

## CHAPTER 3

### RESEARCH METHODOLOGY



#### 3.1 Study Design

The research design of this thesis was a descriptive study by searching for the outcomes among health centers, which have or have not the contracted midwives, in performing the health services to the community especially in Maternal and Child Health care program.

There are many other factors, which can affect the effectiveness of maternal health care program such as socioeconomic status of a family, nutrition and sanitation as well. But as the data were not available and time were limited, the study is only based on secondary data which is obtained from health center records and from the authority of district health.

To control the confounding factors that can influence the measurement of effectiveness of Maternal and Child Health care programme, this thesis used a matching method by searching similar background characteristics among the midwives.

From 17 sub-districts in the District of Donggala, 11 sub-districts were chosen as samples for this research by a purposive (non probability) sampling in order to represent the district as a whole. The 11 sub districts were selected since there are only the 11 sub-districts, which have similar background characteristics such as similar population size and the total coverage target of MCH program as well. This selection procedure was considered on purpose to eliminate and to control the confounding factors as mentioned above.

Amongst those 11 subdistricts, it was chosen 2 villages to represent its subdistrict. Every 2 villages chosen, one village that has a Contracted Midwife and it was chosen a Civil Servant Midwife for another village. It was known that every village has one midwife posted. The sample chosen the villages, which have the population target as similar as possible where the midwives posted. Amongst the midwives, it was chosen the midwives have the same year of graduation from the Midwife Training School. The population target regard to Maternal and Child Health program are as follows:

- The population target of pregnant women services
- The population target of delivery aid services
- The population target of postnatal care services

In this study, it was also assumed that all the other factor which can affect the intervention of the program remain the same such as:

- health care seeking behavior of patients
- the severity of diseases when patient come to their facilities to get the services
- the disease pattern of people
- equipment of midwifery services is the same
- drugs for Maternal and Child Health care are available

The proposed measures of effectiveness of the intervention of the program are listed as follows:

- Number (%) of pregnant women covered by the prenatal care.
- Number (%) of deliveries assisted by midwives
- Number (%) of mothers covered by postnatal care

The effectiveness term in this study was defined as a number of the population target covered by the midwives for each activity of MCH program. In measuring the effectiveness ratio it was expressed in a percentage term.

The formulation was used to measure the effectiveness is given below:

$$\text{Effectiveness} = \frac{\text{Output}}{\text{Target}} \times 100\%$$

### 3.2 Data/Information Calculation

#### 3.2.1 Midwife Training

To analyze the cost of training one midwife, the following information and data from the Midwife School authority are used:

- a. Number and types of staff that work in the organization (Midwife Training School) with their monthly salary structure, including fringe benefits, and also the emoluments of teachers and other personnel related with the training of midwife program in 1994/1995.
- b. Total operating and material costs including travel costs and food stuffs costs for midwife students.
- c. Electricity, water and telephone bills, fuel and maintenance costs of vehicles and equipment.
- d. Total time spent by curriculum to train the midwife students was used to allocate the cost shares of Contracted Midwife (CM) students and Civil Servant Midwife (CSM) students.
- e. Information about cost of buying or making year of capital inputs, lifetime of the capital inputs and interest rate are used to estimate average annual cost of the capital cost items.

All the input costs occurred was summed up to get the total costs. After calculating the total costs, the average cost of training per one midwife is obtained by dividing the total cost by the number of midwife students trained.

### 3.2.2. Midwife Performances

To calculate the cost per activity of midwives and to analyze how the effectiveness of the midwives related to Maternal and Child Health Program, the information and data were collected from District Health Authority and Health Center records. The data were collected from year 1996/1997 to 1997/1998 are as follows:

- a. The name of villages and sub districts where the Contracted Midwives (CM) and Civil Servant Midwives (CSM) posted including the total number of population
- b. The monthly salary of contracted midwife (CM) and civil servant midwife (CSM).
- c. The detail recurrent costs of each activity related to Maternal and Child Health Program.
- d. Information on activity of midwives to calculate cost of time spent for each activity i.e. time spent for pregnant mother services, delivery services and postnatal services.
- e. Total target of each activity related to Maternal and Child Health program.
- f. Total coverage of each activity conducted by Contracted Midwives (CM) and Civil Servant Midwives (CSM).

All the cost inputs occurred in delivering the MCH care services by the midwives was summed up to get the total costs. After calculating the total costs, the average cost of service or the average cost of output is obtained by dividing the total cost by the number of population covered by midwives services.

