

COST EFFECTIVENESS ANALYSIS OF MUTADIN HOSPITAL AND NEJAT HOSPITAL FOR
SUBSTANCE USER IN AFGHANISTAN



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จุฬาลงกรณ์มหาวิทยาลัย

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โรงพยาบาลเนจีต ในประเทศอัฟกานิสถาน



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ให้บริการโดยรัฐบาลและเอกชนมีจำนวนไม่เพียงพอที่จะครอบคลุมจำนวนผู้ป่วยทั้งหมด กระทรวงสาธารณสุข
และกระทรวงป้องกันการใช้สารเสพติดของอัฟกานิสถาน กำลังวางแผนเพื่อเพิ่มการเข้าถึงในการเข้ารับการ
รักษาและบำบัดยาเสพติดและขยายศูนย์บำบัดในแนวทางที่มีประสิทธิผล ต้นทุนประสิทธิผล คือ เครื่องมือการ
ประเมินผลทางเศรษฐศาสตร์ที่ดี เพื่อหาแนวทางที่มีประสิทธิผล ต้นทุนจากมุมมองทางคลินิกของปีงบประมาณ
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สารเสพติด แม้กระทั่งต้นทุนประสิทธิผลของการบำบัดทั้งที่ให้บริการโดยภาครัฐและเอกชน

วิธีการปันส่วนต้นทุนบริการ (Step down Method) นำมาใช้สำหรับต้นทุนของทั้งสองโรงพยาบาล
ผลลัพธ์ของต้นทุนประสิทธิผล คือ ความสำเร็จของการรักษาในการลดระดับของสารเสพติด ข้อมูลถูกเลือกมา
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การศึกษาแสดงให้เห็นว่า การบำบัดในโรงพยาบาลเอกชนมีต้นทุนประสิทธิผลมากกว่าโรงพยาบาล
รัฐ โดยที่ความสำเร็จของการรักษาสำหรับผู้ป่วยที่ใช้สารเสพติดเฮโรอีนในโรงพยาบาลรัฐ คือ 532 ดอลลาร์
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ดำเนินการที่ชัดเจน ทำให้เกิดขึ้นและทำให้เกิดความร่วมมือในการทำงานระหว่างกระทรวงสาธารณสุขและ
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The incidence and prevalence of substance users are increasing day to day and the number of treatment center, which is provided by Public and private is not enough to cover all patients. The Ministry of Public Health and Ministry of Counter and Narcotic in Afghanistan is planning to increase access to drug treatment and expand treatment centers in an effective way. The cost effectiveness is a good economic evaluation tool to find the effective way. The costing is from the clinical perspective for fiscal year 2012 to find each unit cost for each OPD/counseling and IPD, types of substance as well and cost-effective treatment within public and private hospitals.

The step down method used for the costing of both hospitals. The outcome for the cost effectiveness is the successful treatment of detoxification. The data were collected for the year of 2012 from a clinical perspective.

The study shows that the treatment in a private hospital is more cost-effective than the public as the successful treatment for heroin and opium users in a public hospital is 532 USD for opium 527 USD and for the multi users 532 while it is less in private hospital as it is 509 USD for heroin user, 493 USD for opium and 506 for multi user. In addition the percentage of effectiveness of treatment is higher in private hospital than the public hospital as well.

The MoPH should establish the core principles to guide the development and implementation of a positive, productive and collaborative working relationship between the MoPH and the private sector. Through this relationship, the MoPH propose to increase the contribution of the private sector to MoPH goals for the health of the Afghan population by facilitating and supporting private sector investments.

Field of Study: Health Economics and Student's Signature
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CONTENTS

	Page
THAI ABSTRACT	iv
ENGLISH ABSTRACT	v
ACKNOWLEDGEMENTS	vi
CONTENTS	vii
List of table	X
List of Figure	XI
CHAPTER I INTRODUCTION.....	1
1.1 Significance of the Problem.....	1
1.1.1. Opium and Heroin production use.....	1
1.1.2. Hospitals	4
1.2. Study description.....	5
1.3. Country profile	5
1.3.1. Geography	5
1.3.2. Economy.....	6
1.3.3. Education.....	7
1.3.4. Health.....	7
1.3.4.1. Hospitals for substance users	9
1.4. Questions.....	14
1.5. Objectives.....	14
1.6. The Scope of study	15
CHAPTER II LETHERATURE REVIEW	16
1.1. Hospital Costing Concepts.....	16
1.1.1. Cost Terminologies and Classification of Cost:.....	17
1.1.2. Cost Center	18
1.1.3. Cost allocation method	20
1.2. Previous study analysis:.....	22
1.3. Hospital Costing	24

	Page
CHAPTER III METHODOLOGY	26
3.1. Study design and procedures:.....	26
3.2. Study sample:.....	27
3.2.1. Mutadin Hospital (Public).....	27
3.2.2. Nejat Hospital (Private).....	28
3.3. Data Collection:.....	29
3.4. Data Analysis.....	30
3.5. Hypothesis testing.....	31
3.6. Output:.....	31
3.7. Conceptual Framework	31
3.7.1. Cost effectiveness.....	34
CHAPTER IV ANALYSIS AND RESULTS.....	37
4.1. Hospital Statistics:.....	38
4.2. Staff of the Hospitals	39
4.3. Hospitals Cost.....	39
4.4. Cost breakdown by budget line	43
4.5. Recurrent cost breakdown.....	44
4.6. Salary breakdown for each cost center	45
4.7. Total cost by clinical department.....	46
4.8. The Average cost	47
4.9. Cost effectiveness of program	49
4.9.1 Mutadin Hospital.....	50
4.9.2. Nejat Hospital	51
4.9.3. Ratio and Effectiveness.....	53
4.9.4 Sensitivity analysis	53
4.10. Benefits	56
4.11. Discussion:.....	57

	Page
4.11.1. Sustainability of substance user funded centers	58
4.11.2. The possibility of introducing of hospital charge	59
4.12. Positive externalities of treatment	60
CHAPTER V CONCLUSION AND RECOMMENDATION	62
5.1. Conclusion	62
5.2. Recommendation and policy implication	63
5.2.1. More focus should be paid on follow up stage	63
5.2.2. Expansion of treatment center for substance users in Afghanistan	64
5.3. Suggestion for further study	64
5.4. Limitation of study	65
REFERENCES	66
APPENDIX	68
Appendix A Capital and Recurrent cost questionnaires for both hospitals	68
Annex B: Questionnaires for data collection	71
VITA	74

List of table

Table 1: Inflation rate in Afghanistan.....	6
Table 2: Afghanistan Key Health indicators.....	8
Table 3: List of treatment centers in Afghanistan in 2012.....	9
Table 4: Number of admission cases in both hospitals	11
Table 5: Statistics of both hospitals	38
Table 6: Details of the staff in both hospitals.....	39
Table 7: Cost breakdown for Mutadin hospital.....	39
Table 8: Cost breakdown for Nejat hospital.....	41
Table 9: Cost breakdown by budget line in both hospitals.....	43
Table 10: Cost breakdown of recurrent cost in both hospitals.....	44
Table 11: Cost breakdown of salary.....	45
Table 12: Total cost by clinical department	46
Table 13: Average cost for substance user per day in both hospitals.....	47
Table 14: Average cost of detoxification treatment in both hospitals.....	49
Table 15: Average cost of Heroin, opium and Multi users for both hospitals.....	53
Table 16: Assumption I.....	54
Table 17: Assumption II.....	55

List of Figure

Figure 1: Afghanistan map with substance treatment centers in Afghanistan	3
Figure 2: Inflation percentage in Afghanistan.....	7
Figure 3: Conceptual Framework	36
Figure 4: Percentage of expenditure by three main cost center in Mutadin hospital .	40
Figure 5: Percentage of expenditure by three main cost centers in Nejat hospital	41
Figure 6: Mutadin hospital clinical cost breakdown.....	46
Figure 7: Nejat hospital clinical cost breakdown	47
Figure 8: Average cost per day in Mutadin hospital.....	48
Figure 9: Average cost per day in Nejat hospital.....	48
Figure 10: Cost and effectiveness for types of substance in Mutadin hospital.....	51
Figure 11: Cost and effectiveness for types of substance in Nejat hospital	52

List of abbreviations

ALOS	Average length of stay
ANC	Anti Natal Care
AMS	Afghanistan Mortality Survey
BOR	Bed occupancy rate
BPHS	Basic Package of Health Services
CFC	Civil Military Fusion Center
CC	Cost Center
EPHS	Essential Package of Hospital Services
GIRoA	Government of the Islamic Republic of Afghanistan
HEFD	Health Economics and Financing Directorate
HOSPICAL	Hospital Cost Allocation Tool
IPD	Inpatient department
MoHE	Ministry of Higher Education
MoPH	Ministry of Public Health
MMR	Maternal Mortality Survey
MoCN	Ministry of Counter Narcotics
NHA	National Health Accounts
NRVA	National Risk and Vulnerability Assessment
NGO	None Governmental Organization
OOP	Out-Of-Pocket
OPD	Outpatients department
PWUD	People Who Used Drugs

USAID	United State Aid for International Development
UNODC	United Nations Office on Drug and Crime
WB	World Bank
WHO	World Health Organization
UNODCP	United Nations Office for Drug Control and Crime Prevention



CHAPTER I

INTRODUCTION

1.1 Significance of the Problem

1.1.1. Opium and Heroin production use

The expected number of substance user in the world is about 230 million people, illegal drug use is constant and it is increasing in several developing countries (UNODC, 2012).

0.2 Million people die from the drug user like cocaine, heroin and other form of substance.

Substance users undermine economic and social development and contribute to crime, instability, insecurity and the spread of HIV/AIDS. The production of opium amounted to be 7000 tons in 2011 in the world and Afghanistan is continuing to be the world's biggest producer.

Afghanistan cultivates opium and produces 92% of the world's heroin (Palau, 2012) A survey conducted by UNODC in 2009, shows that there are around 800,000 illegal drug users in Afghanistan (UNODC, 2009) - around 3.3% of the total population. The most common substances used are heroin, opium, hashish or cannabis, alcohol, and pharmaceuticals (Macdonald, 2003).

The number of substance user is increasing in Afghanistan as a survey by UNODC shows an increase of 53 percent in the number of opium users, from 150,000 to 230,000 and a jump of 140 percent in the number of heroin users, from 50,000 to 140,000 compared to a similar survey conducted in 2005.

30 years' war, trauma, availability of inexpensive narcotics and partial access to treatment have created a major, and increasing, addiction problem in Afghanistan

It is a long time that Afghans used opium for relieving pain, self-medication. Still, the impact is typically negative, opiate use generate behavioral, social and health problems, crime, accidents and loss of productivity in the workplace.

Sixty percent of substance users use cannabis, which case USD 1.5 burden per day and its prevalence is 0.2 percent annually. Opium consists of 60 percent of drug users as well with the burden of USD 1.6 per day and 2.5% prevalence annually; 30 percent of drug users use heroin, which is the highest burden of USD 2.2 per day with a prevalence of annually 1 percent (UNODC, 2009). It was estimated that drug users in Afghanistan spend an average of 300 million USD on drug consumption every year (UNODC, 2009).

In 2009, there were 33 drug treatment facilities across Afghanistan, twelve provinces do not currently have any drug treatment facility, and 20 provinces have one. Additionally, the majority of these facilities is located in the provincial capitals or in urban areas and may not serve the needs of rural communities affected by drug abuse (Palau, 2012).

The number of hospitals for treatment of People Who Use Drugs (PWUD) is very low and limited, but more attention to providing and supporting administrative and financial needs of existing hospitals is needed.

