CHAPTER 2

Research Description

Research Questions

1. How did the health personnel and VHVs in Yasothon Province implement the model for DM prevention and control?
2. What were the problems and obstacles of implementation?

Goal

- To improve the health personnel and VHVs implementation in accordance with the DM prevention and control model in Yasothon Province

General Objective

To evaluate the process of implementation in accordance with the model for DM prevention and control in Yasothon Province

Specific Objectives

1. To assess the processes of the :
   - 1.1 DM service system
     - 1.1.1 Screening system
     - 1.1.2 Treatment system
   - 1.2 Support system
     - 1.2.1 Medical and medical equipment support
     - 1.2.2 Development of health personnel and VHVs' potential
     - 1.2.3 Development of the information system
     - 1.2.4 Supervision
2. To identify the problems and obstacles to implementation

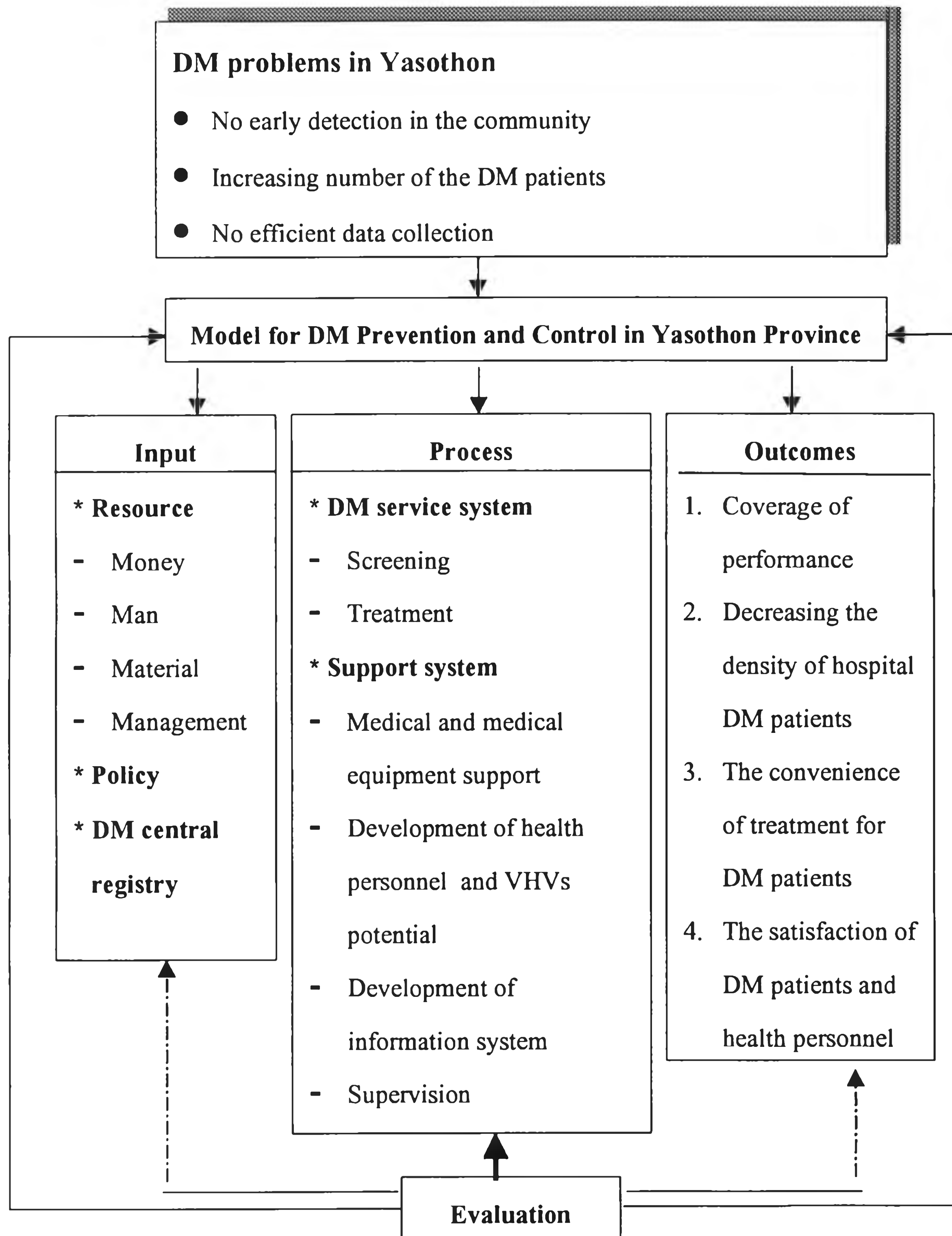

Figure 5 : Conceptual Framework

Research Methodology

Research Design

This study was formative evaluation research and focussed on implementation evaluation.

Population and sample

Populations for this study were :

1. Health personnel who were responsible to the task of prevention and control of DM in Yasothon Province.

2. Village Health Volunteers (VHVs) who were responsible to screen the target group.

Samples were health personnel who were responsible to the task of prevention and control of DM and VHVs in Yasothpn. How to select samples and areas were as follows:

1. District selection was by stratified random sampling in accordance with the area size and population. Dividing districts into three sizes since the responsible health centers in each size is different, therefore the administration and service is also different. The selection as listed below:

- **Large Districts** are Muang and Loengnoktha.
- **Medium Districts** are Kudchum, Mahachanachai and Khumkaunkeaw.
- **Small Districts** are Saimoon, Patiu, Korwang and Thaicharoen.

Next, picking at random in accordance with the size of district (one size/ district). The proper three districts were --Loengnoktha; Kudchum and

Korwang. So Loengnoktha Hospital, Kudchum Hospital and Korwang Hospital were the district facilities.

2. Tambon selection was by picking at random, two tambons / district. The researcher needed to compare the process in the same district as follows :

2.1 For Tambon in Loengnoktha District, namely Tambon Samakee and Kudchiengmee.

2.1.1 Tambon Samakee : there are two facilities but the Wai Health Center was the only one being picked.

2.1.2 Tambon kudchiengmee : there are two facilities but the Kudchiengmee Health Center was the only one being picked.

2.2 For Tambon in Kudchum District, namely Tambon Naso and Phonyam.

2.2.1 Tambon Naso : the facility is Naso Health Center.

2.2.2 Tambon Phonyam : there are two facilities but the Phonyam Health Center was the only one being picked.

2.3 For Tambon in Korwang District, namely Tambon Phahaun and Kudnamsai.

2.3.1 Tambon Phahaun : the facility is Phonmaung Health Center.

2.3.2 Tambon Kudnamsai : there are two facilities but the Toom Health Center was the only one being picked.

3. Sample were selected by purposive sampling

3.1 Health personnel who were responsible to the task of prevention and control of DM and VHVs in Loengnoktha, Kudchum and Korwang Districts as were follows :

Hospital

- Doctor (1 person/hospital)	3	persons
- Pharmacist (1 person/hospital)	3	persons
- Nurses who work in DM clinic(1 person/hospital)	3	persons
- Card Recorder (1 person/hospital)	2	persons
- Lab investigator (1 person/hospital)	3	persons
- Health personnel who were responsible to this job	2	persons
District Health Office		
- Health personnel who were responsible to this job	3	persons
Health Center		
- Health personnel who were responsible to this job	6	persons
Total	***25***	***Persons***

3.2 VHVS : samples were selected by purposive. They were the VHVs who lived in the villages where health centers are established, one group / health center (about 6 –12 person / group). Totals were six groups, 47 persons .

Research Instruments

1. In-depth Interview Form
2. Focus Group Discussion Form
3. Documents
   - 3.1 DM Card
   - 3.2 Non-Communicable Disease 1 Form (NCD1 Form)
   - 3.3 Referral Form
   - 3.4 Referral Record
   - 3.5 DM Central Registry program
   - 3.6 Drug Form request

3.7 Supervise Record

3.8 Lab Record

Data Collection Methods

1. Requesting the recommended documents from the Yasothon PCMO to hospital Directors and district health officers in target areas for the appointed time to collect data.

2. The researcher collected data on health personnel and VHVs, by herself.

Primary Data

- Health personnel by in- depth interview technique
- VHVs by focus group discussion technique

Secondary Data

- Collect data from documents

Evaluation Plan and Indicators

Table 1 : Evaluation Plan

Evaluation Structure	Indicators – Variables	Resource	Instrument
1.Process Evaluation			
1.1 DM service health system			
1.1.1Screening system	- The target group were history investigated, checked urine sugar, measure the body weights, height, blood pressure and health educated in the village.	- Health personnel who are responsible to this job in the hospital and health center - VHVs	- In-depth interview form and NCD1 - FGD.form
	- The target group who abnormal urine were referred to recheck fasting blood sugar (FBS) in the hospital.	- "-------------------"	- "--------"
	- The target group who abnormal urine or having risk factors were followed up.	- "-------------------"	- "--------"
1.1.2Treatment system	- Having set up DM clinic in the hospital and health center.	- Nurses and health personnel in the health center	- In- depth interview form
	- The DM patients were history investigated, checked blood sugar, measure the body weights, height, blood pressure and health educated.	- "-------------------"	- In- depth interview form and DM Card

Evaluation Structure	Indicators – Variables	Resource	Instrument
	- The DM patients were checked FBS.	- Lab investigators	- In-depth interview form and Lab record
	- The DM patients were treated in accordance with doctor's plan.	- Doctor	- In- depth interview form and DM card
	- The DM patients were referred to treat at the health center in accordance with criteria.	- Doctor and Nurse	- In-depth interview form, DM card, referal form and referal record
	- The DM patients were referred to treat at the hospital in accordance with criteria.	- Health personnel in the health center	- "----------------"
1.2 Support system			
1.2.1 Drug supply and medical equipment service	- The health personnel planed to use urine strips, blood strips and medicine.	- Health personnel in the health center and district health office	- In-depth interview form and drug form request
	- The pharmacist provided urine strips, blood strips and medicine in accordance with the plan.	- Pharmacist	- "----------------"