By using the similar way, the unit cost of target and the cost effectiveness ratio were obtained.

### **3.3 Conceptual Framework**

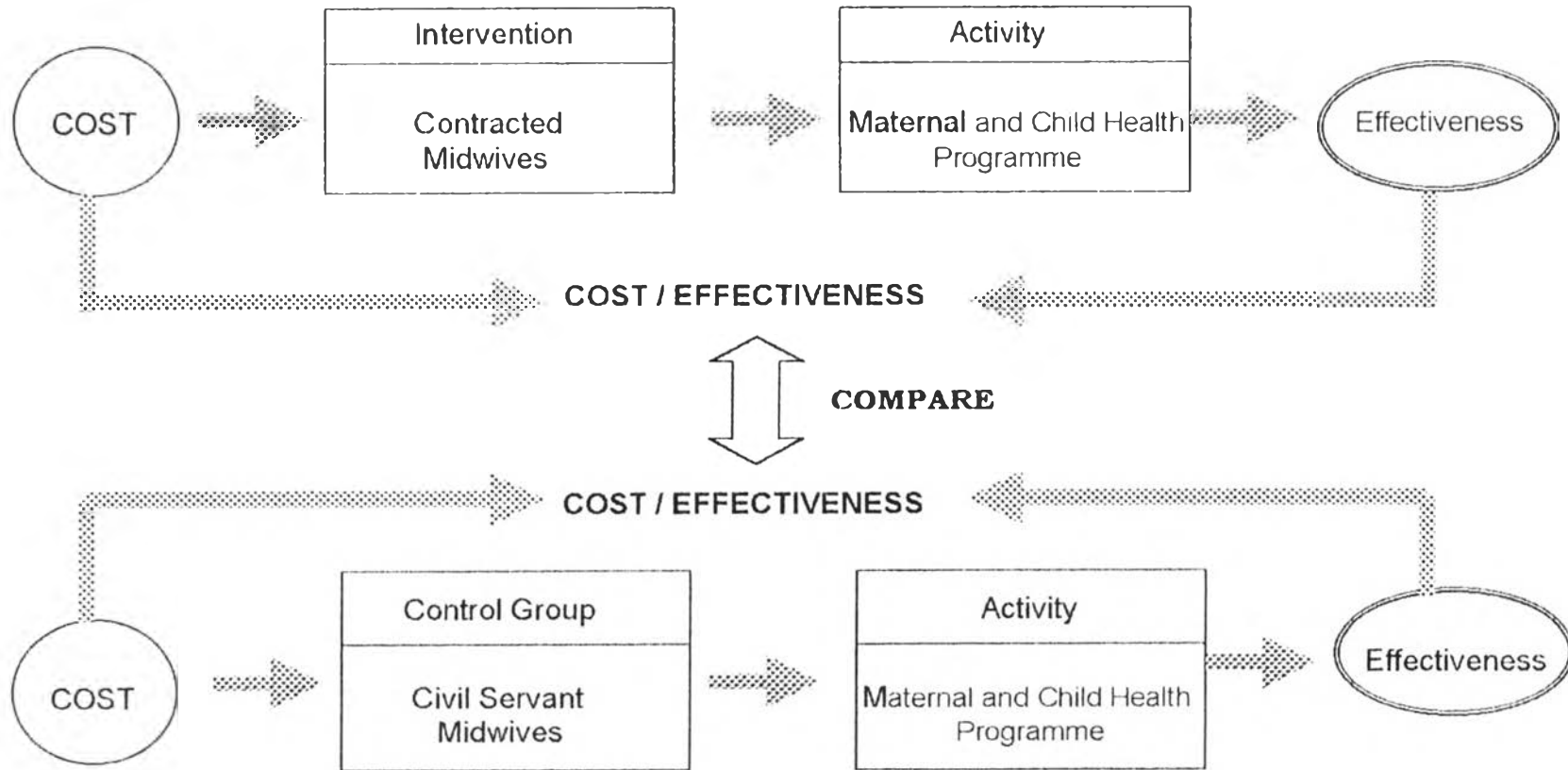
The conceptual framework for this study was to calculate and compare the cost per performance (output) among midwives in performing the health services to the community especially in Maternal and Child Health Program.

The unit cost of activity per midwife was analyzed and linked that cost to the output/performance of the midwife.