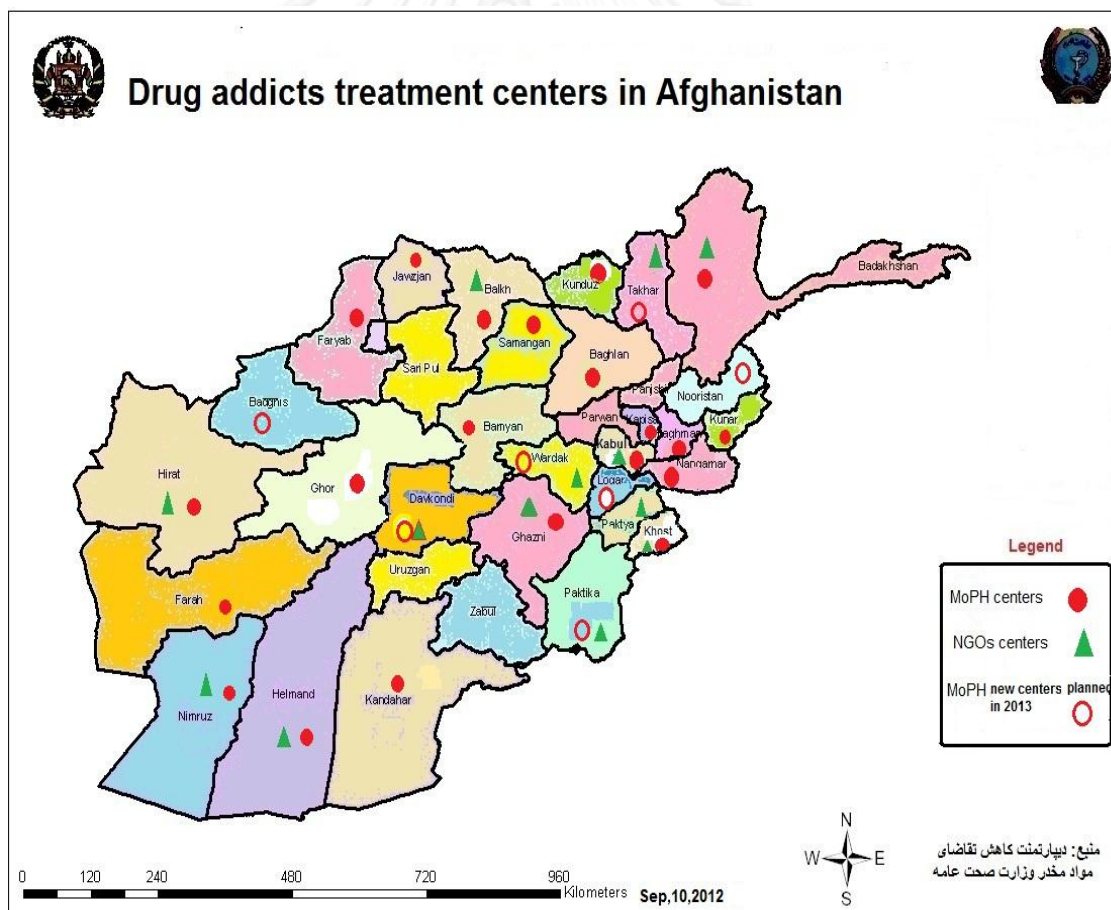
Taking into consideration the PWUD population in the country (800,000), the Government of the Islamic Republic of Afghanistan (GIROA) with the private sector has limited human and financial resources for treating clients.

Only 2.86 percent of the existing opium and heroin users in the country on an annual basis provided any care per year (MoCN, 2012).

Based on the limitation of resource, cost effectiveness analysis can be the most suitable solution contributing to the decision making process.

Cost effectiveness analysis is one of the basic useful tools among the economic evaluation methods for intervention. It is important for healthcare decision maker in the substance user treatment program and it is needed to consider how much cost per treatment of substance users in public and private hospitals with the different level of cost and outcome, which they cover, and whether they should continue contracting.

Figure 1: Afghanistan map with substance treatment centers in Afghanistan



1.1.2. Hospitals

The health service in Afghanistan consists of two packages; Basic Package of Health Services (BPHS) and Essential Package of Health Services (EPHS).

While the BPHS and EPHS have deeply improved the delivery of primary and secondary health services, less attention has been paid to improving the delivery of tertiary care through Afghanistan's hospitals and there is little improvement over the last several years. The main problems with tertiary care facilities in Afghanistan include lack of standards for clinical patient care and management; lack of hospital management skills; lack of necessary staff, equipment, supply and pharmaceuticals; and lack of a functional referral system.

In Afghanistan, hospitals account for 29% of the Total Health Expenditure (NHA, 2009). In the hospital there are a high number of trained health staff and waste valuable resources, causing the majority of hospital inefficiencies. For example, human resources typically comprise a large proportion of total hospital expenditure. Little autonomy to control resource allocation from one department to another. Each year, hospital managers are required to make budget projections and plans without essential information on the amount of funding that will be available, the cost of services or price information (such as for salaries, equipment, drugs and supplies). Hospitals also have limited control over their own human resources; staffing is centralized within the MoPH.

1.2. Study description

While the incidence and prevalence are increasing day to day and the number of treatment center is not enough to cover all patients so this study is expected to be used for MoPH, health economic researchers and decision makers for developing policies to select the effective treatment and expand the drug demand reduction program in Afghanistan. This study will explain the costs of each department and expenditures by the Mutadin hospital and Nejat hospital as well the outcomes of both hospitals. This study will display the actual expenditures and costs of services, as well as unit cost of substance used.

The costs and outcomes in Mutadin and Nejat hospitals will be compared to assess which one is more cost effective. This is important for policy makers and donors for future funding and choosing the most effective treatment option in private and public for the treatment of people who used drugs (PWUDs) in Afghanistan.

This study will provide a clear view about the total cost for hospital managers to assess their own performance and improve planning processes. Also, this will determine the proportion of the cost structure for the hospital to identify what is inefficient in order to reallocate resources efficiently.

1.3. Country profile

1.3.1. Geography

Afghanistan has a total population of 25,011,400 and is located in South-Central Asia (AMS, 2010) Kabul is the capital of the country. Afghanistan is bound by six different countries: Pakistan, Iran, Tajikistan, Uzbekistan, Turkmenistan, and China.

The longest country to border Afghanistan is Pakistan (at 2,430 kilometers), whereas the smallest is China (at 76 kilometers) (AMS, 2010). Afghanistan is also divided into 34 provinces.

1.3.2. Economy

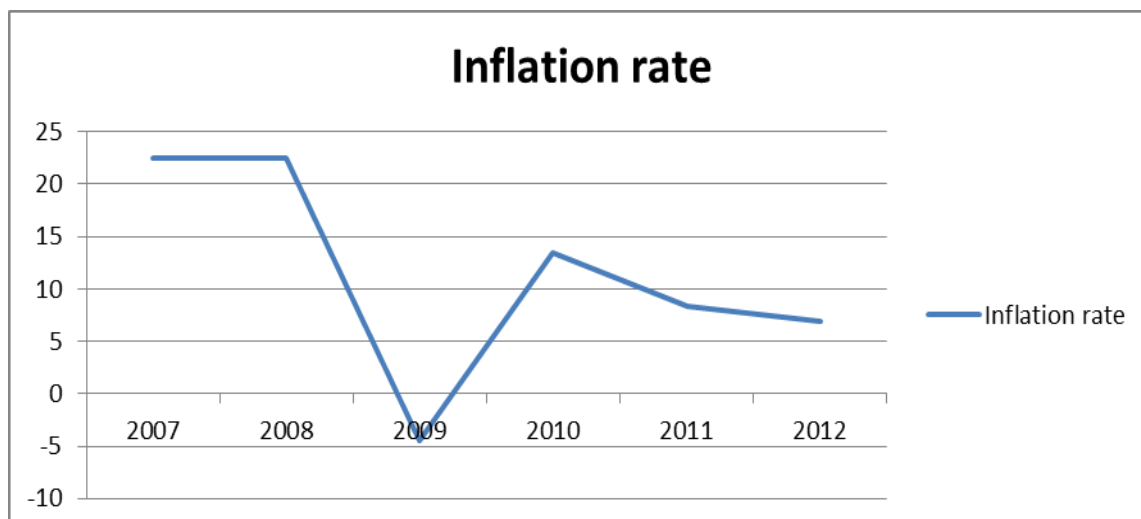
In 2009, the health expenditure in Afghanistan was USD 1,043,820,810, approximately ten percent (NHA, 2009) of the country's gross domestic product (GDP). This represented a per capita expenditure of almost USD 42. The share of government spending allocated to health was only 4 percent. The health expenditure of government sources of funding accounted for 6 percent, donor sources 18 percent and private sources 76 percent. Out of Pocket (OOP) spending on health was USD 31 per person.

Since 2002, the economy of Afghanistan has improved significantly from a combination of international assistance and funds. Afghanistan remains one of the poorest and least developed countries in the world and depends heavily on foreign aid. About 36 percent (WB, 2009) of the country's population is unemployed and lives below poverty where they cannot meet their basic needs.

Table 1: Inflation rate in Afghanistan

Year	2007	2008	2009	2010	2011	2012
	22.5%	22.5%	-4.5%	13.5%	8.4%	6.9%

Figure 2: Inflation percentage in Afghanistan



1.3.3. Education

Sixty-one percent of males are illiterate and 88 percent of females. Illiteracy rates in urban areas are 52 percent, in rural areas 79 percent, and for Kuchi (nomadic) populations, it is 94 percent (NRVA, 2008).

1.3.4. Health

The health system of Afghanistan is characterized by lack of technical staff (health workers) especially females, poor infrastructure, isolated population based on a geographical map of Afghanistan, weak administration and financial management and donor dependency (WB, USAID, and EC).

Access to health care is difficult due to natural barriers (mountainous, transportation, economic, etc.) especially for children and women.

Health services are provided by three categories in Afghanistan, including Public system, private and NGOs. The public system is organized into three steps (primary, secondary and tertiary) and through two kinds of services, Basic Package of Health

Service (BPHS) which includes primary health service and the second is an Essential Package of Hospital Services (EPHS) which explains the secondary and tertiary health service. The BPHS includes health post, mobile health team, basic health center, comprehensive health center, and district hospital (BPHS, 2010). The EPHS consists of provincial hospital, regional hospital, and specialized hospitals, mainly in Kabul (EPHS, 2005).

At 2001, the infant mortality rate was estimated at 165 per 1000 live births and under-five mortality rate was estimated 257 per 1000 live births. The maternal mortality ratio (MMR) in Afghanistan from 1990- 2008 was estimated to be between 1,400 and 1700 per 100,000 live births (WHO, 2010). However, there have been significant improvements in the health status of the people. According to the Afghanistan Mortality Survey conducted in 2010 (AMS, 2010) there have been considerable changes in the health status of Afghanistan, as outlined in below.

Table 2: Afghanistan Key Health indicators

Total Fertility Rate (TFR)	5.1
Use of any method of family planning	22%
Antenatal care (ANC)	68%
Institutional Delivery	42%
Under 5 Mortality Rate (Excluding the South Zone)	97 per 1,000 live births
Infant Mortality Rate (Excluding the South Zone)	77 per 1,000 live births
Maternal Mortality Ratio	327 per 100,000 live births
Male Life Expectancy	62 years
Female Life Expectancy	64 years

(AMS, 2010)

1.3.4.1. Hospitals for substance users

In 2009 there were 33 drug treatment facilities across Afghanistan, twelve provinces do not have any drug treatment facility, and 20 provinces have one on in 2009. Additionally, the majority of these facilities is located in the provincial capitals or in urban areas and may not serve the needs of rural communities affected by drug abuse (Palau, 2012).

Based on international cooperation in 2012 the number of treatment centers increased to 78 both from private and public. The number of beds differs from 5 beds to 120 beds in these treatment centers.

The list of treatment centers are as follow

Table 3: List of treatment centers in Afghanistan in 2012

Provider	Implementer	Number of Treatment center
Public	MoPH	21
Private	WADAN	21
	SSAWO	6
	Nejat Center	6
	KOR	3
	SHRO	18
	ARC	2
	OSD	1
Total		78

21 of treatment centers supported and implemented by the public and 57 of the treatment centers implemented and supported by the private

There are only two models of of hospital in Afghanistan one is public which supported and implemented by the government and the second is private which is supported by international donor and implemented by NGOs.

These facilities are likely to focus on detoxification and aftercare in health facilities. However, aftercare and rehabilitation services happen rarely and cases that relapse following detoxification alone are extremely common, especially in hospitals because they do not provide after care and psychotherapy(Palau, 2012).

Patients will be hospitalized from 30 days up to 45 days for detoxification services.

The most common treatment for drug users in Afghanistan is detoxification. The philosophy of detoxification is that, it is a medical phenomenon and is a very small component of a much bigger problem. The purpose of detoxification is to make the person comfortable during the process of withdrawal while his/her body is becoming free of the chemical substance. The modality depends on the drug of use as well as the use of a single drug or poly drugs. In the majority of cases, the drugs required for detoxification are:

- Combinations of analgesics like Paracetamol, Brufen, Diclofenac and etc
- Hypnotics such as Temazepam or a long-acting Benzodiazepine
- An antihistamine with a long-acting phenomenon such as Retard Avil
- Antidepressants with a sedative component such as Prothiadine to cover high anxiety and restlessness during withdrawal
- Intravenous fluids for dehydration like Ringer infusion, Mix infusion and Glucose infusion
- Multivitamins, anti-diarrheal and anti-emetics as supportive therapy

The treatment is symptomatic for all types of substance user the amount drugs for treatment differs based on the exist symptoms, if a patients feel pain during his/her withdrawal they will be advised analgesic like Ibuprofen, Diclofenac or some other

kinds of analgesic if they feel dehydration they will be advised infusion if they feel insomnia they will be advised sedative drugs.

In addition, treatment with Methadone (an opiate substitute), has been described by non-governmental medical experts in Afghanistan as highly successful and also by Naltermoxone as well. The treatment by Methadone is recently started as a pilot project by a Non Governmental Organization.

In Mutadin hospital 97% of pharmacy is used for IPD or detoxification treatment and 3% used for OPD or counseling.