Evaluation Structure	Indicators – Variables	Resource	Instrument
1.2.2 The development of health personnel and VHVs	- Training the health personnel and VHVs as follows:		
	1. Knowledge of DM	- Doctor, Health personnel in the health center and VHVs	- In-depth interview form and FGD
	2. Caring for DM patients	- "-----------------"	- "---------------"
	3. Methodology to test urine sugar by urine strip	- Lab investigator, Health personnel in the health center and VHVs	- "---------------"
	4. Methodology to test fasting blood sugar by Glucometer (especially health personnel)	- Lab investigator and Health personnel in the health center	- In-depth interview form
1.2.2 The development of information system	- Supporting DM card	- Card recorder	- In-depth interview form, DM card
	- Having the DM central registry program and using it	- "-------------"	- In-depth interview form and DM central registry program
	- DM patients' name are not reiterated	- "-------------"	- "---------------"
	- Training health personnel for using the program and reporting the result	- "-------------"	- In-depth interview form

Evaluation Structure	Indicators – Variables	Resource	Instrument
1.2.4 Supervision	- The health personnel in health center monitor and supervise the VHVs in the village - The health personnel in district health office and hospital monitor and supervise the health personnel in the health center.	- Health personnel in the health center - VHVs - Health personnel in the hospital, district health office and health center	- In-depth interview form - FDG and supervise record - In-depth interview form and supervise record
2. Problems and obstacles of implementation	-	- Each of health personnel - VHVs	- In-depth interview form, - FGD

Period of Time

- October 1999 – March 2001 (Shown in Table 2)

Table 2 : Research Planning

Activities	Period
1. Reviewing literature, the scope of the title for study and consulting the adviser	• Oct.-Nov. 1999
2. Doing research proposal and improvement	• Dec.1999 - Jan. 2000
3. Research proposal presentation	• Feb. 2000
4. To improve research proposal	• Mar. 2000
5. Implementation	• Apr.2000 – Oct.2000
5.1 Data Collection	• April 2000
5.2 Data Analysis and summarization	• May – Jun. 2000
5.3 Submitting the research results to the top manager	• Jul.2000
5.4 Submitting the research results to medical specialists and a conference to discuss the model	• Jul.2000
5.5 Submitting the research results to district managers and a conference to discuss the model	• Sep.2000
5.6 To improve the model	• Oct.2000
6. Research Evaluation	• Oct. – Nov.2000
7. Conclusion	• Dec.2000
8. Thesis writing	• Jan – Feb. 2001
9. Final examination	• Mar. 2001

Expected Outcomes

1. To obtain the results of the study and offer them to the top administrator for considering the direction of this model to determine the appropriate policy and performance.

2. To solve the problems and obstacles and improve strategies of performance for higher quality services.

Data Analysis and Results

Qualitative Data

The data analysis was done using content analysis, which is a systematic examination of text (field notes), then identifying and grouping themes and coding, classifying, and developing categories (Nicholas Mays and Catherine Pope, 1997: 3).

Quantitative Data

The data analysis used was statistical descriptive analysis namely, frequency and percentage.

The data analysis was divided to four parts as follows:

1. DM Service System
   - 1.1 Screening system in the village
   - 1.2 Treatment system
     - 1.2.1 DM treatment in the health center
     - 1.2.2 DM treatment in the hospital
2. Support system
   - 2.1 Medical and medical equipment support
   - 2.2 Development of health personnel and VHVs potential

2.1 Development of DM information system

2.2 Supervision

3. Problems and Obstacles of Implementation

4. Suggestions

The results of this research were as follow:

1. DM Service System

1.1 Screening System in the village

DM screening is the finding cases where the patient is ill but exhibits no symptoms by using specific and valid instruments to detect abnormalities of disease. It must have economic support and is applied to screen the people in the community. Nowadays, DM is screened from urine and blood (Supawan Manosunthon, 1999: 140). Quality of screening is necessary and important because the screening outcomes are divided into normal, risk and illness groups. The screening responsible persons is required know about specimen collection, understand steps and how to use instruments accurately. In addition, they should know about the methodology and steps to refer specimens for confirmation. Besides, they should know about the methodology and contents of health education to educate both ill and risk groups who undergoing DM screening.

The Yasothon Provincial Health office developed the DM screening and treatment system in 1995 and has strictly determined the policy of DM prevention and control since 1997. First, the screening process began in people over 40 years old because the Health Research Institute of Thailand and Ministry of Public Health 1991

studying (Department of Medical Service, Ministry of Public Health, 1994:130) found that DM patients in Thailand were clearly increasing when the people were 40 years old or over 40 years old. This process was monitored in the village mostly. The health personnel who work in health centers and VHVs were the key persons. So data collection to evaluate DM screening was focused on these groups by in-depth interviews in the health personnel and focus group discussions in the VHVs.

The DM screening process in the village can be summarized as follows:

1. Target Group Determination

This policy determined that the target groups for DM screening were new cases and old cases. The new cases were people 40 years old or over 40 years old but never screened. The old cases were people who were screened two or three years ago and urine was normal and people who had DM symptoms or DM risk factors. This study found that every VHVs was not clear about the target determination each year. Everyone understood that the target group was every person over 40 years old where urine must be checked every year and those who had DM symptoms or DM risk factors. Furthermore, this study found that every VHV group never surveyed or listed the names of target groups. The names were surveyed in every age group by Basic Minimum Need (BMN) form.

" Before urine checking we never shared ideas to determine the target group .Whoever goes there (place of checking up), will be checked "

" Checking every two or three years never say, declaring never hear too "

" The health personnel order VHVs to tell people who live in areas for which they are responsible to be checked every year. "

" Never list the names, we never did really."

" If we know the criteria, there are about 3 - 4 persons/block, so we can check the names at our home. "

" If the health personnel order it, why we can not do it? "

(VHVs Group)

In addition to interviews, the health center level personnel were agreeable to discussion in the VHVS group. That was to say only 1/3 of health personnel could tell target groups correctly and 2/3 of them misunderstood. But in health personnel group attested they surveyed people over 40 years old every year. Besides, documentary analyses in health centers found that there were people over 40 years old with registration. Some health centers could be surveyed using family folder and record data in the computer by using the Tambon Health Office Program (THO Program). It is a package program that records the database of the health center. Some health centers could be surveyed at the same time with the BMN form.

" Target group are the people over 40 years, have risk factors, may be obese or DM genetic person."

" The screening is focused on only new cases or risk group. "

" The target groups are the people over 40 years old and who have never been screened. "

(VHVs Group)

" I'm not sure who is the target group. Whoever wants to be screened, I will check everyone."

" After surveying the people over 40 years old by VHVs, we will screen in the village."

" Telling VHVs to survey every year but this year we began the survey by ourselves. We survey family folder and record data in THO program at health center."

" We will survey family folders and record data in the THO program, the computer will calculate the age population."

(Health Center Level Personnel Group)

Some part of this study indicated that the process to determine the target groups was not clear. It might be the frequent changing of DM responsible persons in district and tambon levels or the job assignment might not be clearly understood. Sometime the new responsible persons could not find original document.

" The responsible persons often change; so it will have the problem of assignment."

" The staff who are assigned DM job don't study in detail. When they do, they can't find the original document, so they begin to screen everyone again. We assume that they never screen."

(DM Responsible Persons in District Health Office Group)

2. Target Group Preparation

The headman or the spokesman of the village would declare the date; time and place of screening to the target groups through the village broadcast tower mostly. Only a minority would be declared by VHVs. Besides, VHVs would walk to tell the target groups who lived at home in their areas of responsibility. In some villages the health personnel would tell VHVs to declare the name of target groups. If they didn't come, the VHVs would follow up with them at home.

" The headman or the spokesman will declare mostly. "

" Walking to tell them, if whoever suspect themselves can go to check. "

" At first the health personal must appoint and tell VHVs that there is urine screening, then they will appoint the people by declaring through the broadcast tower to tell them get their urine checked. "

" Declaring through the broadcast tower and VHVs who are the responsible persons in each block, and VHVs will walk to tell the target group at home again. "

" Health personal note the letter to the headman of village, then he will read it. "

(VHVs Group)

" Note the letter to head of VHVs or leader of village then they will announce the time for screening. "

" We tell VHVs to announce, but don't speak ourselves. "

" To tell VHVs to declare that they will screen DM and check blood pressure tomorrow. "

" I will prepare wording for speaking through the broadcast tower."

" If the target group is absent, I will tell VHVs to follow up again."

" There are the direction give to VHVs, then they announce who will check urine."

" If the headman of the village absent, his assistant will announce."

(Health Center Level Personnel Group)

3. Screening

The DM screening began in the morning everywhere after VHVs finish their routine duty. At first the health personnel would control the work. They checked VHVs preparation and divided the job in accordance with their skill. This study showed that most of VHVs had the skill of urine checking by urine strips and could read its result. But in the skill of blood pressure measurement, there were only two or three expert persons in each village. Most of them were health personnel assistants at health centers, who were trained blood pressure measurement experts, so this duty was for the experts only. Other duties such as recording names, addresses and results, measuring body weight, height (in some villages) and checking urine could divided and rotated among VHVs, so they could help each other. The health personnel didn't take these actions. The urine screening began with the target group giving their urine to the checking place, and the VHVs would inquire about history and records. After that, they would measure body weight, height and blood pressure and check urine; some steps might be rotated in accordance with situation. Sometimes, in cases of target group that could not check urine by themselves, they might give their urine to others for checking. However, this study found that during urine screening in the years before, there was no

clear health educational model. Besides, in the day of screening the health personnel would check chemical blood of agriculturists; it was the job integration.