The study applied the direct distribution method as a method of the cost allocation. It was obtained from the total provider (government) cost such as labor costs, utility costs and operating costs from the budget of Maternal and Child Health Care Project (Proyek Peningkatan Pelayanan Kesehatan Masyarakat). The cost was the true costs of delivery the services to patients or target population with regard to Maternal and Child Health care program.

A schematic of the conceptual framework is as follows:

### CONCEPTUAL FRAMEWORK



This study proposed to compare the effectiveness of Maternal and Child Health care program performed by the Contracted Midwives and by the Civil Servant Midwives as a control group.

To identify the difference between the cost of training civil servant midwives and contracted midwives, the following variables was calculated as the total cost to train/produce one midwife:

a). Capital Cost:

- School building
- Student dormitory
- Vehicle
- Equipment

b) Recurrent Cost

- Staff salary and emoluments
- Material
- Maintenance
- Vehicle operating cost
- Utilities
- Supplies
- Travel cost

After calculating the total cost, the average cost of training one midwife was obtained by dividing the total cost by the number of midwives.

### 3.4 Data Analysis

#### 3.4.1 Cost classification:

Costs by inputs were classified here into two groups:

- a. Capital costs
- b. Recurrent costs

Capital costs are those cost items that last longer than one year, such as building, equipment, vehicles, etc.

The capital cost items related to the Midwife Training costs were building with the furniture and fixtures including school building, room for school staff/administration, dormitory for students, vehicles (bus and motorcycle) and equipment such as education kit, computer and type writer.

Recurrent costs are those cost items that are used up in the course of a year and usually purchased regularly, such as salary, material cost, supplies costs, utilities costs and maintenance costs.

Recurrent costs are basically calculated as the sum of cost of all inputs used.

#### 3.4.2 Calculation of Capital Costs

All the costs were calculated at 1999 price and then the average annual costs of all capital cost items were calculated. To calculate the average annual costs of all capital cost inputs, the following information were need:

- a. Bought/made in year with value of the items/assets.
- b. Lifetime of assets.
- c. Interest rate during the period of a study

The rate of return is used since the study needs to know the portion of the total amount of funds invested in the capital assets. The expenditure for the



capital assets is typically referred to as investment in capital or simply investment. By such reason, so this study used the investment rate in calculating the average annual cost of capital items.

The rate of the capital assets used in this study is considerably higher than that of the World Bank discount rate. The annual cost calculation of capital items will be lower if using discount rate of the World Bank.

The average annual cost of the capital cost inputs were then calculated by using the following formula:

$$AC_k = \{C_{t_0}(1+r)^{1999-t_0}\}/n$$

Where

$AC_k$  = Average annual cost of the capital cost assets at 1999 price

$C_{t_0}$  = The purchase value of making/buying costs of the capital cost items at the year bought or made.

$r$  = Interest rate during the period of study

$t_0$  = The year of the capital assets bought or made

$n$  = Life time of capital assets

By using the formulation above, the annual capital cost items were calculated as follows:

Purchase value of school building ( $C_{t_0}$ ) = Rp. 80,400,000,

Purchase year ( $t_0$ ) = 1993,

Interest rate during the period of study ( $r$ ) = 15.77 %,

Study period = 1999,

Life time of school building ( $n$ ) = 20 years

So, the average annual cost of school building =

$$\begin{aligned} AC_k &= \{C_{t_0}(1+r)^{1999-t_0}\}/n = \{\text{Rp. } 80,400,000(1+0.1577)^{1999-1993}\}/20 \\ &= \{\text{Rp. } 80,400,000(1+0.1577)^6\}/20 \end{aligned}$$

$$= \{Rp. 80,400,000(2.407555)\}/20$$

$$= Rp. 193,567,414/20$$

$$= Rp. 9,678,371$$

The other capital cost items were calculated by similar way to obtain the average annual cost of the capital items.

The average annual capital cost calculation of capital cost items in Midwife Training program are shown in the following Table 3.1.

