

CHAPTER 4

RESULTS AND DISCUSSION



The sample patients were classified by their general characteristics and alcoholism treatment costs. Costs consist of direct costs that are directly related to alcoholism treatment, and indirect costs, which reflect the value of the time lost through travel or waiting while take part of a service. The results are shown as follows:

1. General characteristics of alcoholism patients

The general characteristics of alcoholism patients are sex, age, occupation, average monthly income, education, place of abode and alcohol consumption behavior. The sample sizes are 76 in-patients and 22 out-patients and the details are as follows:

1.1 General characteristics of alcoholism in-patients

Age: Most patients were of middle adult age. The minimum age of the patients was 21 and the maximum age was 71 years. Nearly half, i.e. 46.05 %, aged between 30 and 39 years old, 26.32 % were 40 to 49 years old and 10.53 % were 20 to 29 years old. Most patients were in their productive period. When the disease affected the patients, they were unable to work because of alcoholism. Therefore, the patients lost income and the country possibly lost production. The age structures of the patients are shown in table 4.1.

Table 4.1 Distribution of in-patients by age group

Age	Frequency	Percentage
21-29 years	8	10.53%
30-39 years	35	46.05%
40-49 years	20	26.32%
50-59 years	6	7.89%
60-69 years	5	6.58%
over 70 years	2	2.63%
Total	76	100.00%

Sex: Most alcoholism patients were male: 68 patients or 89.5% were male and 8 patients or 10.5 % were female as shown in table 4.2.

Table 4.2 Gender of in-patients

Sex	Frequency	Percentage
Male	68	89.50%
Female	8	10.05%
Total	76	100.00%

Education: The majority of patients were poorly educated. Patients with an educational background of not more than primary level were 48.7%, while patients with bachelor degrees or the equivalent were 2.6%. Other education levels recorded were lower secondary/lower vocational, upper secondary/upper vocational and non-attendance of school at percentages of 26.3, 14.5 and 7.9 respectively. The distribution of patients by education level is shown in table 4.3.

Table 4.3 Education level of in-patients

Education level	Frequency	Percentage
Not Attended School	6	7.90%
Primary School	37	48.70%
Lower Secondary/lower vocational	20	26.30%
Upper Secondary/Upper vocational	11	14.50%
Bachelor Degree or the equivalent	2	2.60%
Total	76	100.00%

Occupation: The majority of patients were unemployed. This was approximately 34.2% of all patients. Labor patients were 27.6% and sales worker patients were 21.1%. Other occupations were government official/state enterprise officials, agriculture and company employees at 10.5%, 5.3%, 1.3% respectively. Distribution of patients by occupation is shown in table 4.4.

Table 4.4 Occupation of in-patients

Occupation	Frequency	Percentage
Unemployed	26	34.20%
Government Officials/State enterprise Officials	8	10.50%
Labor or self hire labor	21	27.60%
Sales workers	16	21.10%
Agriculture	4	5.30%
Company employees	1	1.30%
Total	76	100.00%

Average monthly income: Because most of the patients were unemployed (26 patients or 34.2%), so the majority of patients had no income at a percentage of 34.2%. About 32.9% of the patients had a monthly income of not more than 4,000 baht. Approximately 13% had a monthly income between 10,001 and 30,000 baht. Other groups of

patients earned incomes between 4,001 and 7,000 baht and between 7,001 and 10,000 baht at a percentage of 11.8 and 7.9, respectively. Distribution of patients by average monthly income is shown in table 4.5.

Table 4.5 Average monthly income of in-patients

Monthly income	Frequency	Percentage
None	26	34.20%
Not Over 4,000 baht	25	32.90%
4,001-7,000 baht	9	11.80%
7,001-10,000 baht	6	7.90%
10,001-30,000 baht	10	13.20%
Total	76	100.00%

Place of residence: Most patients receiving treatment at Thanyarak Hospital were from the Central Region (44.7 %) followed by patients from Bangkok (34.2 %), patients from Eastern Region (7.9 %) and the smallest percentage of patients were from Southern Region (1.3 %). These are detailed in table 4.6. Patients from Northern, Southern, Eastern, Western and Northern were fewer than Central Region and Bangkok because each region has drug addict rehabilitation center where there is a branch of Thanyarak Hospital.

Table 4.6 Place of residence of in-patients

Address	Frequency	Percentage
Northern	1	1.30%
Southern	1	1.30%
Eastern	6	7.90%
Western	4	1.30%
Northeast	7	9.20%
Central	21	27.63%
Bangkok & Vicinity	39	51.32%
Total	76	100.00%

Age when alcohol was first consumed: Approximately 90 % of patients started consuming between the ages of 10 and 39. Those were aged between 10 and 19 years old (38.16 %), between 20 and 29 years old (38.16%) and between 30 and 39 years old (14.47 %). These are detailed in table 4.7.