80% of pharmacy is used for the treatment of heroin users and 2% for opium users and 18% for multi users.

In Nejat hospital 90% of pharmacy was used by IPD or detoxification and 10% for OPD or counseling. 85% of pharmacy was used for heroin user, 4% used for opium users and 11% used for multi users. It shows that most of pharmacy is used for the treatment of heroin users in both hospitals.

The number of substance users in Mutadin and Nejat hospitals is as follow

Table 4: Number of admission cases in both hospitals

S/N	Type of Substance	Mutadin Hospital	Nejat Hospital
		Number of admission cases	Number of admission cases
1	Heroin	781	285
2	Opium	25	52
3	Other	174	25

The patients when come to the hospital for the treatment, they will be evaluated for their need and symptoms as well if they admitted to the hospital they be

registered as IPD and if they goes back after counseling they will be registered as OPD/Counseling. These patients based on criteria are hospitalized in the hospital, the criteria is as follow:

- Inability to stop using drugs
- Voluntary
- Inability to meet requirements at work, in the family or to friends
- Withdrawal symptoms occur when drug use is stopped
- Compulsive use of the drug, even when harmful consequences are recognized
- No acute medical problems
- No drug use 12 hours before admission
- Willing and able to actively participate in treatment
- Referral by other hospital
- Collection of substance users from the place that these people are living by the hospital team.
- For individuals with a history of repeated relapses and treatment history involving multiple

Every person when come to the hospital for treatment purpose for IPD or OPD then they will be checked for the above criteria for classification to OPD or IPD. If they do not meet the criteria for admission they will be classified to OPD and if they meet the criteria for admission then the patients will be investigated more while they are addicted or not. Complete history will be recorded and even

some physical examination will be performed, after the evaluation the technical staff in the hospital will decide to admit the patients or not.

For this study two hospitals, which are specialized hospitals for the treatment of substance use only selected. The reason for the selection is as follows:

- Mutadin and Nejat hospitals are the biggest substance user treatment center
- We can find the accurate and available data in these hospitals
- The Mutadin hospital is the biggest public hospital for substance user only
- These two hospitals are located in Kabul, the capital of Afghanistan
- These hospitals have more patients than other hospitals
- Mutadin hospital is long term supported by government

1.4. Questions

This study will answer the following questions;

- What is the cost structure of Mutadin and Nejat Hospital?
- What is the average cost per treatment and total cost of Mutadin and Nejat hospital?
- What are the costs and effectiveness of substance user treatment from the health system perspective under public and private in Kabul, Afghanistan?
- What treatment center is the most cost-effective public or private?

1.5. Objectives

The study objective is to measure cost effectiveness analysis of the treatment for substance user patients in Mutadin national hospital and Nejat hospital in 2012.

Specific objectives:

- To identify the cost structure and total cost of Mutadin and Nejat hospital.
- To analyze the cost of each person's substance user treatment.
- To assess and measure the cost of Mutadin hospital compares to Nejat hospital.
- To analyze the effectiveness of substance user treatment in Mutadin and Nejat hospital.
- To find out the most cost-effectiveness treatment in public system compared to the private system.

1.6. The Scope of study

The study focuses on cost effectiveness and unit cost analysis for Heroin, Opium and other drug use in Mutadin and Nejat hospitals in the fiscal year of 2012 from the provider's perspective in the Kabul capital of Afghanistan. The scope of the study is to provide analysis of the cost effectiveness and total cost of inpatients and outpatient services. The average cost of successful treatment for detoxification of Heroin, Opium and other substance.

Through the cost effectiveness analysis, existing and alternative substance abuse approaches will be evaluated the most effective treatment method assessed. Evaluating the outcomes and costs of treatment is necessary to determine how to efficiently allocate limited resources.

While in Afghanistan the fund for reduction of demand for drugs is only from a donor source so in term of efficiency and effective use of sources, this study will be useful.

CHAPTER II

LEATHERATURE REVIEW

While the resource is scarce, economic evaluation is necessary for health care decision maker.

The cost effectiveness of health care program or any other intervention is very useful tools to evaluate and assess the program economically.

1.1. Hospital Costing Concepts

In the first step of cost-effectiveness analysis, we have to cost the hospitals. The objective of the hospital costing study is to obtain a unit cost per visit of outpatient services and a unit cost per bed day of inpatient services, total cost of hospital for a period of time, as well as cost structures.

Meanwhile, hospital costing help us to answer the following policy questions such as, Does hospital efficient or effective in providing clinical services?, In addition about the allocation of resources from one cost center to other cost center to be more productive and efficient.

Even with the level of resources committed to hospitals in developing countries, the gap between available and required resources is rising. Their hospital costs are rising, while their health needs are not decreasing, though these may shift with social, demographic, and epidemiological changes. Because of the gap in resources, many countries are exploring ways to generate additional revenue for their hospitals and health systems. In many countries, finding new revenue sources is necessary, but of

equal importance are alternative strategies that include improving resource allocation and increasing the efficiency of hospital operations.

Wasting valuable resources represents a major source of hospital inefficiency. In the Americas, WHO estimated that up to 40% of resources available for health services are wasted. Gains in efficiency alone could generate substantial savings because of the scale of hospital resources and operations (MSH, 2012).

The goal of HOSPICAL (Hospital costing allocation tool) is to help managers develop reasonable cost information for each of their hospital's principal services in order to identify inefficiencies, compare costs and improve decision making and resource allocation.

1.1.1. Cost Terminologies and Classification of Cost:

The cost theories which were applied in this study explained as follows:

Cost Analysis Perspective:

Costing perspective differs from Providers' perspective to patient's perspective and social perspective.

It is very valuable for the evaluation of economics to be identified. The costing in this study is from provider's perspective.

Cost: amount of expenditure spends on particular good or activity (MSH, 2012).

Capital Cost: Capital cost are inputs that last for more than one year like the cost of depreciation of main equipment, machineries, buildings and other fixed assets.

Straight-line method of depreciation will be used for the cost depreciation based on the rule in Afghanistan.

The useful life years for example for computer is 3 years, but the depreciation cost for some of medical and none medical equipment that is in a list for these two hospitals are not included in the tax guideline of MoF in Afghanistan, so the depreciation cost of these materials was calculated based on life years and quality of those materials.

The straight line method of depreciation is used for the calculation of capital cost.

Labor Cost: defined as the salary and other fringe benefits of all staff in all departments in a health facility(MSH, 2012).

Material Cost: cost of all medical goods and supply and none medical supply which spend in department for operation of activities.

1.1.2. **Cost Center:** A program or a department within a hospital.

Cost center identification: the cost center can be divided into three categories, General cost, ancillary cost center and clinical cost center (MSH, 2012).

General Cost Center: Managerial, administrative, and financial activities that support, but do not directly provide patient care services. This cost center category is sometimes called administration or overhead.

Ancillary Cost Center: Medical support activities indirectly required to deliver a clinical service, i.e., Laboratory, pharmacy, radiology, etc.

Clinical Cost Center: Direct medical activities are relevant to the production of clinical services, i.e., Gynecology/obstetrics, pediatrics, surgery, internal medicine (MSH, 2012).

Allocation of Costs: The assignment of costs to different cost centers or departments according to estimated use of resources (in terms of space, number of staff, cost, number of bed days and admission etc.) (MSH, 2012).

Unit Cost per Bed Day: the total cost (direct and indirect) of producing inpatient services divided by the number of bed days for a given timeline. Note that it is very difficult to get a unit cost per bed day by diagnosis (e.g., Peritonitis) because hospitals include many complex diagnoses. For this reason, the final result of the step-down process is the unit cost per bed day per department. (MSH, 2012).

Unit Cost per Outpatient Visit: the total cost (direct and indirect) of producing outpatient services divided by the number of outpatient visits for a given timeline. (MSH, 2012).

Direct cost: Direct cost is directly linked to the use of particular resources or cost objectives like a medical service or a department of a hospital (MSH, 2012).

Indirect cost: is that cost that cannot be directly visible to a particular cost objective and are earning for multiple cost objectives (MSH, 2012).

1.1.3. Cost allocation method:

There are four types of cost allocation methods

Direct allocation method: In this type of allocation each general cost allocates directly to the clinical or final cost (Donald, 1998).

Step-down Costing: is a process of allocating general and ancillary cost centers to clinical cost centers to get a full unit cost per visit and per bed day. The allocation is based on a proportional distribution of those costs. It is a two-step allocation. In the first step, the costs of general services (administration) are assigned (or “stepped down”) to inpatient, outpatient and ancillary cost centers according to the selected allocation factor. In the second step, the costs of ancillary services are assigned (or stepped down) to inpatient and outpatient cost centers according to their percentage of use of services.

The Step-down costing is the common costing methodology adopted to perform hospital costing analysis.

The step down method in this study was used, the reason for selection of this method is, our objective is to find the cost of unit in each department and the cost for OPD per visit and IPD per day so step down method is selected for this purpose to efficiently allocate the cost and it is as well common costing methodology adopted to perform hospital costing analysis (MSH, 2012).

Step down allocation with iterations: the general cost allocates in a step wise of all general cost and then to the clinic or final cost centers, this scheme will repeat several times to reduce remaining unallocated amounts (Donald, 1998).

Simultaneous Allocation: this method is mathematical and computer based. This method uses infinite round of allocation and provide allocation of cost by solving a set of simultaneous equations. This is very complex and difficult to implement it. (Donald, 1998).

Selection of step-down allocation method:

Step down method is selected for this purpose to efficiently allocate the cost from general cost of ancillary and clinical and then the allocation of cost from ancillary to clinical cost center.

This method is easily and efficiently allocates the cost and other methods like direct allocation method is not reasonable because the allocation of general cost allocates directly to the clinical center so maybe some part of the cost will be missed from the calculation. And in Step down allocation with iterations the general cost allocates in a stepwise and then to the clinical cost centers, this scheme will repeat several times while the result is the same with Step down method and the simultaneous method is mathematical, computer based and very complex and difficult to implement it.

Unit cost analysis: in this study, we explain that five main parts in cost calculations like cost center identification, direct cost determination, allocation criteria, full cost determination and unit cost calculation.

1.2. Previous study analysis:

There has been no research on cost effectiveness of substance user treatment in public and private hospital in Afghanistan yet. As a matter of facts this research is essential to provide a specific economic evaluation of public hospital compared to the private hospital.

In a literature review, we will focus on why they do cost, cost analysis methods, costing tools and conclusion.

Cost analysis from the provider's perspective reviewed in Pakistan, Afghanistan and Thailand.

The study in Pakistan was conducted by United Nations Office for Drug Control and Crime Prevention (UNODCCP) in six major cities of the country: Quetta, Karachi, Lahore, Faisalabad, Peshawar, and Rawalpindi/Islamabad. The institutions assessed included government-run facilities and NGO-run facilities. (UNODCCP, 2000).

The objectives of the study were to describe the major treatment approaches currently practiced and to compare the different treatment approaches in terms of cost-effectiveness and relapse rates.

They did a qualitative survey to find the recovery ratio or success treatment ratio in term of effectiveness of intervention, and this qualitative research was conducted through open ended, semi-structured interviews and focus group discussions. The primary participants included thirty personnel from twelve health centers. Similarly, three focus-group discussions were held with eighteen clients who were currently undergoing drug treatment. These discussions were undertaken in order to identify the client's expectations and perceptions of treatment and recovery. All interviews

and discussions were recorded and the essence of the discussions held has been included in the relevant part of this study.

The conclusion was that the hospital based treatment having a case load of psychiatric patients, may not essentially provide long term inpatient drug treatment services, and their interventions were limited to management of acute withdrawal symptoms. While the hospital spends a high ratio of health expenditure, but there is no aftercare program, follow up and other necessary health care, exercise which is a part of Drug user treatment, and this caused the treatment in the hospital has the highest ratio of relapse.

After the comparing of outcome for both interventions, the UNODC preferred that the NGOs hospital with community based program is cost effective (UNODCCP, 2000) and some suggested strategy in this study is that relevant organizations develop protocols and demonstration projects for selected modalities which are effective, especially those for community-based service delivery of drug treatment and rehabilitation programs.

Cost effectiveness of PPM versus public system of TB in Vietnam

Mr. Tran Nhat Quang did a cost effectiveness analysis of Public Private Mix DOTS (PPM DOTS) with public treatment of TB patients (Quang, 2012) to find out the cost effectiveness treatment, he used the activity based costing method to find the direct and indirect cost and total cost, the outcome was successful treatment of TB. He divided the total cost per successful treatment cases and found the ratio of cost-effectiveness. The cost-effective ratio show that the PPM DOTS strategies are cost

effective in almost countries, while it is clear from the reduction of TB infectivity burden and increasing of the TB treatment completion in PPM system.

1.3. Hospital Costing

The objectives and question of researchers in cost analysis of hospital are to find out the total cost, unit cost per OPD visit and IPD per day and the ratio of cost centers as well from the provider's perspective.