Table 3.1 Average Annual Cost of Capital Cost Items at Midwife Training School in 1999 price

Capital items	Life time (Year)	Making/ Buying Year	Cost (Rp)	Interest Rate (%) **)	Value at 1999 (Rp)	Average annual cost at 1999 price (Rp)
1	2	3	4	5	6	7
School Building	20	1993	80,400,000	15.77	193,567,414	9,678,371
Student Dormitory	20	1993	74,888,000	15.77	180,296,972	9,014,849
Bus (# 1)	5	1995	24,000,000	15.77	43,111,722	8,622,344
Motorcycle (# 1)	5	1995	5,500,000	15.77	9,879,770	1,975,954
Education Kit (# 1)	5	1994	30,000,000	15.77	62,388,051	12,477,610
Computer (# 1)	5	1995	5,000,000	15.77	8,981,609	1,796,322
Typewriter (# 1)	5	1995	700,000	15.77	1,257,425	251,485
Furnitures	5	1993	10,000,000	15.77	24,075,549	4,815,110
<b>TOTAL</b>						<b>48,632,045</b>

Notes: Column 6 = Column 4 \* (1 + Column 5)<sup>Life time of the capital item used</sup>

Column 8 = (Column 6 / Column 2)

\*\*): Information from The Center Bank of Indonesia, <http://www.bi.go.id/ind/datastatistik/>

After calculating the average annual cost of capital items, and then the cost was allocated to each type of midwife students by using a given allocation basis (see item 3.4.4 page 32 on Allocation basis for calculating the annual cost). It aimed to obtain the cost shares of capital cost assets for each type of midwife.

It was found that the Contracted Midwife (CM) students used 50.52 % of total area space of building and 49.48 % was used by Civil Servant Midwife (CSM) students. Detail information on allocation basis for calculating the space area used is on page 32 (item 3.4.4).

So, the annual capital costs of school building including library and school office, dormitory, motorcycle, computer and typewriter were calculated as below:

In 1999 price, average annual costs of school building = Rp. 9,678,371

So, school building costs were allocated to CM Students' costs =

Rp 9,678,371 \* 50.52 % = Rp. 4,889,513

School building costs were allocated to CSM Students' costs =

Rp 9,678,371 \* 49.48 % = Rp. 4,788,858

Allocated costs for other capital cost items of the Midwife Training School were calculated by using the similar way as mentioned above. Detail explanation on allocation basis for the calculating is on page 32 (item 3.4.4).

The allocation of annual cost calculation of capital items at Midwife Training School was summarized in Table 3.2 below.

Table 3.2. Summary of Capital Costs at Midwife Training School  
in Academic Year 1994/1995 (in 1999 price)

(in units of Rupiah)

Capital Items	Average Annual Cost (before allocated)	Cost Allocation (basis of % space total area used)	
		Cost for CM Students	Cost for CSM Students
1	2	3	4
School Building	9,678,371	4,889,513	4,788,858
Student Dormitory	9,014,849	4,554,302	4,460,547
Bus (for students)	8,622,344	4,442,232	4,180,112
Motorcycle	1,975,954	998,252	977,702
Computer	1,796,322	907,502	868,820
Typewriter	251,485	127,050	124,435
Furniture	4,815,110	2,432,594	2,362,516
Education Kit	12,477,610	6,428,465	6,049,145
<b>Total Cost</b>	<b>48,632,045</b>	<b>24,779,909</b>	<b>23,852,136</b>

Notes: CM = Contracted Midwives

CSM = Civil Servant Midwife

Allocation basis for CM students Cost is 50.52 %

Allocation basis for CSM students Cost is 49.48 %

Column 3 = Column 2 \* 50.52 %

Column 4 = Column 2 \* 49.48 %

### 3.4.3 Calculation of Recurrent Costs

Cost of each recurrent inputs were calculated as unit cost of that input during the training year or the service periods, and then multiplied by the total number of units used.

By reason of the different time frame occurred between the cost of midwife training and the cost of midwives service, so all the costs were calculated at 1999 price by using the formulation below:

$$C_r = \{C_{10}(1+i)^{1999-10}\}$$

Where;  $C_r$  = present value of the recurrent cost (at 1999 price)

$C_{t_0}$  = cost occurred at actual year

$i$  = discount rate

$t_0$  = the year in which the cost occurred.

The cost of training and the cost of service were added together to get the total cost.

In term of recurrent cost for training the midwives, total time spent by curriculum of the training was used as a basis for allocating and sharing the costs of Contracted Midwives (CM) students and Civil Servant Midwives (CSM) students. It was used to obtain the average cost of training per one midwife.