Table 4.7 The first drinking age of in-patients

First drinking	Frequency	Percentage
10-19 years	29	38.16%
20-29 years	29	38.16%
30-39 years	11	14.47%
40-49 years	4	5.26%
50-59 years	2	2.63%
over 60 years	1	1.32%
Total	76	100.00%

Money spent on alcohol consumption per day: The majority of patients spent 21-150 baht per day. Nearly one-third of patients spent 51-100 baht per day on alcohol consumption. About 27.60 % and 25.00 % of patients spent 101-150 baht per day and 21-50 baht per day on alcohol consumption, respectively. The details of money spent on alcohol consumption per day are shown in table 4.8.

Table 4.8 Expenditure for drinking alcohol each day of in-patients

Expenditure	Frequency	Percentage
1-20 baht	3	3.90%
21-50 baht	19	25.00%
51-100 baht	24	31.60%
101-150 baht	21	27.60%
151-200 baht	5	6.60%
Over 200 baht	4	5.30%
Total	76	100.00%

1.2 General characteristics of alcoholism out-patients

Age: Most of the patients were adult. The minimum age of patients was 18 and the maximum age was 63. Approximately 73 % of patients were between 30 and 49 years old, aged between 30 and 39 and between 40 and 49 years old were equal at percentage of 36.36. About 18 % of patients were aged between 20 and 29 years old and aged between 50 and 59 years old. Those aged were equal at percentage of 9.09. The distribution of patients by age is shown in table 4.9.

Table 4.9 Age of out-patients

Age	Frequency	Percentage
10-19 years	1	4.55%
20-29 years	2	9.09%
30-39 years	8	36.36%
40-49 years	8	36.36%
50-59 years	2	9.09%
60-69 years	1	4.55%
Total	22	100.00%

Sex: Most alcoholism patients were male: 17 patients or 77.3 % were male and 5 patients or 22.57 % were female as shown in table 4.10.

Table 4.10 Gender of out-patients

Sex	Frequency	Percentage
Male	5	22.70%
Female	17	77.30%
Total	22	100.00%

Education: The majority of out-patients were similarly ill-educated as the in-patients. Most patients had an education background of not more

than primary level (31.8 %). Lower secondary/lower vocational school and upper secondary/upper vocational school had on equal percentage of 27.3 %. Bachelor degree or equivalents were few; only 9.1 %. Only 4.5 % had not attended school level as show in table 4.11.

Table 4.11 Education level of out-patients

Education Level	Frequency	Percentage
Not Attended School	1	4.05%
Primary School	7	31.80%
Lower Secondary/Lower Vocational	6	27.30%
Upper Secondary/Upper Vocational	6	27.30%
Bachelor Degree or Equivalent	2	9.10%
Total	22	100.00%

Occupation: A half of the patients were laborers or self-hire laborers (54.5%). Unemployed patients were 18.2%. Nobody worked in agriculture. The distribution of patients by occupation is shown in table 4.12.

Table 4.12 Occupation of out-patients

Occupation	Frequency	Percentage
Student	1	4.50%
Unemployed	4	18.20%
Government Official	1	4.50%
Labor or self-hire laborers	12	54.50%
Sales workers	1	4.50%
Company Employees	1	4.50%
Housewives	2	9.10%
Total	22	100.00%

Average monthly income: The patients had no income at a percentage of 31.8% or 7 patients, which consisted of unemployed patients, housewives and students which were 4 patients, 2 patients and 1 patient respectively. The other average monthly incomes were not over 4,000 baht, between 4,001 to 7,000 and between 10,001 to 30,000 baht equal to a percentage of 18.2. The details of average monthly incomes are shown in table 4.13.

Table 4.13 Average monthly income of out-patients

Monthly income	Frequency	Percentage
None	7	31.80%
Not over 4,000 baht	4	18.20%
4,001-7,000 baht	4	18.20%
7,001-10,000 baht	3	13.60%
10,001-30,000 baht	4	18.20%
Total	22	100.00%

Place of residence: Most of the out-patients came from Bangkok and the vicinity (90.91% or 20 patients). They mostly live in Pathumthani Province or near the hospital; for example DornMaeg, Hrak Si, etc. Only one patient came from Northeast Region and one patient from the Central Region as shown in table 4.14.

Table 4.14 Place of residence of out-patients

Address	Frequency	Percentage
Northeast	1	4.50%
Central	1	4.50%
Bangkok & vicinity	20	90.91%
Total	22	100.00%

Age when alcohol was first consumed: The majority of patients started consuming between the ages of 10 and 29. Half of patients were aged between 20 and 29 years and 36.39 % of patients were aged between 10 and 19 years old. These are detailed in table 4.15.

Table 4.15 The first drinking age of out-patients

First Drinking	Frequency	Percentage
10-19 years	8	36.36%
20-29 years	11	50.00%
30-39 years	2	9.09%
40-49 years	1	4.55%
Total	22	100.00%

Money spent on alcohol consumption per day: The patients spent 21-150 baht per day on alcohol consumption. A half of patients spent 51-100 baht per day. About 27 % and 23 % of patients spent 21-50 baht per day and 101-150 baht per day as shown in table 4.16.