Different method of costing used for cost analysis of hospitals, step-down used in Afghanistan and Thailand hospitals for analysis and only simultaneous method used in one hospital in Thailand. The data were collected through a developed questionnaires and analyzed into excel sheet and hospital cost allocation tool (HOSPICAL).

The cost centers categorized in a different ways based on availability of revenue and none revenue, such as revenue produced cost centers, none revenue produced cost centers and patient services for the hospitals that have revenue (Nareerat, 2002)in Thailand, And in Afghanistan while the health service is free, so the cost centers categorized into three groups, general cost centers, ancillary cost centers and clinical cost centers (MoPH, 2012).

The findings from this review was the total cost, unit cost and shows that there is the difference ratio of cost centers between the general cost center, ancillary and clinical cost center (MoPH, 2012)or labor cost center, material cost centers and capital cost center and as well the cost of OPD per visit and IPD per day. In Afghanistan the average cost of IPD services is 83% of the total cost and the average of OPD services is 17%.

The variation in cost for IPD and OPD in hospitals is as below.

In Afghanistan the lower cost for OPD is USD 2 and the higher cost is USD 6 for IPD it starts from USD 16 up to USD 36, the cost centers for general cost centers is 23% up to 49% of the total cost and for ancillary cost center it is 7% up to 42% (MoPH, 2012)total cost and for clinical cost center it is about 35% up to 44% (MoPH, 2012)total cost which shows the variation of cost for health services and cost centers in hospitals in Afghanistan.

Also, we can recognize that in Indragandi hospital and Malalai hospital general cost made, the higher ratio of expenditure while in Rabia Balkhi hospital Ancillary cost center made the higher ratio of cost expenditure (MoPH, 2012).

The studies in three hospitals revealed in Thailand that the lower cost for OPD is USD 5 (Thantaristri, 1998)and the higher cost is USD 8(Nareerat, 2002) for IPD it starts from USD 31(Sridaeng., 1998) up to USD 54 (Nareerat, 2002)the cost centers for Labor cost centers is 54% up to 70% (Thantaristri, 1998)and for Material cost center it is 11% (Nareerat, 2002)up to 30% (Sridaeng., 1998)and for capital cost center it is from 10% (Thantaristri, 1998)up to 23%(Nareerat, 2002) which shows the variation of cost for health services and cost centers as well in Thailand's hospitals.

The labor cost has totally the higher ratio in these three hospitals and different in each but the material cost and capital cost is different ratio it means in one hospital capital cost has the second highest ratio and in another hospital material cost has the second ratio instead of capital cost.

CHAPTER III

METHODOLOGY

3.1. Study design and procedures:

This study is quantitative. The step down method used to find the unit cost in each department for OPD per visit and IPD per bed per day.

This method easily and efficiently allocates the cost.

Secondary data collected through questionnaires in fiscal year 2012 at Mutadin and Nejat Hospitals. The direct cost and indirect cost calculated from the provider perspective for fiscal year 2012 to find each unit cost for each OPD/counseling and IPD and cost per every patient.

The cost centers from the provider perspective divided into three cost centers: General cost center, Ancillary cost center and Clinical cost center.

The total cost in each cost center consisted of labor cost, material cost and capital cost. In the first step we will cost the general cost center and then allocate the general cost (administration, finance and etc) to all other cost centers that have received administration and financing services. The second process is the costing of ancillary cost center and then allocation of the cost of ancillary or support service costs (together with the administrative costs which already allocated) to the patient care departments.

Then we will cost the clinical department, which includes all departments followed by the allocation cost of general cost and ancillary cost according to their percentage of use of services. The general costs include Administration, Finance,

Maintenance and utilities, Transportation, Kitchen, and Laundry. The ancillary costs include Pharmacy only which are indirectly involved in the health service in clinical level and the clinical cost center include the departments that deliver direct health services.

After finding the full cost per unit (cost for each type of substance or average cost) and outcome, the cost and outcome in interventions, Mutadin and Nejat hospitals will be compared, and we will find the ratio of cost festiveness as well. The outcome is successful detoxification treatment of heroin and opium as the numbers of subjects who were successful in the completion of the detoxification treatment program.

The outcome used for analyzing the effectiveness of health program like the number of patients with successful treatment of detoxification treatment.

3.2. Study sample:

In this study Mutadin hospital and Nejat hospital was selected for the study Mutadin hospital (Public hospital).

3.2.1. Mutadin Hospital (Public)

Mutadin hospital is one of the national hospitals with 120 beds located in Kabul capital of Afghanistan. It is the only specialized and the largest public hospital for substance user treatment that many substances addicted patients from all over Afghanistan are referred to. MoPH established this hospital. Duration of treatment is extended up to 45 days, according to the type of drug user and treatment policy.

Total Number of staff is more than 65 persons. The services are for all drug users, including people who use heroin, opium, amphetamine, cannabis and pharmaceuticals. The types of services in Mutadin hospital are inpatient department (IPD), outpatient department (OPD) for patients.

These hospitals focus on detoxification, psychotherapy and aftercare as well.

This hospital includes Administration and Finance departments which include maintenance and utilities, transport, clinical management, kitchen, laundry and cleaning. The clinical department includes OPD and IPD departments for opium, heroin, cannabis and amphetamine. The ancillary services includes Pharmacy department only.

3.2.2. Nejat Hospital (Private)

Nejat center is a social Development, Drug Rehabilitation and medical services in Afghanistan and financially supported by UNODC and Colombo plan. Since 2002 Nejat Center drug rehabilitation center functions an independent Afghan NGO and continues its activities in Kabul and some other provinces in Afghanistan.

Nejat Center carried out its activities in the drug treatment and services in more than four facilities for substance user with Pre-treatment phase, detoxification and aftercare program. Nejat Hospital is a 60 beds hospital, which is located in Kabul, the capital of Afghanistan, having 22 personnel including technical and non-technical staff. The structure and the treatment are the same like Mutadin hospital.

The general cost center including Administration, finance department, kitchen, laundry and transportation and the ancillary including only pharmacy and the clinical

cost center including from OPD and IPD for heroin, opium and other drug users. The treatment method of detoxification is as follows

- Combinations of analgesics
- Hypnotics such as Temazepam or a long-acting Benzodiazepine
- An antihistamine with a long-acting phenomenon such as Retard Avil
- Antidepressants with a sedative component such as Prothiadine to cover high anxiety and restlessness during withdrawal
- Intravenous fluids for dehydration
- Multivitamins, anti-diarrheal and anti-emetics as supportive therapy

3.3. Data Collection:

This study was a retrospective of the year of 2012, secondary data from the registers and account records from different area such as administration, finance, HMIS, pharmacy and human resource in Mutadin and Nejat hospitals were collected from the provider's perspective. The questionnaires developed and used in both hospitals for data collection.

The questionnaires collect the hospital information on general department, Ancillary department, clinical department, hospital statistics such as number of hospital's bed, number of OPD, number of admission, number of discharge, number of death, expenditures like food, laundry, stationary, administration, electricity, medical and non medical equipment and other recurrent and capital expenditure collected, list of staff with details for their position, profession, monthly salary and their time allocation as well.

And also data and information on pharmacy department as ancillary distributed to inpatient and outpatient based on the distribution list was collected.

3.4. Data Analysis

The questionnaires developed for data collection of different area such as administration, finance, HMIS, pharmacy and human resource then we have the expenditure, staff income and time allocation, hospital statistic and general information, pharmacy and administration.

The HOSPICAL tool was used for data analysis. The tool allows analysis of unit costs and total costs for each department in the hospital. This tool was used for provider's perspective only. The HOSPICAL tool developed by MSH for costing of the hospital.

A sensitivity analysis in terms of risk management will be conducted. Sensitivity analysis (SA), generally defined, is an investigation of the potential changes and errors and their impacts on the conclusions to be drawn from the model. It is proposed that when using sensitivity analysis for decision support, it can be very helpful to attempt to identify which recommendation from creating assumptions is the best way to sum up the implications of the model. After determining the cost per unit and collection of data on outcomes, both interventions will be compared to find their cost-effectiveness.

The cost-effectiveness measured by the the total cost per effectiveness or ratio of both cost and effectiveness, the cost is total cost of hospital for detoxification and the effectiveness measured by the number of successful detoxification treatment per total number of inpatients for detoxification.

The total and average cost based on the selected costing method will be found, and the outcome of our study is the successful treatment of detoxification in the substance use treatment hospitals the duration of successful detoxification is around 30 up to 45 days, which means that patients will be included in the outcomes that completed successfully the treatment in the required period and are discharged from the hospital. The cost effectiveness measurement is cost per outcome and then the both intervention will compared in term of cost effectiveness for the ratio of cost and effectiveness.

3.5. Hypothesis testing

Public hospital for treatment of substance users is cost effective than Nejat private hospital for substance users.

3.6. Output:

In addition, of successful treatment of detoxification (For Heroin, Opium and other) we also find the total cost of the hospital for one year, Cost per OPD/counseling visit per day, Cost per IPD per day, Average length of stay and Bed occupancy rate as well.

3.7. Conceptual Framework

The study describes the cost structure and cost analysis of public and private hospitals and cost effective treatment as well in fiscal year 2012 from the provider's perspective in Mutadin and Nejat hospitals, as we used the step down method in this

study so we divided the cost centers into three groups, which include the general cost center, ancillary cost center and clinical cost center.

In the last step, the unit cost for each substance user will be earned.

General Cost Center includes Managerial, administrative, financial activities, Maintenance and utilities, Transport, Kitchen, Laundry and cleaning. It also called administration or overhead.

The Ancillary Cost Center includes pharmacy department and,

The Clinical Cost Center includes Direct medical activities are IPD and OPD or counseling (For Heroin, opium, and other).

Allocation of Costs is the he assignment of costs to different cost centers or departments according to the estimated use of resources (in terms of number of staff, time allocation of staff, total expenditure, number of beds and the number of admissions. In the general cost center, there are several sub cost centers, which mentioned in above. For example, the admin sub-cost center has two kinds of costs, one is direct which is already exist and the other is indirect cost which is allocated from a capital cost to the admin cost center, then the admin cost center is allocated to the rest of other sub- cost centers, pharmacy cost center and clinical cost centers based on the allocation criteria of total expenditure.

The kitchen sub cost center has direct and indirect cost which the indirect is allocated from capital and administration cost centers and then the kitchen sub-cost center allocated to the IPD only based on the allocation criteria of admission because only the IPD use this cost center. Laundry sub cost center is the same as kitchen sub cost center.

Transportation sub-cost center has also direct and indirect cost centers the indirect comes from capital, and administration cost centers and then it allocated to the pharmacy and clinical cost centers based on the allocation criteria of total number of staff used. The pharmacy cost centers received the indirect cost from the above cost centers and it allocated based on the percentage of pharmacy used for IPD and OPD to the clinical cost center, which is final cost center.

In the last stage we do not need the cost of OPD and only we dealt with the IPD cost.

The IPD cost divided to the total number of substance user who successfully completed the detoxification to get the average cost but without pharmacy cost, then the cost of pharmacy based the percentage usage of pharmacy divided to the number of heroin, opium and multi users, and this cost plus the average cost is given the the average cost for heroin, opium and multi users.

The total cost in each cost center consisted of labor cost, material cost and capital cost. If we explain stepwise the step down then we will do in the first step to find the cost for the general cost center including direct and indirect cost and then allocated the general cost (administration, finance and etc) to all other cost centers that have received administration and financing services. The second process is the costing of ancillary cost center and then allocation of the cost of ancillary or support service costs (together with the administrative costs which already allocated) to the patient care departments in terms of number of staff, expenditure, time allocation of staff, number of bed and number of admission.

We got the unit cost per each cause of substance users, such as heroin, opium and multi users and outcome and then we will compare the cost of both intervention and outcome as well to find the ratio and the effective treatment.

3.7.1. Cost effectiveness

The resources are scarce and limited and the need is increasing, day to day for health service, so economic evaluation is necessary to evaluate the program or project efficiency and cost effectiveness analysis is one of the important methods of evaluation of economics. Through the cost effectiveness analysis, existing and alternative substance abuse approaches will be evaluated the most effective treatment method assessed. Evaluating the outcomes and costs of treatment is necessary to determine how to efficiently allocate limited resources.

The total and average cost based on the selected costing method will be found, and the outcome of our study is the successful treatment of detoxification in the substance use treatment hospitals, which means that patients will be included in the outcomes that completed successfully the treatment in the required period and are discharged from the hospital. The duration of successful treatment of detoxification is around 45 days. The cost effectiveness measurement is cost per outcome and then the both intervention will compared in term of cost effectiveness for the ratio of cost and effectiveness.