> *" After finishing the daily job, VHVs will meet together at the community primary health care center (CPHCC)."*
>
> *" The health personnel will check the readiness of VHVs in the early morning, then we divide the jobs, and those who can write beautifully will be recorders."*
>
> *" If someone cannot come to be checked, they will send another, such as the husband cannot come, so he will send his wife."*
>
> *" Never gave health education before. When they come, we will check instantly."*
>
> *" If urine is abnormal, we will refer them to the health center."*
>
> *" Never gave DM health education, our DM knowledge is like the people."*
>
> *(VHVs Group)*

> *" We tell VHVs to check urine. We only advise them."*
>
> *" We will designate the place for urine screening, and at the appointive time we will help them."*
>
> *" Mostly we will check chemical blood of agriculturist together."*
>
> *(Health Center Level Personnel Group)*

This study found that every step of screening was the VHV's responsibility. The health personnel only took action for making sure the work was ready and correct the first time. It was found that health personnel in some place didn't come all the time. However, VHVs were satisfied because they could work freely. But in some villages

the VHVs weren't sure how to check urine, they needed the health personnel to live with them because they were anxious the people didn't believe in them.

" At first the health personnel must come everywhere to determine whether urine checking is done correctly, then they will move to other villages."

" It is good for me if the health personnel supervise from afar. We can work freely and comfortably."

" We can check DM, no problem and not difficult."

(VHVs Group)

" Some villages are OK, we can leave them and only check again when they conclude. But some places we will help to check the results, it's right or not."

" In some villages the VHVs are new, they aren't sure how to check urine so we will work with them."

(Health Center Level Personnel Group)

4. Follow up of Abnormal Group

The VHVs list the names of people whose urine is abnormal and send them to health center level personnel to confirm blood sugar again. Results of this study found that after that they didn't follow up to seriously suggest or educate about DM. They only asked about the symptoms and blood results by chance or live in the block for which they are responsible. But there was only someone who visited for self-care suggestion. However, this study indicated that the VHVs conceded they had a little DM knowledge and the health personnel in hospital should have educated the target group

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The following up of the people with abnormal urine sugar in health personnel was not different from VHVs. But some health personnel would check blood sugar of this group at the health center to confirm before referring them to the hospital because there were not many persons. The health personnel would write the referral form and give it to the people to recheck blood sugar at the hospital. Some of them were sure that the people who were referred would go to hospital but everyone wasn't sure. They would follow up from referral forms that the hospital health personnel would send to the health center and from the VHVs. If the people didn't go to check again at the hospital, the health center level personnel didn't do anything.

" For the target groups with abnormal urine sugar, I will refer 100% to recheck. I'm sure."

" The patient with abnormal urine (begin trace) will have blood sugar confirmed at the health center. If the result > 110, we will refer them to be rechecked at the hospital."

" We must be sure before referring them to the hospital because they will lose time if they go to the hospital and the doctor diagnoses them as normal. They may come back to blame us again."

" We refer every case but we aren't sure they will all go or not."

" It isn't difficult to follow up on them because if we refer them, the VHVs will tell us again"

" Don't draw blood at the health center before because if they go to hospital, they will be in pain again."

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" If they go to the hospital, they will have the referral form from the hospital. So if there is no form, they indicate that they don't go."

" At first we will follow up but next time if they don't go to hospital, I don't know what to do."

(Health Center Level Personnel Group)

For those in the abnormal urine sugar group who when rechecked at the hospital had normal blood sugar or have DM risk factors, the health personnel would follow up by giving them appointments to recheck urine sugar within six months or one year.

" If they have risk factors, we will give them appointments to recheck every year."

" After referral to check blood sugar at the hospital, if it is normal, we will give them an appointment every six months for surveillance. If it is abnormal we will refer to have blood sugar rechecked at the hospital."

" If urine sugar is abnormal but blood sugar is normal we will give them an appointment again next year."

(Health center level personnel Group)

This study indicated that the quality and efficiency of the DM screening system of Yasothon Province must be improved. How to determine the target groups wasn't clear in health personnel and VHVs. The public relations weren't specific to the target group. The knowledge of VHVs about DM and how to practice was little. So it might affect the screening and not find the real illness and risk group. The results of this study related to documentary analysis (Summary of Prevention and Control of DM

in the health center) which showed that only 2.3% of people who were screened urine had abnormal urine sugar. In this group, were found to have abnormal urine when health personnel referred them to confirm blood sugar 33.33%. But when compared with the total screening only 0.76% were found with abnormal blood sugar. However, all health center level personnel and most of VHVs are still continuously responsible for this work.

This study found that the DM screening process in the village could be concluded as follows:

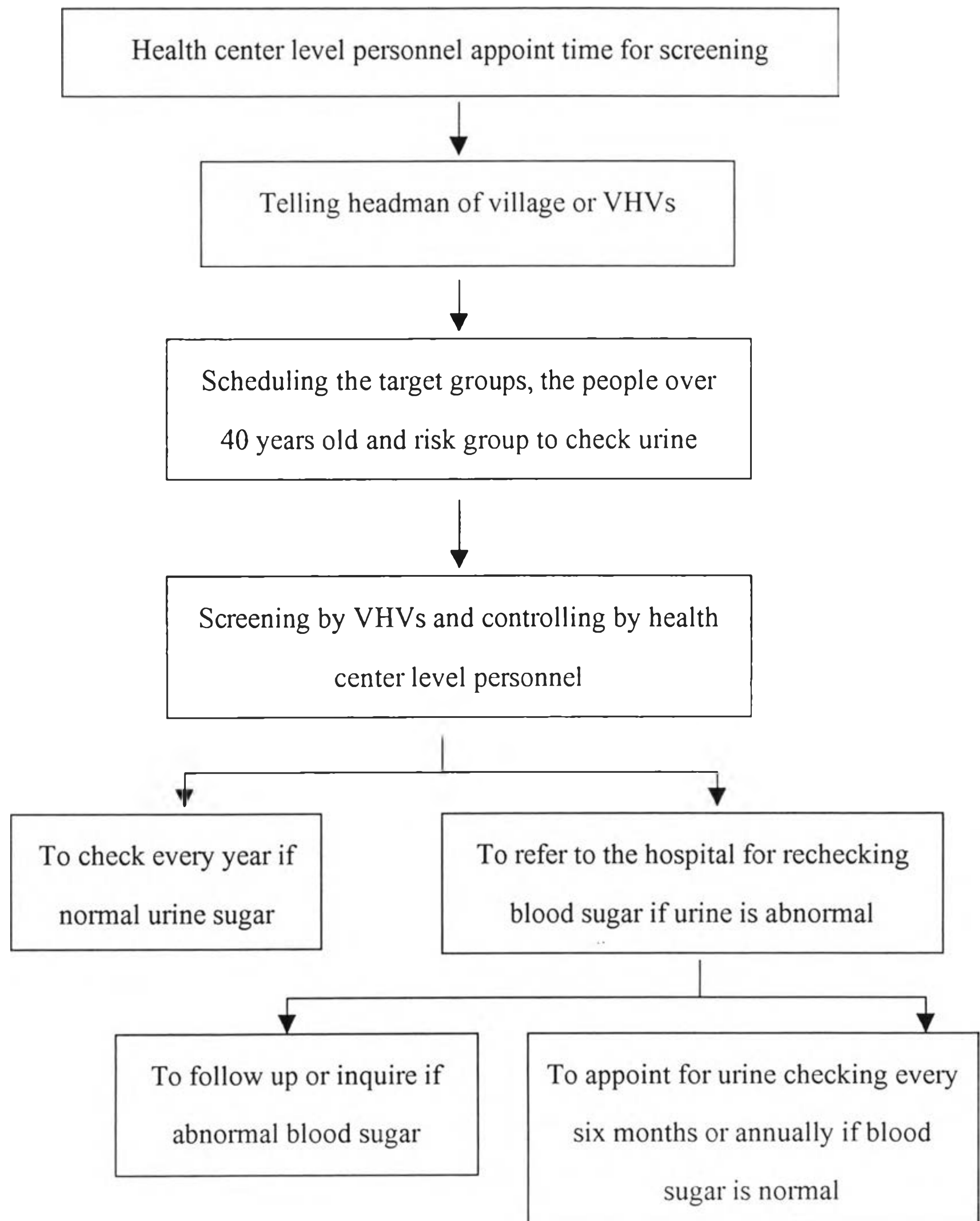

Figure 6 : DM Screening at the Villages

1.2 Treatment System

1.2.1 Treatment System in the Health Center

1) Setting up DM Clinic in the Health Center

This study found that every health center had set up a DM clinic once per week. Fifty percent of health centers in this study set up DM clinics on the same day as the hospital. And fifty percent would be set up one day before the hospital in their district, such as if the hospital set up DM clinic on Wednesday, the health center would set up on Tuesday because DM patients who had uncontrolled blood sugar or had DM complications would be referred continuously.

> *" At first we set up on the same day as the hospital, next we set up after because the DM patients who had high blood sugar were referred immediately , and didn't wait to next week."*
>
> *" The result of blood sugar in nearly period wasn't different."*

The DM patients who referred to be treated were only 29.19% of total DM patients in the health center. There were only 1-6 patients per week, so it wasn't a burden on health personnel. But on the DM clinic day they must start to work more rapidly than regular days.

The service steps in each health center were a little different in accordance with appropriation and convenience of staff. But the core health service was similar such as history investigation, body weight and blood pressure measurement, health education and taking blood from the peripheral finger to examine blood sugar by modern Glucometer because the old one could not be used with modern blood strips.

For height measurement, the staffs were not quite as concerned. There was only one health center from this study that measures height at first time of service.