Table 4.16 Expenditure for drinking alcohol each day of out-patients

Expenditure	Frequency	Percentage
21-50 baht	6	27.00%
51-100 baht	11	50.00%
101-150 baht	5	23.00%
Total	22	100.00%

The general characteristics regarding alcoholism in in-patients were mostly similar to out-patients. Most patients were male. The majority of in-patients and out-patients were poorly educated. They had an education background lower than bachelor degree or the equivalent,

and for most the educational background was primary and secondary level, respectively. There has been a belief that alcoholism is the problem of uneducated people. This does not seem to be true. The distribution by education level and that of total labor force tend to be the same as shown in table 4.17. The occupation and average monthly income of in-patients and out-patients were not very different. The occupation type of in-patients and out-patients were mostly unemployed, laborers or self-hire labor and sales workers. Approximately 35 % of in-patients were unemployed and nearly 65 % of in-patients were employed, while nearly 20 % of out-patients were unemployed and 80 % were employed. Education levels and occupations related to average monthly incomes. Nearly half of in-patients had monthly incomes of not more than 7,000 baht followed by 34 % of in-patients who had no income. Likewise, nearly 40 % of out-patients had monthly incomes of not more than 7,000 baht followed by 31 % of out-patients who had no income. As previously mentioned, each region has a drug addict rehabilitation center. Therefore, most in-patients and out-patients were from the Central Region, Bangkok and the vicinity. The majority of patients spent 21-150 baht per day on alcohol consumption; both in-patients and out-patients. Most in-patients and out-patients began consuming alcohol when they were adolescents (between 10 and 19 years old) and in early adulthood (between 20 and 29 years old), and most were alcoholics between 30 and 49 years of age.

Table 4.17 Education level of alcoholism patients and total labor force at this education qualification

Education level	Patients			Total labor force at this education qualification(%)*
	Total (%)	In-patients (%)	Out-patients (%)	
-Not Attended School	7.14%	7.90%	4.05%	5.68%
-Primary School	44.90%	48.70%	31.80%	63.89%
-Lower Secondary/lower vocational	26.53%	26.30%	27.30%	13.42%
-Upper Secondary/Upper vocational	17.35%	14.50%	27.30%	9.39%
-Bachelor Degree or the equivalent	4.08%	2.60%	9.10%	5.80%
-Others	0	0	0	1.82%
Total	100%	100%	100%	100%

*Source: Report of the Labor Force Survey Whole Kingdom : August 1998 (Round 3)

2. Results of cost evaluation for the treatment of alcoholism patients

As mentioned in the previous chapter, treatment costs and sources of data, treatment costs are classified as first, direct costs, which are hospital costs, and patient costs: second, indirect costs, which are opportunity costs of relatives. Data was acquired from medical records of out-patients and in-patients as well as interviews with doctors, nurses and personnel concerned and records. The following results are the average costs per patient per course.

Direct costs

1. Hospital costs consist of:

1.1 Personnel costs

According to interviews with Head Nurses from Out-patients and In-patients Departments, information concerning procedures of service were obtained as follows:

Service Procedure for the Out-Patients Department

<u>Procedure</u>	<u>Personnel</u>
1. Medical Record Section: registration card	- Medical Record personnel
2. Nurse Information Counter: provide information on the hospital's treatment procedure	- Nurse: assists patient - Technical Nurse: assists patients - Nurse Aid: process documentation
3. Registration: Inquiries about the patient's history. For medical problems or complications, patient will be referred to a physician.	- Welfare worker
4. Dispensary: Patient purchases medicine.	- Pharmacist - Pharmaceutical personnel
5. Payment for medicine	- Finance personnel
6. Safe Deposit: For hospitalized patients, relatives will leave cash with the hospital for the patients use during their stay.	- Finance personnel

- | | |
|---|------------------------|
| 7. X-ray Facility | - Radiologist |
| | - Nurse Aid |
| 8. Blood and Urine Analysis | - Scientific personnel |
| 9. Change Room: prepare patients before admitting | - Technical Nurse |
| | - Patient aid |

For out-patients, the treatment process is less complicated. There are no blood or urine tests, no x-rays, and no need to go through the change room to prepare themselves before being admitted. However, these patients have to be checked by a physician, who determines whether they need to have a physical examination or not. Physical examinations are carried out following the requests of patients.

For in-patients, the treatment process is complicated. Before the patients are admitted, they will be physically checked; namely blood tests, urine tests and chest x-rays. After that they will go to the changing room to prepare themselves for admission. While these patients are in the ward, they must take part in activities following schedules such as exercise, rehabilitation groups and entertainment groups.

The earnings rate of personnel can be calculated from the total expenditure of each member of staff in 1 year, that is the summation of salaries, bonuses and child' tuition reimbursements of each member of staff, divided by the total working time of personnel in each type in 1 year. The earnings rate of personnel is shown in table 4.18.