It was found that Contracted Midwife (CM) students spent 51.52% of total training curriculum hours and CSM student spent 48.48% of total training curriculum hours. *See item 3.4.4 page 32 on Allocation basis for calculating the annual cost.*

Total salary of the staff of Midwife Training School in 1999 =  
Rp.47,129,880

So, staff salary costs were allocated to CM students' costs =  
Rp.47,129,880 \* 51.52% = Rp. 24,281,314

Staff salary costs were allocated to CSM students' costs =  
Rp.47,129,880 \* 48.48% = Rp. 22,848,566

Allocated costs for other recurrent cost items of Midwife Training School were calculated by using the similar way as mentioned above.

The annual recurrent cost items of midwife training program were summarized in the Table 3.3 below

Table 3.3 Summary of Recurrent Costs at Midwife Training School  
in Academic Year 1994/1995 (in 1999 price)  
(in units of Rucian.)

Cost Items	Cost for CM Students	Cost for CSM Students
Labor Cost:		
Staff Salary	24,281,314	22,348,566
Emoluments	11,457,257	10,731,207
Material/Supplies	59,225,131	56,730,481
Utilities & Maintenance	7,949,744	7,480,660
Travel Cost	10,254,152	9,649,093
Other Costs	47,234,158	3,971,107
<b>Total Cost</b>	<b>160,401,756</b>	<b>110,461,114</b>

Notes: Table

CM = Contracted Midwife

CSM = Civil Servant Midwife

In term of recurrent cost of Maternal and Child Health program, salary cost of midwives in performing the Maternal and Child Health program was calculated in the following way:

First of all, per year salary cost of midwives was calculated based on total working hour/year/midwife (235 days in a year multiplied by 8 hours work/midwife/day). Total working days (235 days) were obtained from the total days in a year by omitting the weekend holidays and the public/national holidays as well. To get per hour salary cost of each midwife was obtained by dividing each midwife's total salary cost/year by total working hour/year.

Finally, the total amount of time spent by each midwife for each activity in Maternal and Child Health program was calculated by multiplying the time spent by each midwife per hour salary cost for each activity per year.

Cost salary of midwives per year was calculated as follows:

Average salary of midwife per year = Rp. 5,400,000,

Total working days/year = 235 days

Total working hours/day = 8 hours

Total working hours/year = 235 days \* 8 hours = 1,880 hours,

Average salary/hour = Rp. 5,400,000/1880 = Rp. 2,872.

Salary Cost per activity/year = Rp 2,872 \* time spent for each activity conducted by the midwife.

From the calculation result above, so when the midwife performed the activity of, for example, pregnant women service, the salary cost for such activity was calculated as follows:

Average time spent for pregnant women service = 20 minutes per one pregnant woman served (covered),

Total pregnant women covered (output)/year = 490 pregnant women,

Average salary/hour = Rp 2,872

So, salary cost for the activity of pregnant women service per year =

{Rp 2,872 \* (490\*20 minutes)/60minutes}

= Rp 2,872 \* 163.3 hours = Rp 469,149

The allocation of salary cost of Midwives for each activity is shown in the Table 3.4.

Table 3.4 Allocation of Salary Cost of Contracted Midwives and Civil Servant Midwives to the Activities in Maternal and Child Health Program in 1996/1997 - 1997/1998

Midwives	Number	Year	Total salary/year	Average salary/ year	Total working hour/year	Average salary/ hour	Average time for each activity/year (hour)*			Cost per year for each activity			Total cost/year
							Pregnant women	Delivery	Postnatal	Pregnant women	Delivery	Postnatal	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Contracted Midwives	11	1996/1997	59,400,000	5,400,000	1,830	2,872	163.3	1,028.0	105.0	469,149	2,952,766	301,596	3,723,511
	11	1997/1998	59,400,000	5,400,000	1,880	2,872	182.7	1,296.0	126.3	524,681	3,722,553	362,872	4,610,106
Civil Servant Midwives	11	1996/1997	22,440,000	2,040,000	1,880	1,085	165.3	1,076.0	107.0	179,404	1,167,574	116,106	1,463,025
	11	1997/1998	24,684,000	2,244,000	1,880	1,194	186.7	1,324.0	131.0	222,809	1,580,349	156,364	1,959,521

Notes

\*) Detail information are on Chapter 3 (Data Analysis)

Column 6 = 8 hours \* 235 days = 1,880 hours

Column 7 = Column 5 / Column 6

Column 11, 12 and 13 = Column 7 \* time spent for each activity (Column 8, 9 and 10)

