community based DOT such as China, South Africa and the Philippines.

WHO recommends a community based approach, appropriate to the local settings. Community based DOT can be managed with less resources in the existing health system and without creating new health infrastructures (WHO, 1997). It is also

one of the policies of the NTP in Nepal to involve the community in the TB control program.

However, this approach is not easy. It highly depends on the cooperation and coordination of volunteer groups, local organizations and the health institutions. The volunteers also need to be trained and supervised well for proper performance.

Despite these challenges, this approach of delivery of DOT could be an appropriate alternative in the situation of hilly area of Lalitpur. The main problems are scarcity of trained observers and inadequate health infrastructure along with the geographical constraints for providing DOT in the area. In such situation, health workers alone cannot provide accessible DOT for all the patients in the area. Regarding community based DOT, Hadley and Maher state that, “Decentralizing tuberculosis control measures beyond the health facilities by harnessing the contribution of community could increase the access to effective tuberculosis care” (2000, pp.401). Community Based DOT will raise community awareness on TB and minimizes resources needed for the TB program.

For community based DOT, different community volunteers can be mobilized, but DOT observers must be accessible, acceptable and accountable (WHO, STOP TB Manual). Considering these requirements, Female Community Health Volunteers (FCHV) could be the appropriate group of volunteers in the context of rural areas of Nepal. They fulfill these criteria better than any other volunteer in the community.

**Accessible:**

One FCHV exists in every ward of each VDC. Therefore they are the most accessible trained volunteers in the villages of Nepal. They are local people who can be met in informal settings of the house or working place at any time. There are hardly any FCHVs who are not within easy walking distance. My rapid assessment indicated that almost all of the TB patients could reach the ward FCHVs within half an hour time in the study area of Lalitpur.

**Acceptable:**

FCHVs are mature local women with an average age of 34 years and are usually married (VaRG, Report, 1996). They are mostly (76%) literate and are experienced persons. They are selected by the mothers' groups in the respective wards and are accepted by the VDC members as well (VaRG, 1996). The majority of them are Brahmin, Chhetri and Tharu, which are touchable castes in the social system of Nepal.

In the Hindu dominant cultural system of Nepal, the society consists of four groups of people. The Brahmins are considered as the highest level among the groups and the Chhetris the second highest level. The Baishyas are seen as the middle group of people whereas the Sudras are considered mostly as untouchable group. These groups again consist of many sub-groups and numerous castes. Based on the groups and castes, there is some discrimination or separation in the social practices such as drinking or eating together, allowing visitors inside one's house and some other

practices. However, these discriminatory practices are decreasing remarkably in the Nepali society lately. When Mothers Groups select FCHVs, the cultural aspects are already considered during the selection. Therefore, FCHVs are usually culturally acceptable for the community.

In the rural community, people are familiar with FCHVs and they are the first levels of contact for basic health problems. The FCHV assessment report (VaRG, 1996) shows that eighty eight percent of the population knows about the existence of the FCHVs in their ward and about 55% of the rural population consulted FCHVs for their health problems.

In addition, the TB authorities and HP/SHP staffs agreed to mobilize FCHVs as DOT observers. Most importantly, the majority of the TB patients in my rapid assessment also accepted FCHVs as DOT observers.

#### **Accountable:**

FCHVs have already received training to provide basic health services in the rural communities and have been active in PHC for more than a decade. They are the foundation of the health care system in Nepal and have been included in the health system organogram. Although they are volunteer workers, they are committed to work for their own community. They are well recognized in the local political or administrative system. Therefore, they are socially accountable for the basic health services in the community. On top of that they are satisfied with their work (86%) and

are willing to do additional work (VaRG,, 1996). In some other districts of Nepal, FCHVs have been involved in vitamin A distribution, and the Acute Respiratory Infection control program where they performed very well according to the program evaluation (National Vitamin A program, 1999, DHS, 1997). Therefore, FCHVs could be appropriate DOT observers.

In summary, decentralizing DOTS center to the HP and sub-center to SHP will bring the diagnostic and treatment services closer to TB patients. The community based DOT will provide treatment closer to house or working place. Therefore, decentralization of the DOTS centers and sub-centers, and community based DOT could be interventions for increasing accessibility of DOTS in the hilly area of the district.

## **2.5. CONCLUSION**

Accessibility of DOTS for TB patients is a serious problem in the TB control program in the hilly region of Nepal. Due to the difficult geographical and poorly developed health services in the region, TB patients cannot access convenient diagnostic and directly observed treatment services. If the DOTS services are not accessible, it leads to poor case detection and a high defaulter rate. The TB epidemic in the country remains the same or may deteriorate in the future leading to serious socio-economic impact in the family, community and the whole nation.

The difficult geographical structure and lack of transportation are the main obstacles in the hilly area of the district. The existing health services are inadequate to deliver DOTS so that it could be accessible for TB patients in the hilly area of the district.

Among the various aspects of DOTS management, the main problem is to deliver diagnostic services and DOT conveniently to TB patients in the area. The centralized service centers and shortage of trained treatment observers are the causes of inconvenient DOTS services.

DOTS can be delivered with different approaches. In the situation of Lalitpur District, DOTS centers and sub centers should be decentralized up to HP and SHP level respectively. Secondly, a community-based approach would be an appropriate way for delivering DOT where the local level health services are not accessible for TB patients. The community-based approach of DOT would also create community awareness and enhance community participation in TB control. FCHVs could be an appropriate volunteer group to be mobilized for community-based DOT since they are accessible and acceptable to the community and accountable to the health system.

In short, decentralization of DOTS centers and sub-centers to the HP and SHP and mobilization of FCHVs for community based DOT would be an alternative strategy for accessible delivery of DOTS in the hilly area of the district.

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