The General cost center includes the below cost centers

- Administration
- Kitchen
- Laundry

- Transportation

Ancillary cost center include

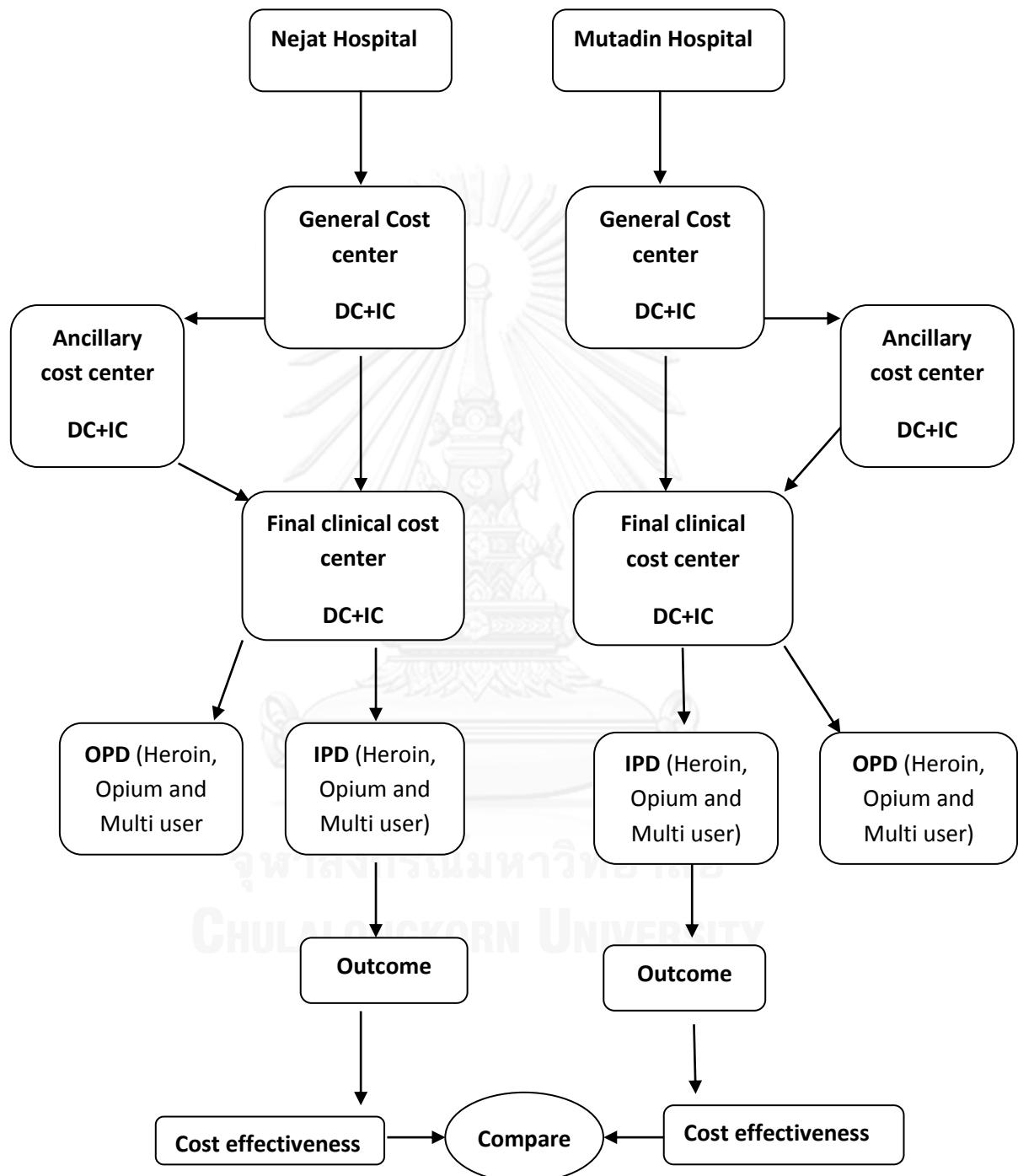
- Pharmacy

Clinical cost center includes

- Inpatient
- Outpatient/Counseling

General department	Ancillary Department	Clinical department	
Administration	Pharmacy	Inpatient	Outpatient/Counseling
Kitchen		IPD	OPD/Counseling
Laundry			
Transportation			

Figure 3: Conceptual Framework



CHAPTER IV

ANALYSIS AND RESULTS

Both Nejat and Mutadin hospitals are specialized hospitals for the treatment of the substance used in Kabul. Mutadin hospital is one of the national hospitals with 120 beds and Nejat is with 60 beds in Kabul. These are the only specialized and largest hospitals for substance user treatment. The Mutadin hospital supported and implemented by the government of Afghanistan and Nejat hospital is supported and implemented by NGO which is private but none for profit. Duration of treatment for detoxification is 30 up to 50 days, according to the type of drug user and treatment policy in both of these hospitals. The structure is the same, both hospitals have three main cost centers like general, ancillary and clinical cost centers. The general cost center divided into administration, kitchen, laundry and transportation. The ancillary cost center includes pharmacy department only. The clinical cost center is Inpatient and Outpatient/Counseling for the treatment of substance use. The services in these two hospitals are for all kinds of substance users, including people who use heroin, opium, amphetamine, cannabis and pharmaceuticals.

4.1. Hospital Statistics:

The below table shows the statistics of both hospitals for the number of beds, admission, discharge, average length of stay and bed occupancy rate.

Table 5: Statistics of both hospitals

Hospitals	OPD	Number of Bed	Hospitalization days	Admission	Discharge	Death	ALS	BOR
Mutadin Hospital	1127	120	30,463	980	898	1	33.9	70%
Nejat Hospital	1016	60	16,290	362	362	0	45	74%

From the hospital statistic, it shows that the number of beds is double in Mutadin hospital than Nejat hospital so that is why the number of inpatients and outpatients is higher in Mutadin hospital. The Bed Occupancy rate is higher in Nejat hospital because the average number of days of a patient for completion of treatment is 45 days.

The total admission patients in Mutadin hospital are 980 while the number of discharge is 898 patients, 82 persons left the treatment, according to different reasons, but in Nejat hospital the total number of patients are 362 and all of them successfully continued the detoxification treatment.

In addition the number of detoxification period is different in both hospitals it defers from 33.9 days to 45 days from Mutadin hospital to Nejat hospital.

4.2. Staff of the Hospitals

Table 6: Details of the staff in both hospitals

Hospital name	Number of doctors	Number of Pschychologist	Number of Nurse	Number of social workers	Number of Pharmacist	Number of Admin	Number of other	Total
Mutadin H	7	4	6	16	3	12	17	65
Nejat H	3	2	1	5	1	2	8	22

Mutadin hospital has totally 65 staff because this hospital has 120 beds so the number of staff is higher than Nejat hospital, while the number of staff is 22 in Nejat hospital.

According the number of beds the number of staff is higher in the Mutadin hospital than the Nejat hospital 3:1 while the number of beds is 2:1

4.3. Hospitals Cost

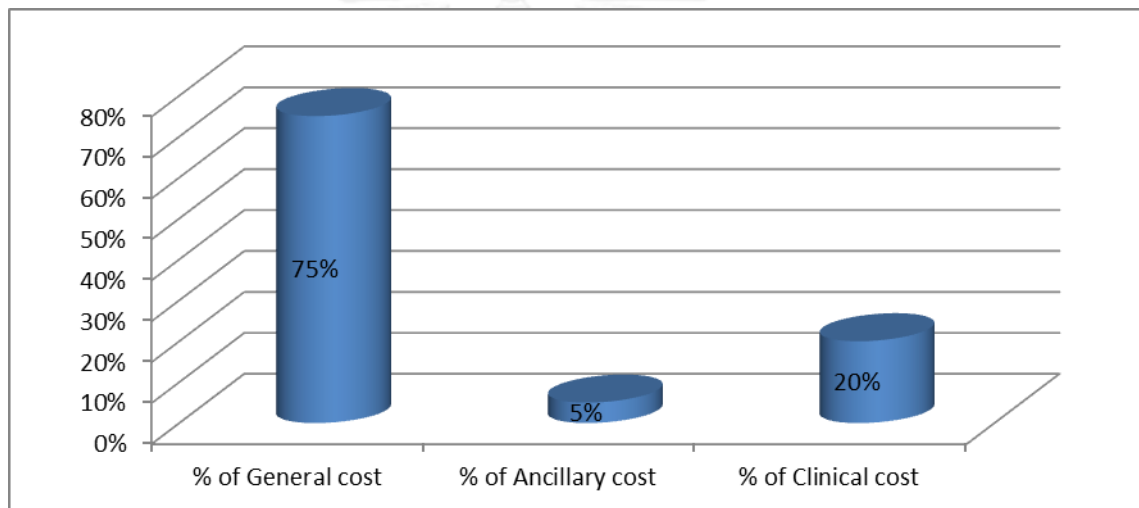
The total cost of Mutadin hospital is \$513,904 which is consist of staff salary, medical and none medical equipment, cleaning materials, food, admin and capital as well. The following table (table 5) shows the amount and percentage for each cost center in Mutadin hospital.

Table 7: Cost breakdown for Mutadin hospital

Break-down of Recurrent Cost by Cost-Center	Amount in USD and as Percentage of total
Cost of General Departments	383,734
General as % of Total	75%

Cost of Ancillary Departments	24,352
Ancillary % of Total	5%
Cost of Clinical Departments	105,818
Clinical as % of Total	20%
Total	513,904 (100%)

Figure 4: Percentage of expenditure by three main cost center in Mutadin hospital



The cost of general department is 383734 USD, which consist from admin and service cost, kitchen, laundry, transportation and capital as well and it made 75% of the total cost of the Mutadin hospital. The cost of ancillary department, which is only pharmacy, is 24352 USD and made 5% of total hospital cost and last cost center, which is clinical cost 105818 USD and made 20% of the total cost of the Mutadin hospital. The high percentage of the cost is in general department and then for clinical department and it is less for ancillary department which is pharmacy department.

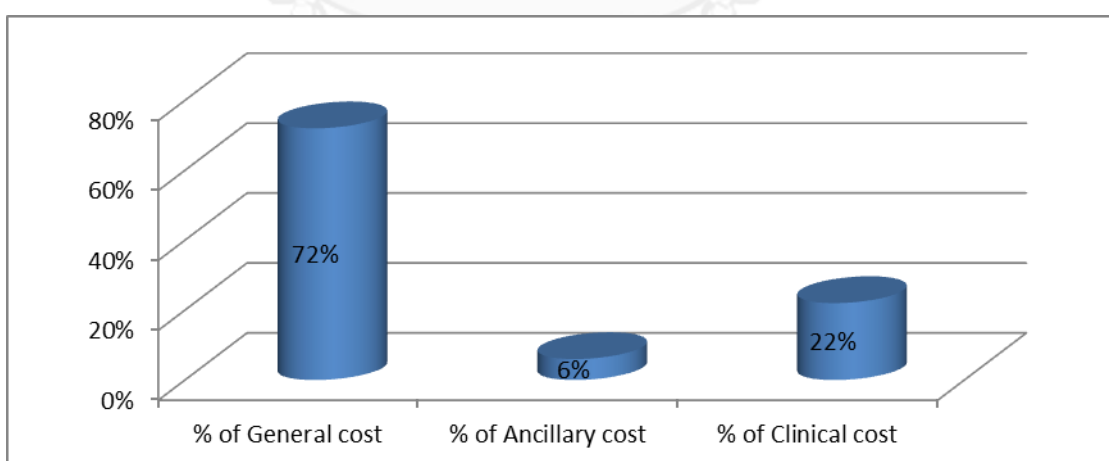
The total cost of Nejat hospital is \$202320 which is consist of staff salary, medical and none medical equipment, cleaning materials, food, laundry, admin and capital as well.

The following table shows the amount and percentage for each cost center

Table 8: Cost breakdown for Nejat hospital

Break-down of Recurrent Cost by Cost-Center	Amount in USD and as Percentage of total
Cost of General Departments	146,600
General as % of Total	72%
Cost of Ancillary Departments	12,240
Ancillary % of Total	6%
Cost of Clinical Departments	43,680
Clinical as % of Total	22%
Total	202,320 (100)

Figure 5: Percentage of expenditure by three main cost centers in Nejat hospital



The cost of general department is 146,600 USD, which consist from admin and service cost, kitchen, laundry, transportation and capital as well and it made 72% of the total cost of the Nejat hospital. The cost of ancillary department, which

is only pharmacy, is 12,240 USD and made 6% of total hospital cost and last cost center, which is clinical cost 43,680 USD and made 22% of the total cost of the Nejat hospital. The high percentage of the cost is in general department and then for clinical department and it is less for ancillary department which is pharmacy department.

General administration department cost, including all fixed and variable costs earned by general departments. These costs comprised of costs of admin and all general supportive staff, materials and capital costs that summarized as costs of administration, maintenances, kitchen and laundry. These costs include both fixed costs and variable costs. Fixed costs in this category consist of a share of depreciation of equipment and durable goods. Variable costs include costs of personnel, supplies, materials, electricity, fuel, transportation and recurrent costs.