> *" The patients will submit identification blue card, the staff will register, measure body weight and blood pressure, check blood sugar, give drug, and health education when the patients receive drugs; but not always if it is crowded."*
>
> *" The patients will be weighed, wait for a minute, then the staff will tell them to submit the card, measure blood pressure, check blood sugar and investigate history."*
>
> *" The patients will come together before 7 O' clock, we will weigh them and measure blood pressure and check blood sugar. After that we give them a DM brochure of exercise and diet. Sometimes we show project the video to them, put drugs into a bag and give them an appointment for next time."*
>
> *" We educate about practice health by the individual; if the patient has questions, he(or she) will always ask us."*
>
> *" After checking blood sugar, if it is high, we will investigate history about diet and educate them about health."*

Every health center level personnel could treat DM patients but the DM responsible person was key man and collected reports to submit to district health office.

> *" Everyone in health center can treat but the respondent is key man. If he (or she) was absent, he (or she) will assign the other."*

" We will help each others to treat DM, if the respondent was absent, the personnel who go to work before other will check them by using the same direction."

After the staff serviced the patients then they would give the patients appointments for next time. They recorded body weight, blood pressure, and blood sugar result and next appointment day on DM the identification card. In addition to recording those results, they would record signs and symptoms and drug treatment in DM service registration that they made up and daily service registration in the health center too. Besides, someone would record data in the chronic record card as well.

" After finishing service, we will record treatment in the DM register and report 1 ก 01."

" To register only treatment book and report 1 ก 01."

" The patients hold identification cards, we will record the results on this card and next appointment day."

" We will register in DM treatment registration book and on chronic record card."

2) Patient Referral System

Regarding referring DM patients to hospitals in accordance with criteria, it was found that the health personnel in every health center didn't refer the patients in accordance with the criteria because the patients no have complications and felt normal. DM treatment in the health center was convenient, saved time and was cheaper than going to the hospital. Furthermore, this study was found some health personnel

misunderstood the criteria for referring patients to the hospital, especially the blood sugar level criteria.

" After treated at the health center for six-months, the patients don't want to go to hospital but we try to explain to them."

" They said that the DM treatment at the health center was convenient, easy and they didn't have to wait until noon."

" We don't refer them in accordance with criteria exactly because when we refer them, they don't want to go."

" They said that they were normal, no complications and have no relatives to take them to the hospital."

" They don't go, we can't force them."

" They don't go because the health center is near. Most of them are elderly so it is difficult to travel and the transportation is not convenient, If they go they will take the car."

" If their blood sugar is higher we will refer them, but some of the staff may forget the criteria because there are many persons."

" Blood sugar is < 80 mg% and > 130 mg% and treated by six-month course completely. I'm not sure."

" We will refer if blood sugar is > 180 mg% or < 60 mg% two times continuously, treat with a six-month course completely or have complications."

" We will refer if treat six-month course completely and blood sugar is > 150 mg% . I'm not sure."

" When blood sugar is > 150 or < 70 must refer immediately."

The researcher analysed the DM treatment registration at the health center and found that the health center level personnel referred 28.8% of the patients in accordance with criteria and 71.20% of referrals were not in accordance with criteria. The most frequently used referral criteria was treated by six-month course completely (65.52%), but the criteria of blood sugar > 140 mg% two time continuously, was never used for referral The data is shown in Table 3 :

Table 3 Percentage of DM Patients Referred from the Health Centers to the Hospitals

Referral Criteria from Health Center to Hospital	**Total NO. of Referral**	**Referrals according to Criteria**		**Referrals not according to Criteria**	
		No.	**%**	**No**	**%**
1. Blood Sugar < 80 mg% one time	44	6	13.64	38	86.36
2. Blood Sugar > 160 mg% one time	39	9	23.08	30	76.92
3. Blood Sugar > 140 mg% 2 times continuously	11	0	0	11	100
4. Blood Sugar <100 mg% 2 times continuously	35	1	2.86	34	97.14
5. Having DM Complications	4	1	25	3	75
6. Treatment six-month course	58	38	65.52	20	34.48
Total	**191**	**55**	**28.80**	**136**	**71.20**

Source : Health Center DM Patient Treatment Registration

In addition to documentary analysis, it was found that more than 70 % of DM patients who were treated at the health center were not treated during appointments. The health center level personnel reasoned as follows :

> " *We make appointments for them every month but some didn't come because sometimes they don't take drugs regularly.* "
>
> " *Sometimes they don't have the relative to bring them. They were absent on the appointment date.* "
>
> " *If they have the vehicles, they will come on time. But if they don't , they don't come on the exact date.* "

The researcher asked the health center level personnel their opinion of the DM treatment system and found that everyone was satisfied with DM treatment at the health center. Only a minority thought that it was a burden but when they compared this with the patients' benefit, it was more than worthy.

> " *From the whole system, we will be satisfied because it is beneficial for the patients, they don't lose time waiting for the doctor.* "
>
> " *We feel good because we can help the patients. If they are crowded in the hospital, they will lose time and some have breakfast in the afternoon.* "
>
> " *I think the patients will be satisfied, it is convenient. After administrating the six-month course completely, we refer them to the hospital but they don't go* "
>
> " *If they go to the hospital they must wait for a long time, sometimes they comeback to tell us that they received the same drug. Why should we refer them?* "

" It must increase the burden certainly because I will come in the early morning but the patients benefit and it was more than worthwhile. So I'm OK."

Furthermore, the health center level personnel increasingly demanded to refer the patients for treatment at health centers. Because the principle of the model to allocate budget in accordance with health care reform project in Yasothon province is the budget of out patient department (OPD) will allocate to health facilities in every district (hospitals and health centers) by the numbers of the people whom register to district level fund. Then getting the by pass patients data to collect money for by pass service and spend the medical supply. If the OPD budget of the heaith facility were balanced, there would be a transfer to revenue that facility, but if it were not balanced, that facility will have revenue returned to the district level fund (Yasothon Province Health Office, 1999:7). For example, if the DM patients for whom the health center is responsible were serviced at a hospital or other health centers, that health center must transfer 80 Baht/time of the budget to the service facility. So if the health center had many DM patients but most of them went to obtain service at the hospital, that health center must send a lot of money to the others. Some staff in the health center with a deficit budget understood that the doctor in the hospital would refer a few DM patients to be treated at the health center because it was related to benefit. But someone understood that it wasn't related because the staff in the hospital would refer patients in accordance with criteria.

"When there is budget relation, I think the staff in hospital don't refer strictly."

" When we refer the patients whom we treated with the six-month course, they don't return at the exact referral time. It may be related to money. Oh! 80Baht/time."

" I think the hospital staff don't keep the patients because the hospital will be crowded all the same."

This study indicated that the quality of DM patients' treatment in the health center should improve. Especially, the referrals accord to the criteria because the impact would harm the patients' life directly. From DM patients treatment registration at the health center it was found that the blood sugar of some patients was 41 mg%, and they didn't refer immediately. The patients may have had hypoglycemia that was an important emergency crisis in DM patients that might have harmed their lives. From the DM association journal of Thailand (1996:81), it was found that when blood sugar was decreased 54 mg% or less than that amount, it might be early neuroglycopenia so the patients would be drowsy, lack concentration and experience psychomotor skill problems. If left for a long time and not treated properly, blood sugar of the patients might decrease until they reach the coma stage or they may be come convulsion or paraplegia and finally dead.

Results of this study found that the process of DM treatment at health center could be concluded as follows:

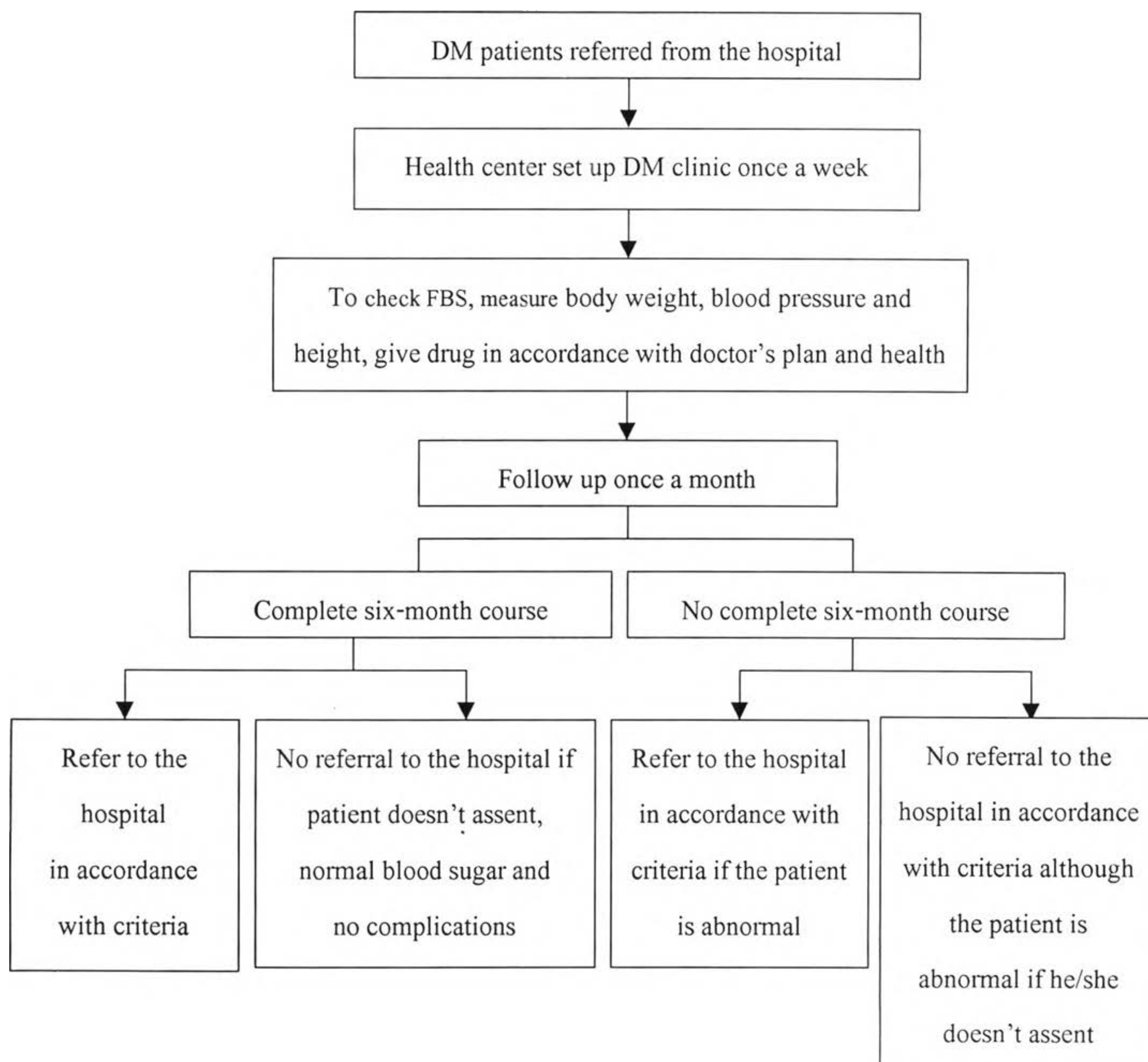

Figure 7 : DM Treatment at the Health Centers

1.2.2 DM Treatment in the Hospital

From the study of the DM the patient treatment process in the hospital the researcher would present the important issues as follow:

1) Setting up DM Clinic in Hospital

Every hospital has set up DM clinic 1-2 times in a week. There was an average of 60 – 70 patients per day. If there were not enough of patients in some hospitals, the clinic would be set up once a week. But if there were, the staff in the hospital would solve the problem by setting up the DM clinic two times a week. However, in the 60 bed hospitals where there were the most patients (100–120 persons/ day), it was found that the staff who worked in DM clinics were not enough, so they set up the clinic once a week and scheduled the patients less frequently. That is to say, if the patients were normal, the doctor would schedule appointments in three-month intervals. But if they could not control blood sugar and had complications, the doctor would schedule appointments in shorter intervals; it might be two weeks/time, one or two months/time. It was in accordance with the patient's signs and doctors' judgement.

There were many kinds of health personnel working in the DM clinic at the hospital namely doctors, nurses, card recorders, lab investigators and pharmacists. Somewhere, there was a nurse who was responsible for the Non-Communicable Disease (NCD) task in the hospital who would help in the DM clinic also. Every person knows his/her role. Besides, the front line personnel, especially card recorders and lab investigators, must work in the early morning.

" Patients will come at 5 o' clock, and we must puncture for blood by ourselves so we must go to work at 7 o' clock.

" We will hurry to work in the early morning because after puncturing for blood, the patients can have breakfast."

(Lab Investigator Group)

" I go to work in the morning every day, but on the day of DM clinic, I go at 6.30 o' clock."

" There is the night shift in the card room, but on the day of DM clinic, I will go to work in the early morning."

(Card Recorder Group)

The service in the DM clinic in each of the hospitals was not different. There was blood puncture, history investigator, measuring body weights, visiting the doctor for treatment, health education, administering drugs and scheduling appointments for next time. The patient's height would be measured the first time when they were registered for treatment. But there was one hospital from this study that never measured patients' height because there were many patients.

The service steps began when the card room personnel would search OPD card or DM card (somewhere used OPD card and somewhere used DM card) to schedule appointments for patients one day before DM clinic day. The most of hospital would make sequence card two numbers / card. When the patients submitted their identification cards to card room personnel, the staff in that room would give one sequence card for the blood puncture queue. And the other sequence card with the same number would be attached to the OPD card or DM card.

The routine lab was an FBS test. The patients must have blood drawn every time when they were serviced. The lab investigator in every hospital would draw blood from the patient's vein by using serum to check because it was safe and its result was more certain than puncture from peripheral finger by using blood strips (in the health center blood strips was used). However, the results from the two methods were not different exactly.

> *" The result is not much different, when we consult the doctor, he admitted. But in the new case, the accurate result is only from vein.*
>
> *" The result is not more than a 10 mg%. difference. I consult the doctor in old cases, he said there was no problem."*
>
> *" It is safer than check from blood strips."*
>
> *" The result is not much different but check from serum is sure better."*
>
> *(Lab Investigator Group)*

After the lab investigator draws the patients' blood, the results are recorded in OPD or DM card and blood result registration book to be evidence. The nurses who stand in front of the doctor's room call the patients to measure blood pressure and inquire about general signs. Then they arrange OPD or DM card in accordance with queue to visit the doctor. After that the patients go to the appointment table to schedule their next appointment and receive drugs at the pharmacy room and go back home. If the patients' conditions are in accordance with criteria, the doctor refer them for treatment at the health center and the nurses write referral forms in accordance with doctor's order. They give one record to the patients and tell them to send a copy to the

staff in the health center and keep the last record in the hospital. Next they record patients' referral in admit-referral patients registration book.

All the steps from the patients submitting identification card to receiving drugs averaged around 3 – 4 hours / case. There were two hospitals in this study, which could complete service by 10.30 AM. The other one, where there were many patients, would not finish until around noon or after, some time it might not be until 00.45 PM.

Furthermore, the researcher found that every hospital of this study had divided internal administrative structure. They merged sanitary and prevention divisions, the health promotion division and NCD unit (at first NCD unit was merged in nursing division) to establish a new division. Some were called **"Community Public Health Division"** and some were called **"Family Medicine Division"**. The objectives of merging were cooperation for planning and using resources in the division or unit responsible to the community. In some hospitals before the NCD unit was merged into the nursing division, the nurses who were responsible for NCD tasks would come to help in the DM clinic. So they could look after the patients from community to the hospital continuously. But after it was divided to merge into another division, they were not responsible for serving DM patients because they must work in the health promotion clinic, namely Antenatal Care (ANC) clinic, Menopause clinic and Family Planning clinic.

> *" Before they were not separated, I would look after them after screening and treatment. After I work here, we will divide job but we can coordinate with each other."*

" I can't help in DM clinic because I must practice in these clinics."

(Nurse Who is Responsible for NCD in the Hospital)

However, although some hospitals were merged with community public health divisions already, the nurses responsible for NCD tasks must work in every chronic patients clinic, namely DM clinic, Heart Disease clinic, Thyroid Disease clinic and Psychiatric clinic and in almost all NCD tasks such as narcotic therapy, elderly task, disability task and mental health task. The OPD nurses are only responsible for general patients who not being chronic patients, so the NCD nurses are over-burdened.

" I must work in screening, DM clinic, referring and almost all NCD tasks."

" I am responsible for psychiatric, thyroid, hypertension and heart disease clinic."

" The OPD nurses are responsible only for general patients and help call DM patients to visit the doctor."

(Nurse Who is Responsible for NCD in the Hospital)

In addition, the results of this study found that there was one hospital where DM service was prominent. That is to say, after the established family medicine division, the nurses who worked there would look after the DM patients who lived in the area for which the hospital is responsible. For the hospital DM clinic would look after the DM patients who lived in health center's area of responsibility that did not completely meet the criteria for referral to the health center.

The DM patients who were served in the DM clinic of the family medicine division would be treated like the patients in the DM clinic of the hospital. But it would be convenient, quick and special service because there were no more than 20 patients / day. So they would be satisfied.

> *" They are satisfied because they don't wait for a long time. But when their blood sugar in high, or they have complications or they must be checked for other diseases, they know that they must visit the doctor."*
>
> *" We have the time for exercise, body weight teaching and health education. They can talk to each other."*
>
> *" There is boiled rice to serve them and we tell them co-payment is 10 Baht/ time/case."*
>
> *(Nurse Who is Responsible for NCD in the Hospital)*

However, the researcher found that the model of health education in every health center was not clear because there were many DM patients in the clinic. Mostly, education would be suggestion only. Besides, this study found that the staff in the pharmacy room had different methods for giving drugs to the patients. Someone would give just enough drugs to last to appointment day but someone else would arrange drugs to be packaged and give more than enough to last until appointment day.

> *" We will suggest about diet control, taking drugs and exercise mostly."*
>
> *" Group health education is never done because there is no time."*
>
> *" The patients will be in a hurry. They don't wait to listen to suggestions or the knowledge that we will give them because they come early morning. They hope to be checked and go back home quickly."*

" Sometimes the doctor orders patients to take drug one tablet but they take only ½ tablet."

" The patients will adjust drug doses by themselves. If there is the after meal drug, sometimes they will not take it. They told that they were tired if they took it."

" The staff in the pharmacy room will count enough drug tablets to last until appointment day. If there are remaining drugs, the patients will carry these with them. The staff will give in accordance with the numbers that doctor's order and offset from the remaining drug."

" The staffs in the pharmacy room will put drugs in the package; as the doctor schedules appointment for three months, they should to give 91 tablets, but they give 100 tablets."

(Nurses Who Work in the DM Clinic Group)

The results of this study indicate that the patients who were served at the hospital had improper self-care behaviors. Especially drug taking was not regular so blood sugar control was affected. If the patients could not control blood sugar, they would be at risk of having DM complications in the long term such as eye, kidney and neuro system complications etc (Pongamorn Boonnak, 1999: 20-24).

2) DM Treatment In accordance with Doctor's Plan

The DM patients served at the hospital came from two ways. One was from the health center referral when urine was abnormal. And the other one would come to ask for blood check. At first, the doctor would investigate the patients' history to determine whether they had abnormal symptoms or not. If they had such symptoms as

often urinating or being thirsty and body weight was decreasing etc., the doctor would order a blood sample taken for blood sugar checking. But for the patients who had no symptoms, he would order their urine sugar to be checked before. If it was abnormal urine, he would order blood checked again. If blood sugar was normal, he would suggest diet control, exercise, observation of abnormal symptoms, and make a follow-up appointment one-month later. For the patients referred from the health centers, some doctors would order to blood test instantly because they assumed that the patient was screened already. If blood sugar was abnormal, the doctor would treat in accordance with his plan. But if it were normal, he would suggest about proper practice and refer them to health center for following up. They were assumed to be a risk group that must be kept under surveillance.