Table 4.18 General earnings rate of personnel

Position	Number of staff	Earning rate (baht/minute/person)
Doctor	14	3.13
Register nurse	79	2.01
Technical nurse	72	1.21
Nurse-aid	10	1.64
Radiology	2	2.05
Social worker	5	2.04
Medical record staff	6	1.41
Scientific staff	9	1.29
Pharmacist	1	1.45
Pharmaceutical staff	8	1.42
Patient-aid	51	0.97
Accountant staff	6	1.07

Table 4.18 shows that the earnings rate of some positions are less than those of others e.g. earnings rate of a pharmacist are less than those of nurse or social worker, but normally earnings rate would be higher. The reason for this is that the total expenditure of the pharmacist is less than the others. The factors affecting total expenditure are salary (depended on age or years in the service), children's tuition reimbursement, fringe benefits etc. The average earning for a nurse could be higher than a pharmacist because most nurses have been working for a long time and are married. Consequently, salary, the children's tuition reimbursement, or fringe benefits of nurses or social workers could be more than those of pharmacists. The total expenditure of nurses and social workers is higher than those of pharmacists. Therefore, earnings rate of nurse and social workers are higher.

Personnel costs of in-patients consist of personnel costs for pre-admission and personnel costs in the wards. Personnel costs for pre-admission are derived from preparing the patients before being admitted, namely registration, interview, payment medicine, physical examination and to prepare patients before admitting. Table 4.19 illustrates the personnel concerned, the time spent for treatment per case, earnings rate of personnel and the costs of personnel for each case. The time spent on case was derived from record time and the costs of personnel were derived from time spent on each case multiplied by the earnings rate of the personnel. Therefore total costs of personnel for pre-admission are equal to a summation of costs for category personnel which were 251.72 baht per case.

Personnel costs in the ward were derived from personnel concerned who had activities with the patients in the ward. These activities are routine activities such as physical examination and ward rounds by the doctor: exercise, rehabilitation group and entertainment by nurses. Accordingly, the total time spent by a doctor in a ward could be calculated by the time the doctor spent for physical examinations in the ward; around 2 hours or 120 minutes each day. These data were acquired by interviewing the doctor. The approximate number of patients each day was 15 cases and the average time spent with 1 patient equaled 8 minutes. Everyday the doctor physically examines the patient and the number of days for treatment per course is 21 days, so the total time spent by the doctor per course per case is equal to 21 days multiplied by 8 minutes per case, which is 168 minutes per case. Therefore the costs of a doctor equal total time spent multiplied by earnings rate which is 3.13 baht per minute; that is 525.84 baht per case. For nurses, the time spent by the nurse would be all day, as 1 nurse works 7 hours or 420 minutes (excluding rest time). Each ward has 4 register nurses, 4 technical nurses and 4 nurses' aides per day. So, the total time spent by each type of nurse is 1,680 minutes per day. The maximum average numbers of patients dealt within

day is 15. Therefore the time spent by each type of nurses per case per day is equal to 1,680 divided by 15, which is 112 minutes. The total number of days for treatment per course is 21 days, so the total time spent by each type of nurses equals 21 days multiplied by 112 minutes per case per day which is 2,352 minutes per case per course. Therefore the cost of each type of nurse equals the total time spent multiplied by earnings rate of each type of nurse. Consequently, personnel costs in the ward equal the summation of the costs of each member of personnel, which are 11,956.56 baht per case as shown in tables 4.20 and 4.21:

Personnel costs for IPD case

Table 4.19 Personnel Costs for Pre-admission

The personnel concerned	Time spent per case (minute/case)	Wage rate of personnel (baht/minute)	Personnel costs (baht/case)
-Medical record staff	13.70	1.23	19.32
-Register nurse	3.67	2.01	7.38
-Technical nurse	37.87	1.21	45.82
-Patient-aid	15.60	0.97	15.13
-Social worker	8.50	2.04	17.34
-Accountant staff	7.60	1.07	8.13
-Pharmacist	3.20	1.45	4.64
-Pharmaceutics staff	3.20	1.42	4.54
-Radiology	1.60	2.05	21.73
-Scientific staff	40.00	1.29	51.60
-Nurse-aid	34.20	1.64	56.09
		Total personnel costs	251.72

Table 4.20 Time spent of personnel in the Ward

The personnel concerned	Working time in 1 day (minutes)	No. of staff in 1 day	Total time spent in 1 day (minutes)	No. of patients per day (cases)	Time spent per case in 1 day (minutes/case)	Total time spent in 21 days per case (minutes/case)
-Doctor	120	1	120	15	8	168
-Register nurse	420	4	1680	15	112	2352
-Technical nurse	420	4	1680	15	112	2352
-Nurse-aid	420	4	1680	15	112	2352

Table 4.21 Personnel costs at the ward

The personnel concerned	Total time spent in 21 days per case (minutes/case)	Earnings rate (baht/minute)	Personnel costs (baht/case)
-Doctor	168	3.13	525.84
-Register nurse	2352	2.01	4,727.52
-Technical nurse	2352	1.21	2,845.92
-Nurse aid	2352	1.64	3,857.28
		Total personnel costs at ward =	11,956.56

Therefore the personnel costs for in-patients equals personnel costs for pre-admission (251.72 baht per case) plus personnel costs at the ward (11,956.56 baht per case) which equals 12,208.28 baht per case.