Ancillary department cost has two components. The first part includes direct costs of personnel, supplies and materials allocated directly to ancillary departments and the other part is costs that were allocated from general administration departments to the ancillary departments.

Costs of clinical departments are the summation of direct costs incurred in the delivery of clinical services and costs that allocated from general and ancillary departments to clinical departments. These costs include fixed and variable costs. Fixed costs include depreciation of medical and nonmedical equipment. Variable costs include costs of general departments allocated to clinical departments, recurrent costs of delivery of each final clinical service, costs of personnel, costs of drugs and other medical and nonmedical supplies.

The amount of total cost of the hospitals and cost centers is different as it is shown in the table 5 and 6. Because Mutadin hospital is a bigger hospital than Nejat center, but the percentage of cost for cost centers of general, ancillary and clinical are almost the same. As the percentage of the cost of general cost center is 75% and 72%, the percentage of cost of ancillary is 5% and 6% and the percentage of clinical cost center is 20% and 22% in both mentioned hospitals. The general cost center is higher than all other cost centers. Because the general cost center includes several sub cost center such as Admin, Kitchen, Laundry and transportation so it makes the bigger percentage of total cost in both hospitals.

4.4. Cost breakdown by budget line

Table 9: Cost breakdown by budget line in both hospitals

Hospital	Mutadin hospital		Nejat hospital	
	Cost in USD	% of total cost	Cost in USD	% of total cost
Staff	212,943	41%	82,920	41%
Recurrent	130,419	25%	108,120	53%
Capital	170,543	33%	11,480	6%
Total	513,904	100%	202,520	100%

The labor cost comprised of salary of all staff working in the Mutadin and Nejat hospitals. The recurrent cost comprised of materials that like a recurrent cost, for example maintenance, electricity, food, gas, wood and etc, or recurrent cost which the value is not consumed more than one year.

The capital cost comprised of the equipment, computer, beds, air conditioner, heater, TV and other materials, which consumed more than one year the value is more than 100 USD.

The percentage of total cost of staff is quite the same in both hospitals, but the percentage of Recurrent is different it is 53% in Nejat hospital, which is higher than Mutadin hospital (25%) and the capital cost is higher in the Mutadin hospital than Nejat hospital which is 33% than 6%. As we mentioned Mutadin hospital is public and running by Ministry of Public Health and this hospital have long term donation by the Government of Afghanistan and the building is from Ministry of Public Health so their capital cost is higher than capital cost than private hospital. And the reason for the 6% of capital cost in Nejat hospital is that because Nejat center running this hospital and the fund is annual based so that is why they have less capital cost expenditure and more recurrent cost expenditure.

4.5. Recurrent cost breakdown

Table 10: Cost breakdown of recurrent cost in both hospitals

Hospital Expenditure item	Mutadin hospital		Nejat hospital	
	Amount in USD	% of total	Amount in USD	% of total
Kitchen	66,888	51%	39,600	37%
Laundry	1,485	1%	3,600	3%
Pharmacy	19,269	16%	8,400	8%
Transportation	12,000	9%	11,600	11%
Administration	30,776	23%	44,920	41%
Total	130,418	100%	108,120	100%

The recurrent cost comprised of materials that like a recurrent cost, for example the cost, which the value is not consumed more than one year as in the Kitchen, laundry, pharmacy, transportation and administration departments.

The percentage of expenditure in most of cost centers is quite similar but there is a difference only in two cost centers with kitchen and administration, the cost of the kitchen of Nejat hospital is less than Mutadin hospital because in public hospital the number of patients is higher than the private hospital. The percentage of cost for administration in Nejat hospital is higher than Mutadin.

In addition, there is not more deference for the rest of recurrent cost centers in the above table.

4.6. Salary breakdown for each cost center

Table 11: Cost breakdown of salary

Hospital	Mutadin hospital		Nejat hospital	
	Expenditure	Amount in USD	% of total	Amount in USD
Admin	83,003	39%	25,440	31%
Kitchen	13,140	6%	7,560	9%
Laundry	5,400	3%	2,400	3%
Pharmacy	5,083	2%	3,840	5%
Detoxification	78,865	37%	36,264	43%
Outreach	26,953	13%	7,416	9%
Total	212,943	100%	82,920	100%

As the above table shows the breakdown of salary in all cost centers in both hospitals are the same, the amount is different because the staff of one hospital is higher than the second one but the percentage of cost centers are still the quite the same in both hospitals.

Some of the staff work for both of OPD and IPD in both hospitals and their salary calculated based on their percentage of the work on each mentioned departments, so in the above table the amount of salary is that amount that allocated directly and indirectly to the each cost center.

4.7. Total cost by clinical department

Table 12: Total cost by clinical department

Hospital	Mutadin hospital		Nejat hospital	
Category	Cost in USD	% of total	Cost in USD	% of total
Detoxification	479,058	93%	183,543	91%
OPD/Counseling	34,845	7%	18,977	9%
Total	513,904	100%	202,520	100%

Figure 6: Mutadin hospital clinical cost breakdown

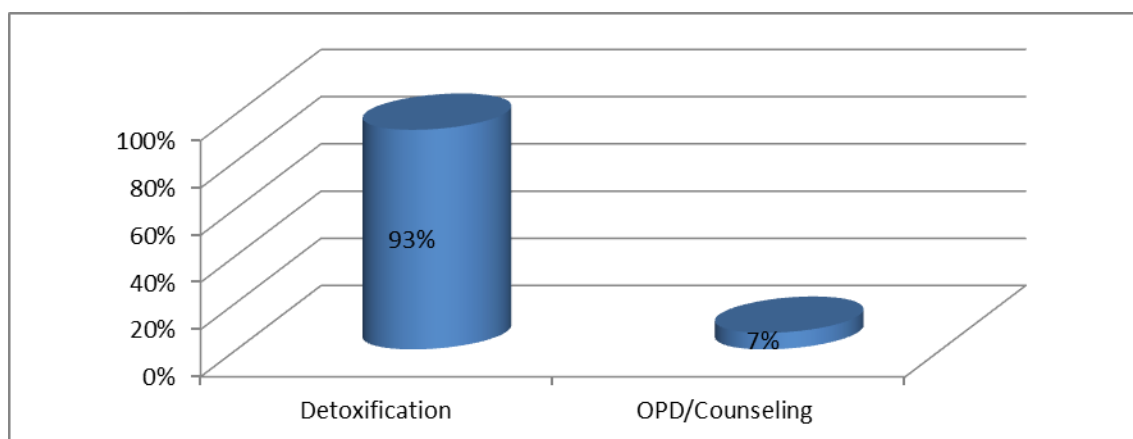
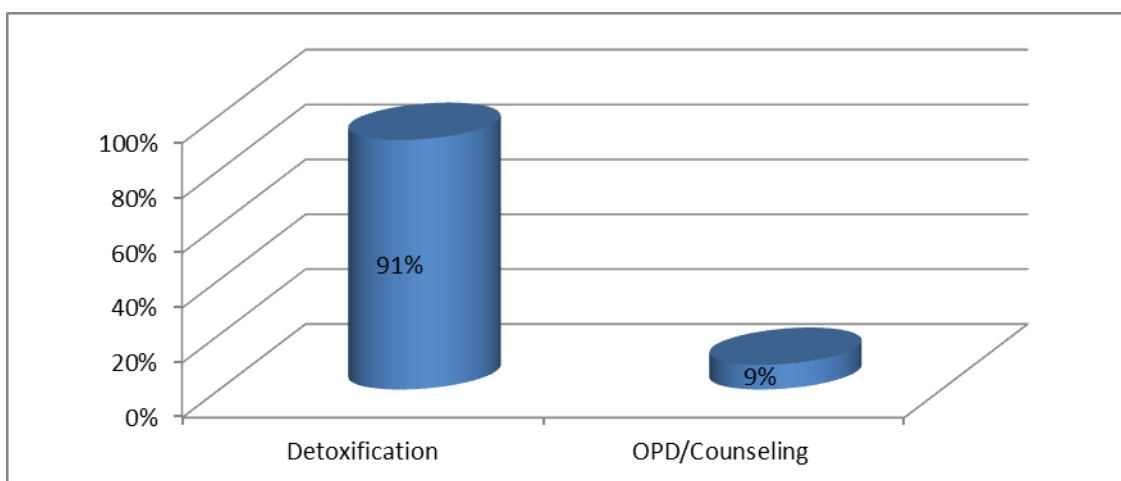


Figure 7: Nejat hospital clinical cost breakdown



The IPD or detoxification cost consists almost the total of hospital cost in both hospital and it is a little bit higher 2% in Mutadin hospital. The OPD or counseling makes very less amount of expenditure in these two hospitals 9% in Nejat hospital and 7% in Mutadin hospital.

In this study, only we need the total cost of IPD because our objectives are to find out the total cost of IPD and divide to total number of successful treatment of detoxification to find the ration between two hospitals.

4.8. The Average cost

Table 13: Average cost for substance user per day in both hospitals

Hospital	Cost in USD in Mutadin hospital	Cost in USD in Nejat hospital
Cost per admitted patient	533	507
Cost per inpatient per day	15	11
Cost per OPD	30	19

Figure 8: Average cost per day in Mutadin hospital

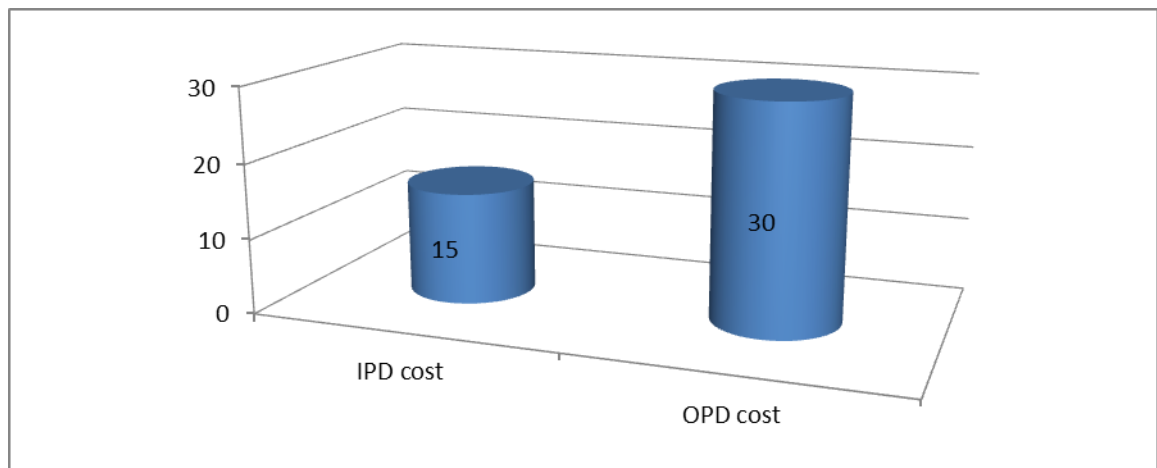
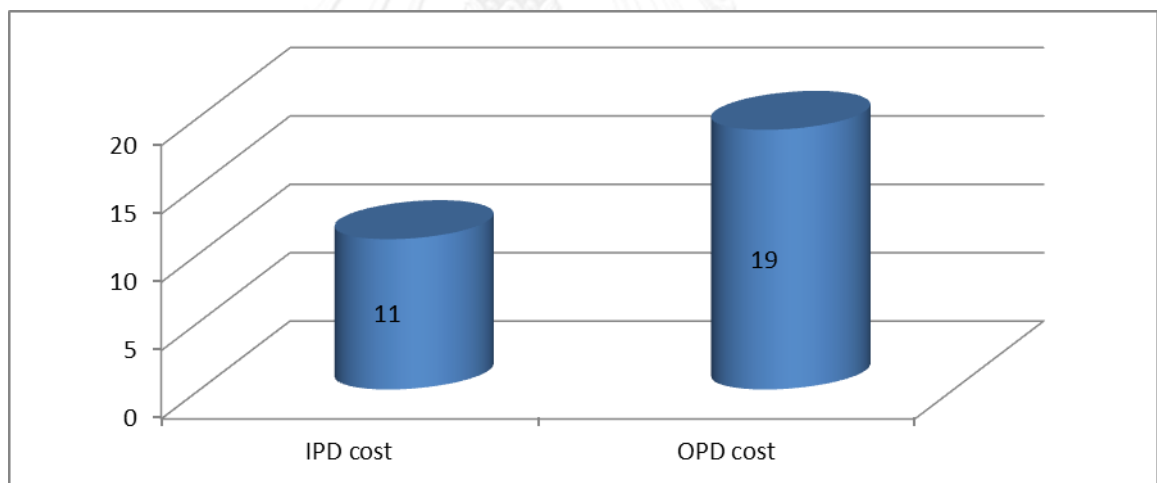


Figure 9: Average cost per day in Nejat hospital



In the above table the average cost for substance user are mentioned while the average number of days (45 days) is higher in Nejat hospital and it is 33 days in Mutadin hospital and still the average cost of treatment of one person is less than Mutadin hospital.