Column 14 = Column 11 + Column 12 + Column 13



The other annual recurrent cost of Maternal and Child Health program such as operating costs were the actual costs. Therefore it was allocated directly without using given formulation. The detail of operating costs is as follows:

Table 3.5 Allocation of Operating Costs of Maternal and Child Health Program to CM and Civil Servant Midwives In Financial Year 1996/1997 - 1997/1998

Midwives	Financial Year	Total Operating Cost/activity per year			Total cost/year
		Pregnant women	Delivery	Postnatal	
1	2	3	4	5	6
CM	1996/1997	4,620,455	2,580,340	1,744,453	8,945,253
	1997/1998	4,972,702	2,431,104	2,286,998	9,690,804
CSM	1996/1997	4,710,987	2,646,268	1,757,860	9,115,115
	1997/1998	5,053,256	2,503,976	2,300,555	9,857,787

Note: CM = Contracted Midwives

CSM = Civil Servant Midwives

While, for allocating the utility costs was calculated based on the percentage of total coverage for each activity. The allocation of the utility costs is shown on Table 3.6 below.

Table 3.6

## Allocation of Utility Cost of Maternal and Child Health Program to Contracted Midwives and Civil Servant Midwives

In Financial Year 1996/1997 - 1997/1998

Activity	Financial Year	Utility Costs*) (Before Allocated) in units of Rupiah	Coverage (Output)			Total Output	Allocation Basis			Allocated Utility Cost for each activity		
			PW	DA	PS		PW	DA	PS	PW	DA	PS
	1	2	3	4	5	6	7	8	9	10	11	12
CM	1996/1997	2,478,352	490	257	315	1,062	46.14	24.20	29.66	1,143,496	599,752	736,104
	1997/1998	2,204,918	548	324	379	1,251	43.80	25.90	30.30	965,863	571,058	667,997
CSM	1996/1997	2,478,352	400	269	321	1,086	45.67	24.77	29.56	1,131,918	613,883	732,552
	1997/1998	2,204,918	560	331	393	1,284	43.61	25.78	30.61	961,646	568,402	674,870

Notes: \*) costs for electricity, maintenance of building and equipment and report and recording)

Column 6 = Column 3 + Column 4 + Column 5

Column 7 = Column 3 / Column 6 / 100

Column 8 = Column 4 / Column 6 / 100

Column 9 = Column 5 / Column 6 / 100

Column 10 = Column 2 \* Column 7

Column 11 = Column 2 \* Column 8

Column 12 = Column 2 \* Column 9

Finally, the annual of all recurrent cost items is summarized in Table 3.7.

Table 3.7 Summary of Recurrent Costs at Maternal and Child Health Program  
in Financial Year 1996/1997 and 1997/1998

(in units of Rupiah)

Cost Items	Cost for Contracted Midwives		Cost for Civil Servant Midwives	
	1996/1997	1997/1998	1996/1997	1997/1998
Labor Cost	3,723,511	4,610,106	1,463,085	1,959,521
Operating Cost	8,945,253	9,690,804	9,115,115	9,857,787
Utility Cost	2,478,352	2,204,918	2,478,352	2,204,918
<b>Total Cost</b>	<b>15,147,116</b>	<b>16,505,828</b>	<b>13,056,552</b>	<b>14,022,226</b>

Source: Table 3.4, Table 3.5 and Table 3.6 respectively

#### 3.4.4 Allocation basis for calculating the annual costs

To allocate costs means to assign them to one or more cost categories. There are two principal ways to allocate these costs: 1) equally among the cost categories or 2) proportionately, (Jack Reynolds, 1993).

Annual costs both capital and recurrent costs at Midwife Training School were calculated proportionately by using appropriate allocation criteria as below:

Allocation for the capital costs of Midwife Training School was calculated by the following way:

a. By criteria on the time spent:

##### For Contracted Midwife (CM) Students:

Total learning hours at classroom = 735 hours

Total practicing hours at hospital and village = 488 hours

Total = 1,223 hours

For Civil Servant Midwife (CSM) Students:

Total learning hours at classroom = 735 hours

Total practicing hours at hospital and village = 416 hours

Total = 1,151 hours

Total curriculum hours for students (CM+CSM) = 1,223 hours + 1,151 hours = 2,374 hours

The percentage of total curriculum hours for Contracted Midwife (CM) students =  $(1,223/2,374)*100 = 51.52\%$  and

The percentage of total curriculum hours for Civil Servant Midwife (CSM) students =  $(1,151/2,374)*100 = 48.48\%$

b. By criteria on the space area used:

Total space area of Midwife Training School = 1,922.1 square feet (sq. ft)

- Student Dormitory = 1,180.8 sq. ft

The allocation of space area are based on the number of student being trained. The total number of students was 79, which consist of 40 CM students and 39 CSM students.