Calculating costs for out-patients is less complicated than in-patients because the treatment process is not so complex. For the first visit, these patients are interviewed by a social worker and they meet the

doctor. There is no blood test, urine examination or x-ray. They just purchase the medicine, which they will take at home. Consequently, the personnel concerned for out-patient are similar to those for the pre-admission of in-patients but the personnel concerned for out-patients do not require radiology or scientific staff. Time spent by personnel was acquired from record times. Personnel costs can be calculated by the time spent by each personnel multiplied by the earnings rate. Therefore, personnel costs for out-patients for the first visit are equal to the summation of each personnel costs which are 82.16 baht per case as shown in table 4.22. The numbers of days for treatment in one course are 21 days. These patients have to return for follow up and purchasing the medicine. The number of follow up days depends on prescription on the doctor, such as 7 days or 14 days. The average numbers of follow up visits are 3. When the patients follow up, the treatment process is less complicated than the first visit as they do not have to be re-interviewed. Therefore, personnel costs when these patients follow up for each visit are a summation of time spent by each of the personnel concerned multiplied by the earnings rate, which are 48.15 baht per case per visit. When these patients follow up 3 times, personnel costs equal 144.45 baht per case as shown in table 4.23. Hence, the total personnel costs of out-patients is the personnel costs for the first visit (144.45 baht per case) plus the personnel costs for follow up visit (82.16 baht per case), which equals 226.61 baht per case.

Table 4.22 Personnel Costs of OPD Case (First time)

Authorities	Time spent (minutes /case)	Rate(baht/minute)	Total costs (baht/case)
-Medical record staff	13.70	1.41	19.32
-Register nurse	3.67	2.01	7.38
-Technical nurse	9.17	1.21	11.10
-Patient-aid	5.00	0.97	4.85
-Social worker	8.50	2.04	17.34
-Doctor	2.75	3.13	8.61
-Accountant staff	4.10	1.07	4.39
-Pharmacist	3.20	1.45	4.64
-Pharmaceutical staff	3.20	1.42	4.54
		Total	82.16

Table 4.23 Personnel Costs when the patient follow up

Authorities	Time spent (minutes /case)	Rate (baht/minute)	Total costs (baht/case)
-Medical record staff	13.70	1.41	19.32
-Technical nurse	5.50	1.21	6.66
-Doctor	2.75	3.13	8.61
-Accountant staff	4.10	1.07	4.39
-Pharmacist	3.20	1.45	4.64
-Pharmacuetical staff	3.20	1.42	4.54
		Total (1 time)	48.15
		-Follow up 3 time	=144.45

In sum, the total personnel costs of in-patients equals 12,208.28 baht per case. Personnel costs of out-patients equals 226.61 baht per case.

1.2 Supplies costs

Supplies costs for in-patients were more than the costs for out-patients. Generally, both in-patients and out-patients will be injected vitamin drugs on average seven days. Basic supplies consist of needles and syringes used for the injection. For in-patients, as both chest x-rays and laboratory examinations have to be completed before admittance, so supplies used for physical examination are x-ray film, solutions for x-ray section and laboratory test etc. Other supplies are cottons, gloves and solution used in the ward. In some cases the patients may be too weak to ingest food, hence the fluids must be given intravenously. Supplies used are scalp vein, intravenous sets, plasters etc. Out-patients do not require these supplies. Therefore supplies costs were 322.16 baht per case for in-patients and 27.1 baht per case for out-patients.

Merchandise prices: the figures used for calculating costs do not represent the actual market price. They include tax such as tariff and VAT. Therefore, tax affects the prices of and demand for medical supplies, medical equipment, including other goods such as building materials, furniture, drugs etc. Generally, the domestic price (P_d) equals world market price (P_w , or import price) plus the product of the tariff rate (t_1) and the import price. For imported goods, demands are pressed down and prices are lifted up by the imposition of tax. Thus, domestic prices do not reflect the scarcity of goods. The higher the tax rate is the more distortion on the domestic price.

$$P_d = P_w + t_1 P_w$$

$$P_d = P_w(1+t_1)$$

In this case tax revenue is the transfer of income between government and government agencies. In the Customs Tariff Decree (1987), Tariff tax rates of medical equipment equaled 30 % but the tax discount was 15 %. An exception is x-ray machines, which are exempt from tax. In addition to the Tariff Tax, goods produced and sold are subject to domestic taxation. These include excise tax, which applies to domestic products, and value added tax, which incurs from the sale of goods or services. Value add tax has been used since 1991 when the rate was 7 % until 1997, when it increased to 10 % and then dropped to 7 % in 1999. The latter is applicable to producers, services, wholesalers and retailers, as well as importers and exporters. Therefore, the World Market Price is the true price for government activity, which does not include tax. For this reason, the actual price must be devoid of tax, as indicated by the equation.