For OPD the cost of Nejat hospital is 19 USD while it is 30 USD in Mutadin hospital, which shows a big difference amount which will be the effect of high capital cost.

4.9. Cost effectiveness of program

The cost effectiveness analysis designed to measure which treatment is more effective in term of cost and effect.

The cost effectiveness, which is the cost, divides by the effectiveness part.

The following equation shows the calculation of cost-effectiveness for each treatment.

$$\text{Cost - effectiveness} = \frac{\text{Cost}}{\text{Effectiveness}}$$

Therefore

$$\text{The CE for Mutadin hospital} = \frac{\text{Cost}}{\text{Successful treatmetn of detoxification cases}}$$

$$\text{The CE for Nejat hospital} = \frac{\text{Cost}}{\text{Successful treatmetn of detoxification cases}}$$

Table 14: Average cost of detoxification treatment in both hospitals

Hospitals	Number of IPD	Cost of IPD	Cost of OPD	Total cost	Unit cost (Average cost) of detoxification treatment
Mutadin Hospital	898	479,058	33,239	513,904	533
Nejat Hospital	362	183,543	18,977	202,520	507

Mutadin hospital CER= 479,058/898=533 USD per case

Total cost for IPD =479,058 USD

Number of IPD=898

Nejat hospital CER= $183,543/362=507$ USD per case

Total cost for IPD =183,543 USD

Number of IPD=362

In the above table shows, that unit cost of Mutadin hospital is higher than Nejat hospital while the number of treatment days or hospitalization days in Nejat center is more than Mutadin hospital.

4.9.1 Mutadin Hospital

The total cost for IPD in Mutadin hospital is 479,058 USD and the cost of pharmacy department is 24,352 USD. 97% of pharmacy is allocated to IPD patients so the amount of 97% of pharmacy will be 23,621 USD, then we have withdrawn this pharmacy cost from the total of IPD cost, we will get $479,058-23,621=455,437$ USD this amount shows that the cost of IPD in Mutadin hospital without pharmacy is 455,437 USD. Now easily we can find the average cost for substance user treatment as it is $455,437/898=507$ USD.

The cost for each of substance users is 507 USD per case without pharmacy. The other cost allocated equally for all type of substance user but only pharmacy differently distributed to each type of substance.

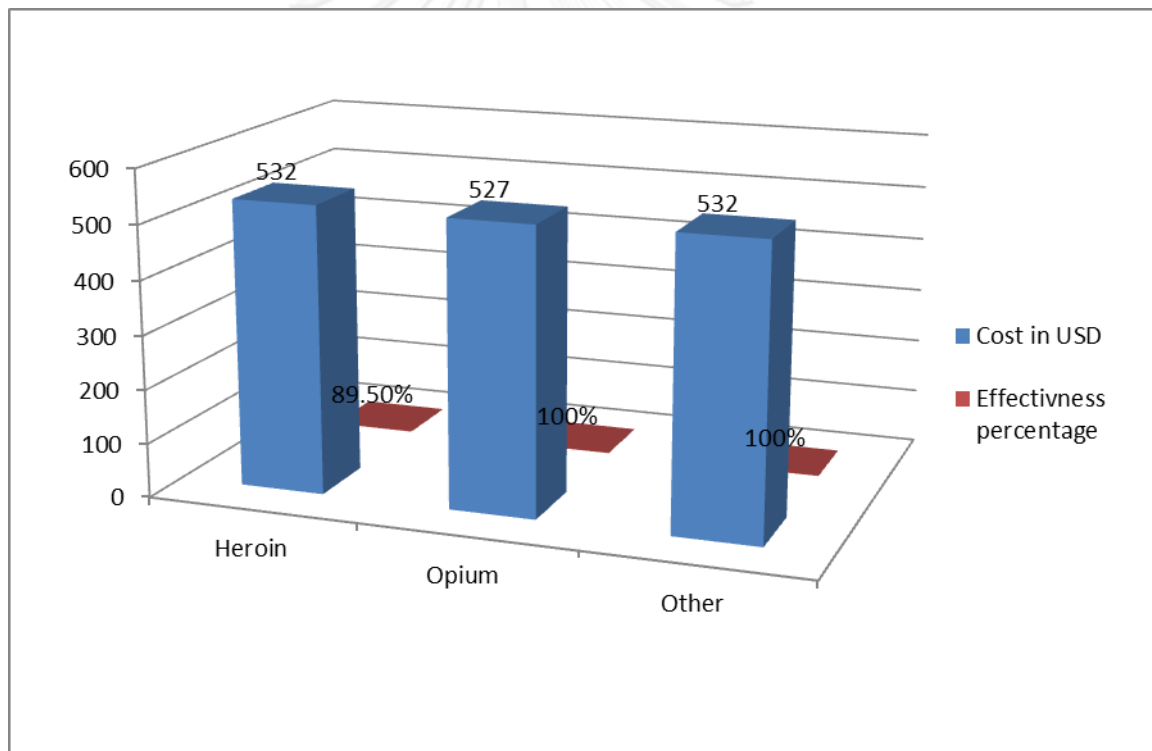
As we have mentioned that 97% of pharmacy is allocated to IPD and also the allocation percentage of pharmacy is different from Heroin users (80%), Opium users (2%) and other (18%) so we divided the cost of pharmacy based on the allocation of pharmacy to the total number of heroin, opium and multiusers of substance users

and then added this cost to average cost (which was without pharmacy cost) to find the average cost of heroin, opium and multi users.

The average cost of substance users in Mutadin hospital is as follows:

- Heroin users =USD 532
- Opium users =USD 527
- Multiusers =USD 532

Figure 10: Cost and effectiveness for types of substance in Mutadin hospital



4.9.2. Nejat Hospital

The total cost for IPD in Nejat hospital is 183,543 USD and the cost of pharmacy department is 12,240 USD and 90% of pharmacy is allocated to IPD patients so 90% of the pharmacy amount will be 11016 USD, Now we drop the

pharmacy cost from IPD total cost to find the average cost of for substance users without pharmacy, then we will have $183,543 - 11,016 = 172,527$ USD, $172,527 / 362 = 476$

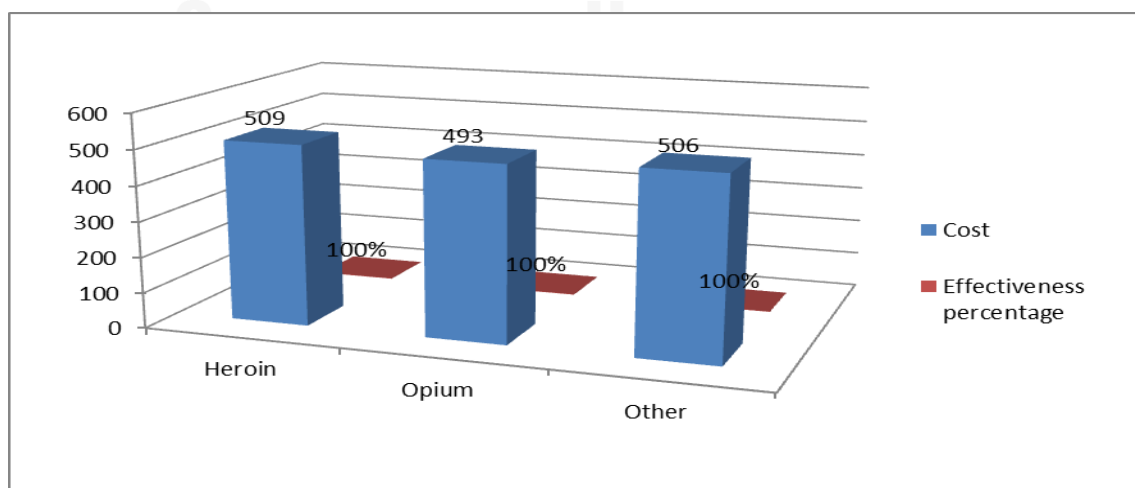
The average cost for each of substance users in Mutadin hospital is 476 USD per case without pharmacy cost.

As we have mentioned that 90% of pharmacy allocated to IPD and the percentage of, pharmacy is different from Heroin users (85%), Opium users (8%) and other (7%). so we divided the cost of pharmacy based on the allocation of pharmacy to the total number of heroin, opium and multiusers of substance users and then added this cost to average cost (which was without pharmacy cost) to find the average cost of heroin, opium and multi users.

The average cost for different kind of substance users like Heroin, Opium and Multi users is as follows:

- Heroin users =509 USD
- Opium users =493 USD
- Other =506 USD

Figure 11: Cost and effectiveness for types of substance in Nejat hospital



4.9.3. Ratio and Effectiveness

Table 15: Average cost of Heroin, opium and Multi users for both hospitals

S/N	Type of Substance	Mutadin Hospital				Nejat Hospital			
		Cost in USD	Number of cases	Number of cured	Effectiveness	Cost in USD	Number of cases	Number of cure	Effectiveness
1	Heroin	532	781	699	89.5%	509	285	285	100%
2	Opium	527	25	25	100%	493	52	52	100%
3	Other	532	174	174	100%	506	25	25	100%

In the above table, the cost effectiveness ratio per successful treatment of detoxification is 509 USD for heroin users in Nejat hospital with effectiveness of 100%, but cost effectiveness ratio per successful treatment of detoxification is 532 USD in Mutadin hospital with effectiveness of 89 %. Therefore, successful treatment of detoxification is more cost effective in Nejat hospital, which is run by the private sector. In addition, the effectiveness is the same for opium and multi users in both hospitals, but the cost is higher in the Mutadin hospital than Nejat hospital.

4.9.4 Sensitivity analysis

A sensitivity analysis in terms of risk management will be conducted. Sensitivity analysis (SA), generally defined, is an analysis of the probable adjust and errors and their impact on results from the model. It is proposed that when using sensitivity analysis for decision support, it can be very helpful to try to see which

recommendation from building of assumptions is the best way to the suggestion of the model.

Assumption 1: as we saw in the result in table13 the effectiveness of the treatment for heroin is higher in a private hospital than the public hospital because the number of defaults is zero in private while the percentage of defaults is more than 8% in public hospitals.

We assume that if the public hospital can reach the zero percentage how it will affect the cost and effectiveness as well.

Table 16: Assumption I

Substance	Mutadin hospital			Nejat hospital		
	Default rate	Cost in USD	Effectiveness	Default rate	Cost in USD	Effectiveness
Heroin	8%	532	89%	0%	509	100%
	0%	480	100%			

The cost of successful treatment of an addicted person to heroin is 509 USD in Nejat hospital with a default rate of zero percent, but it is 532 USD and with a default rate of 8% in Mutadin hospital.

If we assume the default rate is zero percent in Mutadin hospital,

With 8% default rate the average cost is $479,058/898=533$ USD

With 0% of default rate the average cost is $479,058/980=480$ USD

Then the total cost of IPD divided to the total number of IPD which was admitted and discharged.

Then the cost and effectiveness will change, the cost will be 480 USD per addicted person treatment and the effectiveness will be 100% which is better than Nejat

hospital. This assumption shows that the default rate, which is high in a public hospital, has its effect on the cost and effectiveness of substance use and if the public decrease their default rate by implementing of some regulations and some activities it could increase the effectiveness of the treatment in the public hospital.

Assumption 2:

It was mentioned that the duration of treatment is different in both hospitals 33 days in Mutadin hospital, which the average cost is 535 USD while in Nejat hospital is 45 days of successful detoxification treatment, which is 507 USD for a successful treatment of detoxification. If we assume that the number of days are the same in both hospitals, for example the duration of treatment is 45 days in Nejat hospital and 33 days in Mutadin hospital, then the result for successful treatment of detoxification will be different from this result if the duration of detoxification treatment change from 33 to 45 days in Mutadin the average cost for the successful treatment will be 715 USD which is 15% more than the first total cost for a detoxification treatment in Mutadin hospital, the sensitivity result will show the average cost as following in both hospitals.

Table 17: Assumption II

Hospitals	Treatment Duration	Average cost in USD	Treatment Duration	Average cost in USD
Mutadin hospital	33	535	45	715
Nejat hospital	45	507	45	507

4.10. Benefits

The study has drawn a clear view about the cost effective treatment, total cost of hospitals for one year, the cost of each unit of OPD/counseling, IPD per day, and cost of each substance used. The costing will provide a baseline and general idea of Mutadin and Nejat hospitals actual costs, resources and services statistics. This information will be used by the MoPH and Ministry of Counter and Narcotic (MoCN), Health program managers and health economics researchers.

The MoPH and MoCN is planning to increase access to drug treatment and expand treatment centers in an effective way so the total cost of Mutadin and Nejat hospitals, effective treatment and unit cost for each type of substance will help in the planning process. It is essential that the treatment centers to be increased from 20 to 30% (MoCN, 2012) in the coming five years. Likewise, services should cover both out-patient and in-patient with good qualities and affordable prices. This study's impact is in hospital and for the community as well.