The beginning of treatment, from in-depth interview the doctors found that it would not different. That is to say, if blood sugar were not high, the doctor would suggest diet control and make an appointment to follow up again every month. But if blood sugar was high (more than 180 mg% or 200 mg%) or had complications, the doctor would start drug treatment.

> *" At first if FBS was not more than 180 and there were no symptoms, I would tell them to control diet and make an appointment to follow up again next month."*
>
> *" I will check blood sugar, if it is about equal 120 or 130, I will make an appointment to follow up every month. If it was still high (more than 140) I will suggest diet control and exercise."*
>
> *" If their urine sugar is good, I will make periodic appointments with them,*

may be as long a period as two or three months."

" For the new case (if FBS is not high, around 140 mg% but not more than 200 mg%), I will suggest diet control at fist and check complications. If the patients are normal, I will suggest diet control at first and make appointments with them every month "

" I will ask them if they have complications or not. If they have, I will start drug treatment."

(Doctors in the Community Hospital Group)

The beginning of drug treatment, every doctor would start with Glibenclamide in a dose of ½ - 1 tablet B.i.d. or only in the morning. If the patients can not control blood sugar, the doctor would add to the dose until it 2 tablets reached B.i.d., and if blood sugar is still high, he would be add the drug named **"Metformin"**. But if their blood sugar fit the good criteria, the doctor would plan to reduce the drug dose first, and then if it was still low, he would eliminate Metformin. So the dose would remain Glibenclamide only.

" I will treat with Glibenclamide ½ - 1 tablet first. If it is not good, I will adding up to the maximum dose (2 tablets B.i.d.). And if it is still high, I will add Metformin."

" I will treat with Glibenclamide 2 x 2 fully. If it is not less than 140, next I will add metformim.

" I will start to reduce if blood sugar is less than 80 and ask patients about symptoms of dizziness or not; if they have none, I will start to reduce dose."

" I will reduce dose first. For example, if they take one tablet, it will be reduce to $\frac{1}{2}$ tablet or if they take it three times / day, it will be reduce to two times."

(Doctors in the Community Hospital Group)

From this study, it was found that the doctors could not check DM complications in every case because there are many patients. They would spend around $\frac{1}{2}$ - 1 minute / case. The doctors would check both the new and old cases; the nurses didn't help them. If the patients had complications, especially dim eyes, the doctors would refer them to the ophthalmologist in the general hospital to follow up.

" Don't check complication in every case; expect the patients will complain of dim eyes, edema or taking drugs for many years, then I will refer them to Yasothon Hospital."

" Only have one minute or around 30 seconds for each patient."

" If it is nothing, it takes only $\frac{1}{2}$ minute to finish; but if they are not normal, it may take a long time depending on each case."

" I will check every case, both the new and old, and don't order nurses to help."

" I will check every case, although the new or old; except the patients who are in the hospital's area of responsibility who I will refer to the family medicine clinic."

(Doctors in the Community Hospital Group)

From documentary analysis by ckecking OPD or DM cards, it was found that the doctors' actual treatment was consistent with doctors' interview and the suggestion to control diet, start drug treatment and add or reduce drugs.

3) Referring Patients to the Health Center

For the DM patients who were treated at the hospital in the first phase, Yasothon Provincial Health Office was determined to regulate referral criteria to decrease patient crowding at the hospital, and ensure the patients convenience and reduced expenses. From in-depth interviews, the doctors in community hospitals found that they tried to refer as many of the patients who were relevant to the criteria to be treated at health centers as they could. But the health centers in some districts did not have blood strips that could be used because the old Glucometers could not be used with modern blood strips. So the health center level personnel had to refer the patients to be treated at the hospital. Nowadays, they could solve this problem by buying modern Glucometers from the revenue budget of these health centers.

" I will order to refer them by myself."

" Mostly, I will refer in accordance with criteria but this period I can't refer because some health centers do not have blood strips."

" Referring in accordance with criteria or sometimes more than criteria, gliben 2x2 I will be referred also."

(Doctors in the Community Hospital Group)

From documentary analysis by checking OPD or DM cards, it was found that there were many patients who were relevant to the criteria but not being referred

for treatment at the health centers. The researcher could not analyse whether the patients had assented or not because the documents didn't note the reason. But in-depth interviews of the doctors found that one cause for not referring is because the patients didn't assent. Besides, there were many DM patients, so the nurses who worked in the DM clinic could not write referral forms in accordance with the doctor's order on time and if they didn't work that day, the others would not refer the patients to the health centers.

> *" Before I refer anyone, I will ask him or her to receive drugs at the health center near his or her home or not because someone doesn't want really."*
>
> *" I will write referral form but when I ask them, they will not go."*
>
> *" They told me that sometimes they went to the health center but sometimes saw no one."*
>
> *(Doctors in the Community Hospital Group)*

> *" Sometimes there are many patients, I can't write the referral form on time, so they were not referred."*
>
> *" If I work there I try to write the referral form but if I was absent, it would be lost."*
>
> *(Nurses Who Work in the DM Clinic Group)*

From the results of this study, regarding the DM treatment process at the hospital, it was found that the administrative system of some hospitals must be developed, especially in the hospitals where there was no job assignment related to the responsibility, because it affects to the quality of patients' care, namely treatment, health education and patient referral.

The results of this study found that the process of DM treatment at the hospital could be concluded as follows:

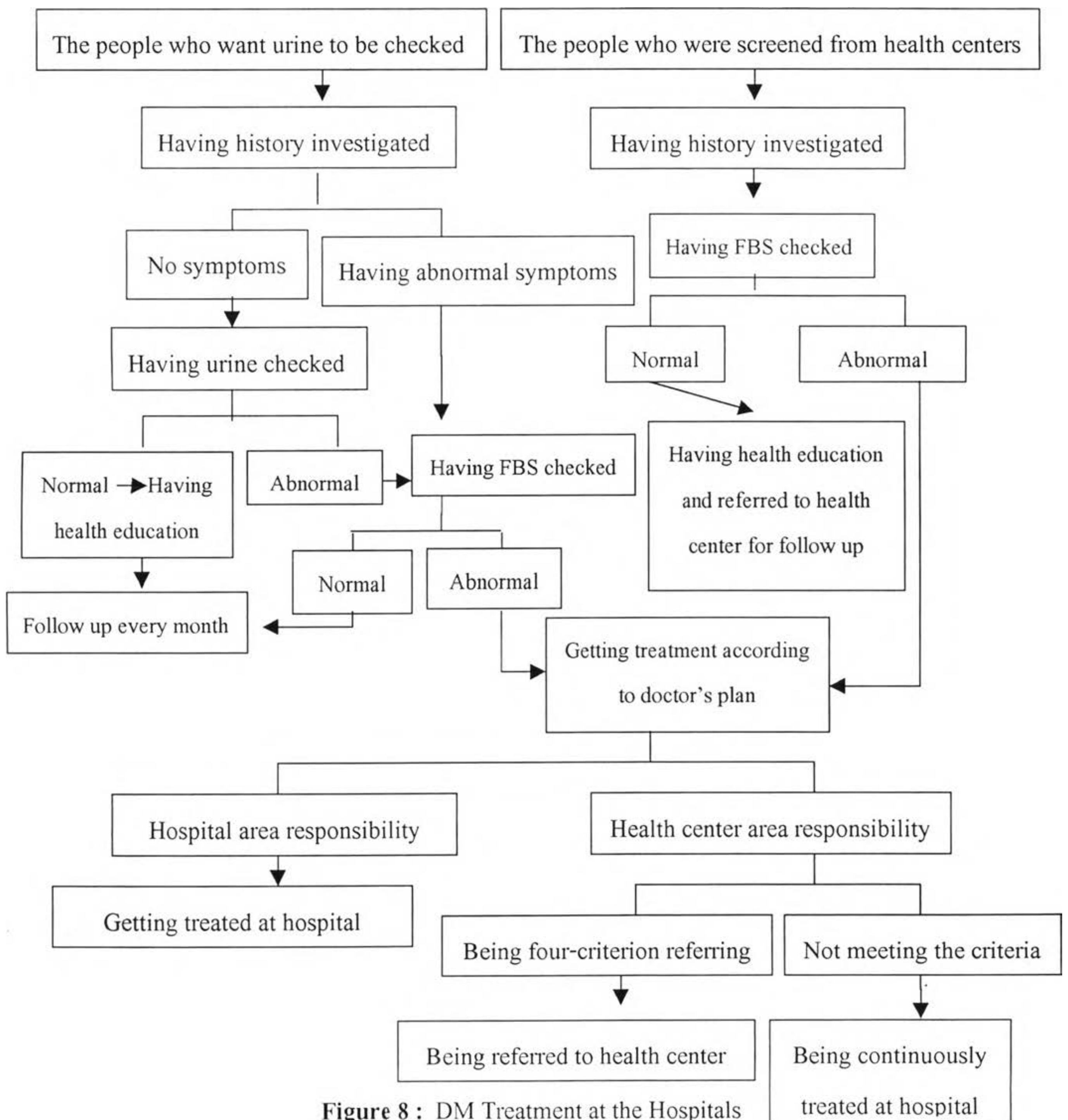

Figure 8 : DM Treatment at the Hospitals

2. Support system

2.1 Drug Supply and Medical Equipment Service

2.1.1 Medical Support

Medical support of the health center is the responsibility of the pharmacy division in each hospital. It is the health center's drug supply. From the results of this study, it was found that the drug to treat DM is Glibenclamide; most health centers would requisition it with other drugs in accordance with drug request form. Next, the hospital would offset budget reduction of health centers from the district level fund.