$$P_d = P_w \left\{ \frac{(1 + \text{tariff tax}) + \frac{(1 + \text{tariff tax})(\text{excise tax})}{(1 - \text{excise tax})}}{[(1 + \text{tariff tax}) + \frac{(1 + \text{tariff tax})(\text{excise tax})}{(1 - \text{excise tax})}] \times \text{value added tax}} \right\}$$

Tax is borne by the consumer and producer. When a tax is imposed on a market, price rises. The consumer price rises, while the price the producer receives falls. The difference between the new price consumers pay and the new price producer receives is equal to the tax. Market prices do not reflect the scarcity of goods. The higher the tax rate is the more distortion on the market price. Hence, calculation costs should use the actual price, which does not include tax as the results represent the actual costs. Because of time limits, the calculating costs of this study use prices that include tax.

1.3 Equipment costs

Medical equipment used in the examination and treatment of patients were x-ray machines, laboratory devices, etc. All in-patients were physically examined before treatment but out-patients were only examined in some case. From the sample of out-patients, nobody was examined. So, equipment costs for out-patients equal 0. The average costs for in-patients equaled 221.14 baht per case as follows:

Table 4.24 Constant Value of Equipment

Equipment	Current value of equipment (baht)	Amount of equipment	Total value of equipment (baht)	Buying year	Present value costs(baht)
-X-ray machine	4,900,000	1	4,900,000	1998	4,900,000
-Film printing machine	300,000	1	300,000	1989	707,384
-Film cassette	10,000	15	150,000	1998	150,000
-Cell counter hematology	1,000,000	1	1,000,000	1992	1,771,561
-Microscope	37,500	6	225,000	1997	247,500
-Urine sediment centrifuge	93,457	1	93,457	1997	102,802
-Minitron	240,000	1	240,000	1997	264,000

Table 4.25 Costs of equipment per case

Equipment	Present value in 1998(baht)	Life time* (years)	Annualization factor**	Annual costs *** (baht)	Expected number of service times per year (time)	Equipment costs per service time (baht/time)
-X-ray machine	4,900,000	8	5.335	918,462.98	7335	125.22
-Film printing machine	707,384	8	5.335	132,593.12	7335	18.08
-Film cassette	150,000	8	5.335	28,116.21	7335	3.83
-Cell counter hematology	1,771,561	5	3.791	467,307.40	7752	60.28
-Microscope	247,500	10	6.145	40,276.65	7752	5.20
-Urine sediment centrifuge	102,802	10	6.145	16,729.49	6995	2.39
-Minitron	264,000	10	6.145	42,961.76	6995	6.14
					Total	221.14

* lifetime of assets from Estimated Useful Lives of Depreciable Hospital Assets, 1978

**annualization factor acquired from annualization formula or standard table

***annual costs = present value of equipment / annualization factor

Calculation the cost per unit (or per time) in addition of using the numbers of outputs to calculate, it should use the total number of times or total number of output that fully utilize for equipment production or building

of all lifetime. It may use the total number to be expected in a year. Then the cost per time (or per unit) will be received. This is the cost per unit that is a constant cost as it does not vary with the level of output. If the numbers of outputs or patients in each year are used for calculation, the cost per unit will be overcosting or undercosting depending on the level of outputs. In this study, costs per unit of equipment and a new building are not the constant costs because of using the number of outputs (patients) in each year to calculate as the costs per unit will be high if the number of outputs are few and vice versa. Therefore, costs per unit of equipment and the new building in each year are not equal. But costs per unit of the old building are the constant unit costs because using the number of outputs that fully utilize for calculation.

1.4 Building costs

Thanyarak Hospital has two main types of buildings: seven old buildings (established in 1967) and a new building (established in 1994). The construction costs of the new building in 1994 was 187,600,500 baht and the total area of the building is 23,500 square meters. The area for treatment is 5,160 square meters, which is equal to 22 percent of the total area. The new building costs are shown in the table:

Table 4.26 New building costs

Building costs (baht)	187,600,500.00
Present value (baht)	274,665,892.05
Useful life (years)*	50
Discount rate (%)	10
Annualization factor**	9.915
Annual costs***(baht)	27,702,056.68
Total space (square meters)	23500
OPD space (%) (first floor)	22
Annual costs of OPD space (baht)	6,094,452.47
Actual number of patients per year in 1998(cases)	20,400
Building costs per case (baht)	298.75

*useful life acquired from Research Project on the Economic Remuneration Rate of Investment in Education.