The costing of these two substance user hospitals will also help upgrade the capacity of physical facilities through the establishment of drug treatment complexes in seven regions of the country. If needed, the establishment of new drug treatment centers across the provinces as well as rehabilitation centers is important.

These objectives are in the development strategy of MoPH and MoCN for the next five years.

It is useful for the hospital manager and the MoPH to conclude percentage of the cost structure for hospital so they will be able to recognize which proportion is too high to transfer the resources efficiently.

It also will be useful for the manager and the MoPH to improve the hospital for:

- Financial system
- Development, Planning and prioritizing
- Resource allotment based on specific information on actual costs
- Making Budget and plans, to allocate costs to activities or services
- For provision of baseline for Mutadin and Nejat hospitals
- Aid for financial support so that they can make a case for funding of activities or services
- Evaluation of effectiveness

4.11. Discussion:

The result shows that the cost effectiveness ratio per successful treatment of detoxification is 509 USD per each person for heroin users in Nejat hospital with effectiveness of 100%, but cost effectiveness ratio per successful treatment of detoxification is 532 USD in Mutadin hospital with effectiveness of 89 %. Therefore, successful treatment of detoxification is more cost effective in Nejat hospital, which is run by the private sector. In addition, the effectiveness is the same for opium and multi users in both hospitals, but the cost is higher in the Mutadin hospital than Nejat hospital.

In addition, the study shows that the heroin users are serious case among other substance users in term of successful treatment. There are very severe cases and not severe cases among heroin users, the severe cases may need more drugs for their treatment and the cost of pharmacy will be a bit higher for sever cases than without severe cases so the average cost of pharmacy was provided by the hospitals for heroin, opium and multi users in this study.

The other reason for cost effective treatment in a private hospital is that the hospital seriously follows the regulation of the organization in term of official time, good behavior of staff with patients, and good altitude as well. Most of the staff that is working in private hospital is with good experience and background. The number of default patients is zero in the private hospital while it is around 82 patients in public hospital.

The following points are also important to be discussed.

- Sustainability of NGO funded hospital
- The possibility of introducing a hospital charge and charging especially for a subsection of the population like the rich
- Positive externalities of treatment

4.11.1. Sustainability of substance user funded centers

According to the NHA report 2008-2009, since 2008 total health expenditure (THE) in Afghanistan was just over USD 1.0 billion (USD 42 per capita). Private expenditures on health constitute around 76 % of total health expenditures, of which household out of pocket (OOP) is approximately USD 31. Donor contributions represent 75 percent of total public expenditures on health, suggesting that health care priorities are largely donor driven.

The bellows important points will be considered:

- Categorize ways to mobilize national resources through taxation and prepayment mechanisms to provide health care for substance user treatment centers.
- Make safe more sustainable external funding for defining as the cost effectiveness, achievement in the private hospitals for substance user treatment.

- Effectiveness of existing resources to ensure that allocations match health care and its objectives for substance users.

4.11.2. The possibility of introducing of hospital charge

There is a large problem of resource availability at National and Specialty Hospitals. There is very low quality of health services which is provided by facilities can be explained by very bad state of financing.

A small amount of the total health budget is allocated to the National and Specialty Hospitals. Ensuring that hospitals have a minimum of flexible funding for purchase of medicines and equipment would improve the effectiveness and quality of service delivery.

User fees are one of the best options that address the shortage of funds at the hospitals and improve quality and efficiency of health services

The autonomy in the hospitals is strongly recommended for improving the quality of services.

User fees can also control public behavior to accomplish the public health objective as international experience showed.

User fee systems can have a negative impact on the ability of the poor to receive care. Taking this approach as consideration, other opportunities are available to raise revenues without negatively affecting care to the poor. For example the housing and feeding of patients at national hospitals will remain, free, some individual patients may choose to pay for a better quality room and more deluxe food. Again, free care will be available to additional revenues for the hospitals may be raised based on

voluntary pay. The institution of user fees at national and specialty hospitals must be done carefully in order to protect the poor and vulnerable people.

4.12. Positive externalities of treatment

Positive externalities of drug use, which is experienced by the majority of the country, are as follows

- Reducing crime is one of the most important benefits of substance treatment. Some studies which released recently and that matched anonymous data from the Police National Computer to information in the National Drug Treatment Monitoring System showed that the total number of crimes committed by users decreasing after they start treatment.
- Higher education levels will be earned, whenever a father treated successfully, then he will pay more focus on the education and health of their children.
- Decrease of High burden of economic and increase economic productivity. As it mentioned in the background the annual economic burden for substance users are around 300 million USD in the Afghanistan, then if the hospital treatment program to decrease the number of substance user of course it will decrease the economic burden.
- Decrease of incidence of HIV/AIDS. As it is clear, the most of HIV/AIDS cases transmitted by the substance user so the successful treatment can prevent from the transmission of such diseases.

- Treatment of substance users helps their families and friends as well.

Separate services are available for the families and friends of substance users.

Services for families offer support such as being able to talk to people in a similar position. Involving families in affecting the treatment system to help improve treatment for users and support for families.

- The treatment leads substance users to re participate in their community.

Most addicts want to get clean and want to get a job and want to have live a more normal life. For many, the first step towards a job will be working within the drug treatment sector, either paid or as a volunteer, giving them the confidence to believe that they can do a job.

CHAPTER V

CONCLUSION AND RECOMMENDATION

5.1. Conclusion

While the incidence and prevalence of substance users are increasing day to day and the number of treatment center is not enough to cover all patients so health economic researchers and decision makers in MoPH are planning to develop policies to select the effective treatment and expand the drug demand reduction program in Afghanistan. In this study the cost effectiveness ratio per successful treatment of detoxification is cost effectiveness in a private hospital than the public hospital Therefore, the substance user treatment in the private hospital is cost effectiveness.

For the implementation of treatment for substance users the cooperation and collaboration of public and private is essential.

The result shows that the cost effectiveness ratio per successful treatment of detoxification is 509 USD per each person for heroin users in a private hospital with effectiveness of 100%, but cost effectiveness ratio per successful treatment of detoxification is 532 USD in Mutadin hospital with effectiveness of 89 %. Therefore, successful treatment of detoxification is more cost effective in a private hospital, which is run by the private sector. In addition, the effectiveness is the same for opium and multi users in both hospitals but the cost is higher in Mutadin hospital than Nejat hospital.

In addition, the study shows that the heroin users are serious case among other substance users in term of successful treatment.

5.2. Recommendation and policy implication

The result shows that the cost per successful treatment of detoxification in Nejat hospital, which is private less than the public hospital so the treatment modality by private is highly recommended for implementation and expansion of the substance users treatment in the country and also some recommendation will be addressed as follows

- More focus should be paid on follow up stage
- Expansion of treatment center for treatment of substance users in Afghanistan

5.2.1. More focus should be paid on follow up stage

The primary goal of aftercare is to prevent a relapse into drug use. By providing continuing counseling, group sessions and other schedule meetings, aftercare programs provide an extra level of accountability that helps insure that the individual has not fallen back on old habit. From other hands follow up can leads for improvement of effectiveness and decrease the cost as well.

Completing drug detoxification is a major achievement, but it doesn't necessarily mean that there is not more work to do. During the weeks, months and even years after completing rehabilitation, individuals in recovery are still at risk for relapse. Having a co-occurring disorder along with a substance use disorder increases the risk of falling back into addictive behaviors and self-destructive patterns.

Aftercare programs help minimize that risk, and keep moving forward on the road to a completely drug-free life.

The quality of the aftercare can have a strong influence on chances of remaining moderate after completion of treatment.

5.2.2. Expansion of treatment center for substance users in Afghanistan

As it was mentioned the current capacity for drug treatment in the country is around 2.86% of total existing opium and heroin users in the country. It is crucial that the treatment capacity needs to be increased from 20 to 30% at least. Likewise services should cover both out-patient and in-patient with good qualities and affordable prices as will efficiently implementation. Even in some province only there is one treatment center for the substance users.

This is recommended that more treatment centers should be establish to cover the rest of substance user especially in the province and remote area.

5.3. Suggestion for further study

For further study, it is strongly recommended that a study should be done on the cost effectiveness of community-based program for the treatment of substance use and hospital based and the costing should be included the cost from social and patient perspective as well.

The cost effectiveness study should be prospective in order to to check the follow up completely for the successful treatment of substance users. If substance

user do not be checked for follow up or the patients leave the follow up, the treatment for detoxification and rehabilitation will not be effective.

5.4. Limitation of study

The costing for acute diseases is easy for the short time hospitalization while for chronic it is difficult that takes much time in hospital for hospitalization so the successful treatment for drug abuse is included detoxification and after care which is around 45 days and 10 months for each.

- The output is only successful treatment of detoxification which including only hospitalization days, which is around 45 days (Detoxification& Rehabilitation), this is one of the limitation of the study to find data on long-term follow up of substance users which in not currently available in the hospitals.
- The second limitation is to find out the relapse rate, it is very difficult to have the number of relapse rate because there is not accurate and complete data on this issue and from other hand the follow up not done successfully in order to find the relapse rate.
- The data from two hospitals public and private was retrospective; the cost was higher in public than private. The NGO was funded by donor so the further study should be from prospective to find out the actual cost.

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APPENDIX

Appendix A Capital and Recurrent cost questionnaires for both hospitals

EXPENDITURE ITEM	TOTAL AMOUNT	COST CENTER (Department/Ward)	Life year	Depreciatio n cost	Cost	Comme nts
Admin and services direct cost						
Chair						
Office Furniture (capital cost)						
Carpet (capital cost)						
Generator (capital cost)						
Office table (capital cost)						
Heater (capital cost)						
Cabinet (capital cost)						
AC (capital cost)						
Computer (capital cost)						
Electric						
Maintenance						
Stationary						
Curtain (Capital)						
Bench (Capital)						
TV (Capital)						
(Bed (Capital						
Mattress						
Blanket						

EXPENDITURE ITEM	TOTAL AMOUNT	COST CENTER (Department/Ward)	Life year	Depreciation cost	Cost	Comments
Pillow						
Hospital rent						
Other						
Total						
Transportation						
Total						
Pharmacy						
Hygienic kit						
Drug						
Infection prevention materials						
Cabinet						
Chair						
Cart for drug transfer						
Total						
Laundry						
Washing machine equipment& materials						
Total						

EXPENDITURE ITEM	TOTAL AMOUNT	COST CENTER (Department/Ward)	Life year	Depreciation cost	Cost	Comments
Kitchen						
equipment& materials (Capital cost)						
Meat						
Food						
Gas						
Dishes						
Chair						
Table						
Wood						
Total						
Grand total						

Annex B: Questionnaires for data collection

General information about Hospital

Source of Data:

S/N	Information about Hospital			Comments
1	Name of Hospital:			
A	Which of the following wards, was working during 2012	Yes	No	
2	IPD			
3	OPD			
4	Follow up			
B	Did some supporting part was working	Yes	No	
5	Pharmacy			
C	Statistical information of Hospital			
6	Approved Number of Beds			
7	Number of Active Beds			
8	Total Number IPD Patients			
9	Total Number of OPD Patients			
10	Total Number of Discharged Patients			
11	Total Number of Death (From Admitted Patients)			
12	Total Number of Admission Days			

Costing of the hospitals

Statistical information of hospital

Source of Data

No	Name of Ward/ OPD	OUTPATIENT	INPATIENT					Comments
		Visits/Round	Beds	Hospitalization Days	Admissions	Discharges	Deaths	
1								
2								

Costing of the Hospitals

Information about Revenue/ donation (from persons, companies or NGOs directly to hospital 2012

Source of Data:

No	Kind of Rev/ Help, cash	Total value	Recourse, NGOs, Individuals	Comments
1				
2				

Information regarding medical staff, administrative staff and other workers

No	Name	Job	Place of Job (which ward/department)	Monthly income								
				Base Salary	Over time	Allowances	Risk Allowance	Duration of work	IPD	OPD	Professional	
1	ID-001											
2	ID-002											

Costing of the Hospitals,

Information regarding Medical Store of the hospital

Resources of

Data

Source of Data:

No	Name of the ward	Percentage of Distributed Medicine	Comments

		IPD	OPD	
1	Pharmacy			
2				

Total inpatients for substance use

Inpatients	Number of patients	Heroin	Opium	Multi user
Total Inpatient Admissions:				
Total Inpatient Discharges:				
Total death				
Total Inpatient Defaulted:				

Information regarding pharmacy of the hospital

Source of Data:

No	Name of the substance	Percentage of Distributed Medicine		Comments
		IPD	OPD	
1	Heroin users			
2	Opium users			
3	Multi users			

Information regarding other ancillary services of hospital

Source of Data:

No	Requested Department for services	Percentage of Department		Comments
		IPD	OPD	
1				

VITA

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