So space allocated for CM students =  $1,180.8 * (40/79) = 597.84$  sq.ft.

Space allocated for CSM Students =  $1,180.8 * (39/79) = 582.93$  sq.ft.

The other building space items were allocated by using a similar way mentioned above, except for classroom, which was allocated in the same proportion because the CM students and CSM students has their own classroom separately

- Library = 118.1 sq. ft

Space allocated for CM students = 59.79 sq. ft

Space allocated for CSM Students = 58.31 sq. ft

- Kitchen (in dorm) = 98.4 sq. ft

Space allocated for CM students = 49.82 sq. ft

Space allocated for CSM Students = 48.58 sq. ft

- Staff Office = 196.8 sq. ft

Space allocated for CM students = 99.64 sq. ft

Space allocated for CSM Students = 97.16 sq. ft

- Classroom = 328 sq. ft

Space allocated for CM students = 164 sq. ft

Space allocated for CSM Students = 164 sq. ft

Total space area for CM students =

$(597.84 + 59.79 + 49.82 + 99.64 + 164) = 971.09$  sq. ft or 50.52 % of total area

Total space area for CSM students =

$(582.93 + 58.31 + 48.58 + 97.16 + 164) = 950.98$  sq. ft or 49.48 % of total area

Total area = 1,922.1 sq. ft

So, the annual capital costs of school building including library and school office, dormitory, motorcycle, computer and typewriter were calculated as below:

In 1999 price average annual costs of school building = Rp. 9,678,371

So, school building cost were allocated to CM Students' costs =

$\text{Rp. } 9,678,371 * 50.52 \% = \text{Rp. } 4,889,513$

School building cost were allocated to CSM Students' costs =

$\text{Rp. } 9,678,371 * 49.48 \% = \text{Rp. } 4,788,858$

Some capital items (such as Education Kit and Bus) that are directly used for both Contracted Midwife and Civil Servant Midwife Students can not be calculated by the percentage of total space area. Those capital items were used on the basis of their time spent under the curriculum hours. Education Kit was used by the students

in classroom and the bus was used specially to transport the students performing the practice activities to the hospital under the curriculum hours.

For the allocation of education kit and bus, it was calculated on the basis of the percentage of the curriculum hours spent by both Contracted Midwife and Civil Servant Midwife Students.

Allocated costs for other capital cost items and recurrent costs of Midwife Training School were calculated by using the similar way as mentioned above.

The capital and recurrent costs of the training were added together to obtain the total cost of Midwife Training. The average cost of training one midwife was obtained by dividing the total cost by the number of midwife students trained.

The recurrent costs of Maternal and Child Health care program was calculated on the basis of time spent by midwives in performing the activity of Maternal and Child Health care program such as pregnant women services, delivery aid (birth attendant services) and postnatal services.

In performing the pregnant women services, a midwife spent her time to perform the services related to the pregnant mother within 20 minutes per one pregnant woman. The actions are undertaken by the midwives basically are as follows:

- Diagnose and check the pregnancy (it was assumed that 5 minutes to be spent this activity per one visit of the pregnant women)
- Immunization for pregnant women (5 minutes per one visit)
- Blood pressure test (5 minutes per one visit)
- Supply an Iron supplement tablet (5 minutes per one visit)

By assuming that the time spent to perform the activity is equal between Contracted Midwives (CM) and Civil Servant Midwives (CSM), so there was

underestimated result for some extents. Such assumption was used due to the lack of data.

In this study, the data used for the analysis is the first antenatal visit of the pregnant women who contact the midwives to get the services.

In delivery aid services, normally the midwives perform the clinical procedures in assisting the delivery or conducting the obstetrical procedures including the actions for a newborn baby.

It was assumed that a midwife spent her time in assisting a mother to deliver her baby normally for 4 hours including the time for preparing the delivery, during and after delivery a baby.