**annualization factor acquire from annualization formula or standard table

***annual costs = present value of equipment / annualization factor

For the seven old buildings established in 1967, the construction costs were 39,500,000 baht. Each building is similar in size and design and one building is used for the treatment of alcoholic patients. Since the cost of each old building equals the annual costs of the old buildings divided by 7, which is 10,923,946.81 baht, the building costs for alcoholism patient's also equals 10,923,946.81 baht. So, building costs per day per case could be calculated by using maximum capacity of alcoholic ward each day, which equals 24 cases. The ward will be able to take 8760 cases per year. Therefore, building costs per day per case equal annual costs of the alcoholic building divided by 8,760 cases, which is 1247.03 baht per day per case. However, alcoholism in-patients spend only 21 days in hospital. Old building costs of alcoholic patient per course per case equals 1,247.03 multiplied by 21 that is 26,187.63 baht per case as follows in table 4.27:

Table 4.27 Old building costs for alcoholic in-patients

Building costs for 7 buildings (baht)	39,500,000
Present value (baht)	758,176,528.60
Useful life (years)*	50
Discount rate (%)	10
Annualization factor**	9.915
Annual costs(baht)***	76,467,627.69
Each building costs	10,923,946.81
Maximum capacity of patients per year (cases)	8760
Building costs per case per day(baht)	1,247.03
Total building costs per case in 1 course(21 days)	26,187.63

* useful life acquire from Research Project on the Economic Remuneration Rate of Investment in Education.

**annualization factor acquired from annualization formula or standard table

*** annual costs = present value of equipment / annualization factor

Therefore building costs for out-patients using only the new building equaled 298.75 baht per case. Building costs for in-patients that include the new building (298.75 baht per case) and the old building (26,187.63 baht per case) equaled 26,486.38 baht per case.

Costs of electricity and water also have to be considered. Costs of building can be categorized as a resource input such as capital costs and recurrent costs. The distinction of these costs is that capital costs are resources that last longer than one year. Another is recurrent cost, which include resources; those are used up in the course of a year and are usually purchased regularly. Recurrent costs of buildings are operation and maintenance costs, which consist of lighting, water, telephone, insurance, cleaning, materials, painting, air conditioning and repairs to plumbing, the roof and office furniture. It is difficult to determine which

costs are related to alcoholics. Nevertheless, the costs of lighting and the water supply can be estimated by dividing the costs of shared resources among various user programs. Another method is regression analysis, which helps to estimate the relationship between variables, such as the costs of lighting and water, and the number of officials. But the data were insufficient for an estimation of costs of lighting and water by using the regression analysis. Appendix B demonstrates the estimation of costs of lighting and water by the regression analysis. (See appendix B)

1.5 Drug costs

From the sample group, the alcoholics had no other diseases or mild complications so the drug costs consisted of 2 components. The first is medicine used for withdrawal symptoms or medicines used for the remedy of symptoms resulting from withdrawal symptoms such as librium, diazepam, hadol, propanolol, tolvon, vitamin B, etc. The second is medicine used for the remedy of mild complications such as paracetamol, antacid, alum milk, brufen etc. Mild complications are mostly common colds and peptic ulcers. (See appendix C)

From collecting data from medical records, it can be determined what kinds of medicines the patients use. And the price of medicines can be obtained from the pharmaceutical division, which the price is the value that hospital bought (see appendix C). Drug costs for out-patients are 333.73 baht/case while drug costs for in-patients are 398.30 baht/case.

2. *Patient costs*

Patient costs consist of travelling costs, travelling time costs, waiting time costs and loss of income during admittance. They are an estimation of the costs, which occurred in 1998.

2.1 Travelling fare costs of patients

The travelling fare costs are the travel costs of patients and relatives coming to the hospital together. That is the amount of money spent on travels (return trip) each time. The data should be obtained by interviewing the patients and their relative. But, because of time constraint, the interview can not be done. So, the estimation of travelling fare costs by taxi is used for the patients in Bangkok and the local vicinity. But for the patients from other provinces, the rent rate for pick-up car and the price of diesel fuel consumed during travelling will be used instead. In this study the travelling costs of in-patients and their relatives were calculated on the date of admittance and did not include visits from relatives because of time limits. For out-patients and their relatives, accurate calculations could be made because medical records held complete data. So, the average travelling fare costs of in-patients and relatives was 1,737.88 baht/case, out-patients and relatives is 1,188.29 baht/case. Average travelling fare costs of out-patients and relatives was lower than those of in-patients. This is because most out-patients live in Bangkok or the vicinity, although they had to travel to the hospital between 3 and 4 times in order to follow up the results from the doctors.

The calculation of travelling fare costs in this study is just an estimation based on an assumption that patients who live in Bangkok and the vicinity, they travel by taxi and the patients who live in the provinces, travel by hiring a pick-up truck. Although some patients and relatives live in other provinces, sometimes they stay with their relatives in Bangkok and do not travel from their homes everytime when visit the hospital. They do not spend much on fare but they have the expense of board and lodging during their stay with relatives in Bangkok. Therefore, the travel costs of the patients who stay with their relatives in Bangkok while receiving treatment should not be much different to the travel costs of the patients who travel from their homes everytime they visit the hospital.