" The health center will requisition DM drug with the other drugs and medical equipment together by the lot that we determine. "

" Gliben will be requisitioned the same as normal drug. "

" The health center will requisition DM treatment drug together with the others. "

(Pharmacists in the Community Hospital Group)

2.1.2 Medical Equipment Support

Part of the budget allocation in Yasothon, is allocated to be health promotion budget (10%). It is offset from each district's OPD budget for health promotion and prevention activities. It could be spent for disease investigation, health promotion and prevention (Yasothon Provincial Health Office, 2000: 7). The medical equipment is provided for DM patient screening, namely urine strips and blood strips. The districts could spend this part of the budget for management.

From this study, it was found that the principles of supporting urine and blood strips in each district were not different. The direction of support was shown as follows:

1. The equipment for screening was a urine strip. The health center level personnel would survey the screening target groups and set the plan for the DM responsible person in district health office. Then he/she would gather the health centers' plans and propose the project for receiving budget support to buy urine strips from health promotion budget and --

2. The equipment for blood checking was a blood strip. The health center level staff would calculate blood strips using the numbers of DM patients who were treated at health centers and then tell the use plan to the DM responsible person in the district health office. Then he/she would practice like the urine strips as the same project.

After the project has been permitted, the DM responsible person in the district health office would co-ordinate with the pharmacist in the hospital. Then the pharmacist would order that equipment. After that, the DM responsible person in the district health office would requisition equipment to keep in health centers and make the admit-offset registration. The health center level personnel would offset from the district health office and sign their names as given evidence.

> *" I will write the project for funding support from health promotion budget. Then I coordinate with a pharmacist to order and keep in stock at the district health office."*
>
> *" There are screening targets to calculate for requesting the equipment."*

" Blood strips will be requisitioned with urine strips together and we will keep them in the district health office."

(DM Responsible Persons in the District Health Office Group)

" We will coordinate with the district health office before ordering to buy."

" The responsible person in the district health office will requisition from me directly."

" The district health office will tell the target for buying. Then we will order and he/she will requisition and keep in stock."

(Pharmacists in the Community Hospital Group)

In the district where there are many patients from health centers being referred hospitals to be treated, the budget would not balance. The hospital could not support urine strips and blood strips for the health center, so they solved the problem by using health centers' revenue to buy them.

After the health center level personnel received urine strips already, the VHVs would requisition them from the health centers every time for screening. Sometimes the health personnel would bring them to VHVs or the VHV representative would requisition them at the health center. The number of requisitions was calculated from the people who were screened last year. If it was not enough, they would divide urine strips into two parts but it was seldom taken part. For the other equipment, namely the instruments to measure body weight and blood pressure, the CPHCC already has this. Besides, for height measurement, VHVs make the scale in the screening place such as the wall and the pole etc.

" We tell the health personnel, then they will arrange it for us. "

" We know the estimated people who were checked last year. It is the same as last year, not much different, I suppose. "

" Once there were many checked people, and not enough urine strips, so we divided them into two parts. No problem "

" There is the blood pressure measurement instrument in CPHCC. When health personnel come here, they will bring the others with them. "

" There is the instrument to measure height in CPHCC. It is over there. " (There is a scale on the pole at CPHCC.)

(VHVs Group)

2.2 The Development of Health Personnel and VHVs' Potential

2.1.1 Health Personnel

During the first period of this project, the health personnel in Yasothon Provincial Health Office and Yasothon hospital trained the persons responsible for DM in every level, namely general hospital, community hospital, district health office and health center. They invited a medical specialist from Yasothon hospital to be an instructor. She gave the knowledge about DM, DM caring, DM complications and patient referring. A year later. Yasothon Provincial Health Office assigned every district to develop health personnel by appropriation. The staffs in the hospitals were the coaches.

This study found that the staff in every district developed persons responsible for DM continuously, except in the year 2000, which they have not done yet. Some districts would have academic meetings, and some districts would tell the

health center level personnel to make a case study of DM and discuss it at their hospitals. The doctors and the nurses were instructors. The most of the training contents are the knowledge of DM, DM caring and DM complications. About knowledge of DM drugs, techniques of blood sugar checking by blood strip and urine sugar checking by urine strip, there is no clear model of training, it is only inserted in some contents. The health center level personnel would ask the pharmacist when they suspect about a drug and ask the lab investigator when they suspect about the checking technique. But the lab investigator in some hospitals used to train staff how to use the Glucometer, especially when the old instrument was changed into the new modern one.

" There is training every year and BMC (Basic Medical Care) is also taught."

" Last year the training was held, but this year hasn't yet been done."

(Doctors in the Community Hospital Group)

" The hospital arranges DM academic training every year."

" There is training about DM every year but I'm not sure whether the head of health center will understand the whole system or not."

" Training is held every year. This year we are planning to arrange it as well, but the plan has not been done yet. Firstly, we must consult with hospital staff."

(DM Responsible Persons in the District Health Office Group)

" Mostly, the doctor will teach about DM causes, symptoms, caring, checking and referring every year."

" If there are new health personnel moving to work here or having work rotating, we will encourage them to revise training every year."

" There is a disease conference table discussion every month. Last year we had a conference about DM."

(Health Center Level Personnel Group)

" There has been no teaching since I stayed here. But when they have a problem, they would consult about how to check it."

" When having academic arrangement, the health center level personnel will enter and I will teach how to use instruments."

" Teaching has ever been held once when getting a modern instrument. We will demonstrate using method to health center level personnel."

(Lab Investigator Group)

2.2.2 VHVs

There are two characteristics to prepare the VHVs. The first way is some health centers make appointments with the VHVs to join the meetings every month. Before the VHVs screen people, the health personnel train them in urine-checking methodology to revise their knowledge. The second one is the health personnel would perform on screening day instantly: they demonstrate urine checking by urine strip and train blood pressure measurement for the screening people. In any VHVs group, if there is a person skilled in reading the validated results, he/she would train the others and then he/she would be the key person to check urine or blood pressure measurement.

" We have the VHVs trained by teaching them about urine checking and blood pressure measurement. Oh-yes. The health personnel will demonstrate first. "

" Telling the people to bring their urine to be checked, and the health personnel will demonstrate once, on the day they bring. "

" If any VHVs forget, they will ask the others. One in VHVs group can remember. "

(VHVs Group)

" We will suggest the methodology of checking again on the screening day to revise the knowledge. "

" Mostly, we will have an appointment with the VHVs coming to the meeting before starting to teach the methodology of checking and DM knowledge. "

" We tell the VHVs to demonstrate before screening and check them whether it is right or not. "

" When the VHVs come to monthly meetings, we will teach them. "

" We will teach them every year about urine checking and blood pressure measurement. When the monthly meeting is held, I will also teach. "

(Health Center Level Personnel Group)

2.3 The Development of an Information System

At the beginning of the performance, it was found that the one of the important problems was DM patients' name being reiterated because they would be given from many health services. So the treatment was not continuous, and the DM situation was really unknown. Yasothon Provincial Health Office solved this problem

by making DM patient identification cards and supplying these to every health facility (hospitals and health centers). The DM patients would bring them every time they are given service. After that the health personnel would record the results of body weight, blood pressure, blood sugar, and drug taking and have the next appointment day written in the DM patient identification cards. Besides, they made DM cards replace OPD cards because it is convenient when recording the service data but only hospitals are supported.

Furthermore, the staff in the Yasothon Provincial Health Office developed a DM central registry program, which is used in every hospital for checking data reiteration. And they train each of the health personnel responsible for record data in this program.

From the study, it was found that the DM patient identification card and DM cards were used continuously and this was convenient for the patients. The DM central registry program, however, made many problems after using it. It could not calculate and check data reiteration or duplication. Now the health personnel at the province level are contacting the programmer to improve it.

2.4 Supervision

Supervision is an administrative process that is related to controlling work to provide needed directions and meet objectives (Julaluck Neerattanaphun, 1997: 47). So Yasothon Province determined DM prevention and control is the strict policy that every health service must perform continuously to meet objectives.

This study found that the health personnel in every level from province, district and tambon are interested in and attend supervision meeting regularly.

2.4.1 Provincial Supervision of Districts

From an analysis of supervisory records and documents in the Yasothon Provincial Health Office, it was found that the staff supervises the performance of each district at least once every year. It was specific supervision that explained the performance direction to health personnel in district health offices and community hospitals. Besides, they randomly supervised the performance of 1-2 health centers per district. After they have supervised every district completely, they summarize the results of supervision and get feed back to the health district agency. Besides, they arrange meetings for summarizing the results of performance every year.

2.4.2 District Supervision of Tambons

From in-depth interviews of health personnel in district health offices and an analysis of supervisory records and documents in the health centers, it was found that the district level DM responsible persons supervise DM responsible persons in health centers at least once or twice every year. The model of supervision is different in each district. Some districts use integrated supervision and join the other jobs by taking part with the district level health coordinated committee (DLHCC) team. There are health personnel in the district health office, hospital and health center serving as representatives. They would co-operate and supervise their own health centers. Some districts also use integrated supervision, but they only join health personnel in the district health office team. However, some use temporary-team supervision, and the

NCD responsible person would supervise only her/ his responsible jobs. After they have already supervised, they would summarize the results in the visit book in each of health center.

" Go supervising twice a year with DLHCC and there is an OPD nurse going with the team."

" Normally I intend to supervise three models namely supervising with DLHCC team, district health office team and temporary supervision team but the personnel in hospital are busy and I have no time. So I only supervise with district health office team.

" Last year I went to supervise temporarily only once and 13 health centers were completely done."