In postnatal services, a midwife spent her time within 20 minutes to serve one visit. The activities in postnatal services are as follows:

- Weighing an infant
- Diagnose and check an infant's health
- Infant Immunization
- Advises for the mothers (health education/counselling)

To get the average cost or the cost per unit of output of each activity was calculated by dividing the total cost of each activity with its output (the coverage) by using an appropriate unit cost of analysis, e.g. cost/pregnant mothers covered, cost/delivery assisted and cost/postnatal care served.

The detail data on the average cost of each activity is shown on Table 3.8 below.

Table 3.8 The Annual Costs of each Activity of CM and CSM in FC Year 1996/1997 - 1997/1998

Cost Items	Financial Year	Annual Cost of each activity			Average Cost of each activity		
		Pregnant women	Delivery	Postnatal	Pregnant women	Delivery	Postnatal
1	2	3	4	5	6	7	8
<b>Labour Cost</b>							
CM	1996/1997	469,149	2,952,766	301,596	957	11,489	957
	1997/1998	524,681	3,722,553	362,872	957	11,489	957
CSM	1996/1997	179,404	1,167,575	116,106	362	4,340	362
	1997/1998	222,309	1,560,349	156,364	398	4,774	398
<b>Operating Costs</b>							
CM	1996/1997	4,620,455	2,580,340	1,744,458	9,430	10,040	5,538
	1997/1998	4,972,702	2,431,104	2,286,998	9,074	7,503	6,034
CSM	1996/1997	4,710,987	2,646,268	1,757,860	9,498	9,837	5,476
	1997/1998	5,053,256	2,503,976	2,300,555	9,024	7,565	5,354
<b>Utility Costs</b>							
CM	1996/1997	1,143,496	599,752	735,104	2,334	2,334	2,334
	1997/1998	965,863	571,058	667,997	1,763	1,763	1,763
CSM	1996/1997	1,131,918	613,883	732,552	2,282	2,282	2,282
	1997/1998	961,546	568,402	674,370	1,717	1,717	1,717
<b>Total Cost</b>							
CM	1996/1997	6,233,100	6,132,858	2,781,158	12,721	23,863	8,329
	1997/1998	6,463,246	6,724,715	3,317,367	11,794	20,755	8,754
CSM	1996/1997	6,022,309	4,427,726	2,506,518	12,142	16,460	8,120
	1997/1998	6,237,711	4,652,727	3,131,789	11,139	14,057	7,969

Note: Column 3, column 4 & 5 are summarized from Table 3.4, Table 3.5 & Table 3.6 respectively

Column 6 = Column 3/its output \* 100 (data on output are on Table 3.6)

Column 7 = Column 4/its output \* 100

Column 8 = Column 5/its output \* 100

To get the total cost of midwives was obtained by adding together both the cost of training and the cost of services. All the costs were calculated at 1999 price as explained before.



To allocate the midwife training costs to the activity of Maternal and Child Health program, it was calculated based on the percentage of total output (coverage).

The allocation of training cost to the activity of Maternal and Child Health program is shown in the following Table 3.9.

Table 3.9 The Allocation of Midwife Training Cost to the activity of Maternal and Child Health program

Midwives	Training Cost	Output			Total Output	%of total output			Allocated Cost		
		PW	DA	PS		PW	DA	PS	PW	DA	PS
1	2	3	4	5	6	7	8	9	10	11	12
CM	4,629,542	490	257	315	1062	46.1	24.2	29.7	2,136,041	1,120,332	1,373,169
CSM	3,445,341	496	269	321	1086	45.7	24.8	29.5	1,572,918	853,054	1,017,957

Note:

Column 7 = Column 3/Column 6

Column 8 = Column 4/Column 6

Column 9 = Column 5/Column 6

Column 10 = Column 2 \* Column 7/100

Column 11 = Column 2 \* Column 8/100

Column 12 = Column 2 \* Column 9/100

### 3.4.5 Incremental Analysis

Incremental analysis is used to refer to the difference in costs and output between the two or more interventions (programs) being compared in the evaluation. Such analysis is performed to obtain the information on the additional cost imposed by use of one service over another, compared with the additional effects it delivers. The

result tells us how much we are paying (for each extra output) in adding the extra inputs.

This study calculated the difference in costs of CM and CSM performed the activity regard to MCH program compared with its output among the CM and CSM.

The incremental cost was calculated by dividing the difference in total cost between Contracted Midwives and Civil Servant Midwives by the difference in their output levels.