2.2 Travelling and waiting time costs for patients

Travelling time costs for out-patients were more than those for in-patients. The calculation method is as follows: the average speed and distance for travelling were used to estimate the travelling time. Since time was limited when collecting data, the interview could not be done directly with those patients. This study found that most in-patients came from the Central Region and Bangkok. They traveled on the day of admission and on the day of discharge. The travelling times from the Central Region and Bangkok to hospital were similar. The average travelling time of in-patients (return trip) was around 3 hours. As most out-patients came from Bangkok, the average travelling time for a return trip was 1.92 hours. Out-patients had to follow up their results approximately 3 times, so the total number of visits equaled 4 times and the total travelling time equaled 1.92 hours multiplied by 4 which is 7.68 hours. The average income per hour for alcoholism patients was 54.51 baht that is less than that of the relatives because the number of patients who were unemployed and had lower monthly incomes were more than that of relatives. Therefore, travelling time costs for out-patients were 418.64 baht per case and travelling time costs for in-patients were 163.54 baht per case as shown in table 4.28:

Table 4.28 Travelling time costs of patients

Type of patient	Average Income per hour (baht/hour)	Total travelling time in 1 course (hours/course)	Travelling time costs (baht/case)
Out-patient	54.51	7.68	418.64
In-patient	54.51	3.00	163.53

Waiting time costs were calculated particularly for out-patients. For in-patients, waiting time is included in the 21 days of treatment. The calculation method is: the time spent for examination of out-patients in the Out-patients Division obtained from timing, from the time patients and their relatives presented themselves to the staff at the hospital until the patients and their relatives purchased medicines and walked out of the hospital. It took about 1 hour for all those processes to be completed. The out-patients had to follow up their results approximately 3 times, so, the total number of visits equal 4 and the total waiting time is equal to 1 hour multiplied by 4 which is 4 hours. The average income per hour of alcoholism patients was 54.51 baht. Therefore, the waiting time costs for out-patients were 218.04 baht per case as shown in table 4.29:

Table 4.29 Waiting time costs of out-patients

Type of patient	Average Incomes per hour (baht/hour)	Total waiting time in 1 course (hours/course)	Waiting time costs (baht/case)
Out-patient	54.51	4.00	218.04

The assumption of estimation for waiting time costs for examination is an estimation of lost time in the hospital as this is under estimation. Because of the patients and their relatives may have lost a whole day for the visit each time, as they have to take a whole day away from work. So, direct interviews with patients and their relatives will give accurate data as to how much time they spend for treatment process.

2.3 Loss of income due to illness (during treatment in hospital)

In-patients spent 21 days for detoxification treatment (including admission date) and therefore lost income for 21 days. The average income of patients was 381.57 baht per day. So the average loss of income for in-patients was 8,012.97 baht/case.

Table 4.30 Loss of income of in-patients for 1 course

Type of patients	Average income per day (baht per day)	Number of admission days (days)	Total income loss (baht)
In-patient	381.57	21	8,012.97

Indirect costs

-Travelling and waiting time costs of relatives

The method of calculation for travelling time costs for relatives was similar to that for patients. The travelling time of relatives was the same as the travelling time for patients because they came together. Accordingly, travelling time for out-patient relatives was 7.68 hours and the travelling time for in-patient relatives was 3 hours. The average income per hour of relatives was 62.98 baht. Therefore, travelling time costs for out-patient relatives were 483.69 baht per case and travelling time costs for in-patient relatives were 188.94 baht per case. See table 4.31.

Table 4.31 Travelling time costs of relatives

Type of relative	Average Incomes per hour (baht/hour)	Total travelling time in 1 course (hours/course)	Travelling time costs (baht/case)
Out-patient relatives	62.98	7.68	483.69
In-patient relatives	62.98	3.00	188.94

Waiting time costs for out-patient relatives were higher than waiting time costs for in-patient relatives because the waiting time for out-patient relatives was higher than that for in-patient relatives. The reason being that out-patient relatives spend their time waiting for the examination of patients for approximately 1 hour for each visit and the patients must follow up their results 3 times. So, the total numbers of visits equals 4 and the total waiting time was 4 hours. In-patient relatives had to wait from the time they arrived at the hospital until the patients entered the ward. . It took about 1.66 hours in all. The time spent collecting patients was also 1.66 hours. Therefore, the total waiting time for in-patient relatives was 3.32 hours per course. The average income for relatives was 62.98 baht per hour. Therefore, the waiting time costs for out-patient relatives were 251.92 baht per case and the waiting time costs for in-patient relatives were 209.09 baht per case. See table 4.32

Table 4.32 waiting time costs of relatives

Type of patient And relative	Average incomes per hour (baht/hour)	Total waiting time for 1 course (hours/course)	Waiting time costs (baht/case)
Out-patient relatives	62.98	4.00	251.04
In-patient relatives	62.98	3.32	209.09

The results are concerned with the treatment costs of alcoholism patients (both in-patients and out-patients) who did not have associated diseases or had mild complications. The treatment costs for out-patients were 3,446.77 baht per case, and the treatment costs for in-patients were 49,948.67 baht per case. But the results of this study are insufficient to evaluate which treatment process, out-patients or in-patients, is better.