(DM Responsible Persons in District health Office Group)

2.4.3 Tambom Supervision of Village

Normally, the health center level personnel would supervise VHVs DM performance in the villages for which they are responsible. This study found that the model of health center supervision was not official. It was only job monitoring, inquiring about the problems of performance, giving VHVs the knowledge and answering the suspicions by integrating with the other jobs such as primary health care job etc.

" I will check their register; they have already done or not and go to some villages."

" I don't supervise only DM job but integrate with the other jobs."

" Having a supervise about the knowledge, checking with urine strip and integrating with the other jobs. "

(Health Center Level Personnel Group)

3. Problems and Obstacles

3.1 Screening

3.1.1 People didn't believe in the VHVs

From the VHVs' focus group discussion, most of them thought that there weren't any problems for DM screening in aspects of checking skill and medical equipment. But the people didn't believe them about their knowledge to perform. It was related from in-depth interviews and some health center level personnel agree that the people didn't believe the VHVs. Besides, this study found the VHVs in some villages were the elderly and they couldn't work swiftly. However, this problem began decreasing when the people found that the VHVs could screen DM more effectively. Now there are only a few not believing them.

" They don't quite believe us. "

" They told us that the VHVs don't know much but a few of them think so. "

" Now someone will ask us to check him. "

" Watching us find DM, they feel better. "

(VHVs Group)

" The technique of some new VHVs is not correct, so we must have them review it regularly. "

" The basic knowledge of VHVs was not certain, lacking confidence and then we try to improve it."

" When we teach them, they will understand. But when they exactly act, they failed owing to having the people look at them, so they will be excited. The people who were checked begin to look at them."

" Some VHVs are young, so the people don't believe them."

" Most of the VHVs are the elderly, so they can't work swiftly."

(Health Center Level Personnel Group)

3.1.2 Lack of morale and commitment in VHVs because there is no reward

From in-depth interviews some health center level personnel found that some VHVs didn't quite co-operate for screening because they were not given any reward like the other projects. Some were not this way and they did it as their responsibility. Some health center level personnel plan to screen by asking for the budget from the primary health care budget that every village receives, being the screening reward of VHVs.

" The VHVs didn't quite come because there was no reward and benefit. If there is a benefit like other projects, they will come a lot."

" We write the screening plan to ask for money to support VHVs."

" Although they complain about not getting some money, they will always help me."

(Health Center Level Personnel Group)

3.1.3 The public relation in the village was not clear

The one of screening problems of VHVs was public relations via a broadcast tower. Mostly, it would be the role of the headman or spokesman of the village. So the people were not quite interested because it was not about any matter but they would announce overall news.

> *" If the headman of village speaks, they will announce other matters first."*
>
> *" If the headman of village speaks, there is much news. So the people are not interested in listening."*
>
> *" The broadcast tower is in the headman's house, the others can't use it."*
>
> *(VHVs Group)*

3.1.4 The screened people were not in target group

An important screening problem of health center level personnel everywhere found that most of the people screened were the old ones who were interested in their health; they would be screened every year, although the results of urine were normal. But some of the people, even if they were 40 years old, never came to be checked. So the health personnel could not screen and get the real target group. And another problem was that the target group didn't stay at home; they went to work in Bangkok or were employed to grow plants in other provinces. However, in the screening day the VHVs and health personnel would check everyone who brought their urine whether they were in the group or not.

> *" The people have their many routines, not being interested in health. The person who often comes is the old one."*

" Most of the persons who were checked are the old ones. "

" Sometimes the person who is less than 40 years old wants to be checked. Sometimes last year the person was normal and this year wants to be checked again. "

" During the rice harvest period the people don't stay at home, they are concerned about earning their livings more than the other matters. "

" Sometimes they go to work in Bangkok or are employed in Rachburee, so we could not follow up. "

(Health Center Level Personnel Group)

3.1.5 Urine strips were not enough

This study found that although some health center level personnel would calculate the target groups for screening and ask for urine strips, these was not enough because the people who are screened were not target groups. So they solve this problem by bringing urine strips form ANC clinic instead or sometimes they would divide urine strips into two parts.

" There aren't always enough urine strips, we must take from the ANC clinic. "

" The reason why the urine strips are not quite enough is because the people who are not the target groups come to be checked. "

" If there are not enough, I would have an applied way by dividing into two parts to give to VHVs. "

(Health Center Level Personnel Group)

3.2 Health Center Treatment System

3.2.1 Modern blood strips could not be used with the old Glucometer

This study found that last year every health center had problems with blood strips because there were no more. The supply company didn't produce the old type of blood strips, and the staffs must order modern blood strips but these could not be used with the old Glucometer. So they must buy both modern Glucometers and blood strips. Some districts hurried to co-ordinate with the pharmacy division of hospital and they had no problems. But in some districts, even though the responsible persons hurried to co-ordinate, it took a long time to receive that medical equipment, so it made an impact on the treatment system. All of the DM patients being referred from the health center returned to the hospital because there were no Glucometers and blood strips. So the patients would crowd the hospital like the past. Besides, the health centers must pay bills for the out-of-territory service cases. Now, every district has solved this problem already, and they are referring the DM patients to be treated at health centers.

" Before this time, we referred them to return to the hospital in every case because there weren't any blood strips and Glucometer."

" The old blood strips were no more. I had to refer the patients back to hospital. The hospital just had referred them to the health center."

" We had to pay the bill, 80 Baht each, so the health center budget imbalance occurs."

(Health Center Level Personnel Group)

" We hurry to coordinate with the pharmacist and tell her to buy so we are given the stuff in time."

" It affected us causing slow work because it took about 3-4 months to do normally."

" We submitted the project about supporting blood strips, but in vain. The staff in the health center must refer patients back to the hospital and the problem occurs-- the DM clinic is crowded with the patients."

(DM Responsible Persons in District health Office Group)

3.2.2 Technique of blood puncture

Due to the problem of the company not producing the original blood strips, the health center must buy the modern Glucometer - it is called **"The Advantage"**. At first the health center level personnel didn't understand how to use it. Thus the results were often mistakes and blood strips were wasted. The lab investigator teaching the technique for using the modern Glucometer solved this problem or the staffs in some districts read the manual. Nowadays, they can check correctly and have self-confidence.

" At first when we received the modern Glucometer, we could not check. Thus it would be often in error. Now we can check, it is no problem."

" The technique of checking-- at first we used a little blood, the results were often in error. We had to puncture two times; blood strips were wasted and the patients hurt."

" The district invites a lab investigator to train people in the technique."

" Studying from the manual may be right or wrong. Now we can check correctly."

(Health Center Level Personnel Group)

3.2.3 The health center level personnel can't to perform in accordance with referral criteria

From in-depth interviews of the health center level personnel and documentary analysis, it was found that every staff could not perform in accordance with hospital referral criteria. Because the patients were satisfied to be treated at the health center and didn't assent to be treated at the hospital (as described above), some of them admitted that it was very difficult to perform in accordance with criteria because the blood sugar level interval was too narrow for the health center level personnel to look after.

> *" I think it must be more flexible, we could not refer in accordance with criteria 100%."*
>
> *" The criteria of low blood sugar, I am OK. If the criteria of high blood sugar 140 showed twice continuously, it should be adjusted to three times."*
>
> *(Health Center Level Personnel Group)*

3.3 Hospital Treatment System

3.3.1 DM patients crowded in the hospital

Although Yasothon province developed the performance model by referring DM patients who meet the criterion to be treated at nearby health centers, not far from their homes, it could solve some other problems. Documentary analysis of summarization of DM performance in the districts studied found that in the 1999, the hospital would refer DM patients to be treated at studied health centers only 29.19% of

the time. And when the in-depth researcher interviewed the doctors and nurses who are responsible for treating patients, the researcher found that the number of DM patients increased and were crowded. They felt tired, bored and are burdened by having to look after all these patients. So it indicate that self-care behaviors of DM patients to control their blood sugar might not be good enough or the health education system to promote the self-care skill of health facilities was not efficient.

" There were many patients. If one of the doctors was absent. I surely would be busy."

" If treat these group for some phase, you will feel really bored."

" If there are many patients, I normally will be bored. We'd like health centers to help us look after them. They are likely to do this."

(Doctors in the Community Hospital Group)

" On DM clinic day, it is crowded."

" Feeling tired, we must work quickly because most patients are in hurry."

" There aren't many problems in the DM clinic except many patients."

" The patients increase everyday and some weeks there are 4-5new DM cases."

(Nurses Who Work in DM Clinic Group)

3.3.2 DM treatment was not continuous

This study found that new doctors are rotated to work in community hospitals in Yasothon every four months. Thus patient caring is not continuous,

especially for chronic diseases because doctors looked after the patients for only a short period.

" Although the moving often can make us learn many places but I think it won't benefit the patients because I can 't look after them continuously. "

" Some of the new doctors were not sure that the health center can treat the patients . "

" I treat the patients continuously, so I will know what to do about priorities"

(Doctors in the Community Hospital Group)

3.3.3 There were no clear directions to refer the patients who had complications to be treated at the general hospital

From in-depth interviews, the doctors in the community hospitals found that they lacked confidence to check complications, especially about the eyes. Because there were no clear referral directions and they admitted not being skilled at performing this aspect, which must use special instruments and take a long time for checking. Besides, this study found the doctors in the community hospital referred the patients to the general hospital, and then the patients were referred back to the community hospital but the specialist didn't tell the details of how to keep on treating them.

" Checking eyes, I' m not really sure but the others may be."

" Sometimes we need suggestions from the specialist but they diagnosis same disease, giving same drug. Nothing else."

" The personnel who write referral forms are not doctors. They are staff in the special clinic; there is no detail of how to continue doing or what was done."

(Doctors in the Community Hospital Group)

3.3.4 Drug was not enough to treat

In accordance with in-depth interviews, the doctors in a community hospital in Yasothon found that there was a severe problem about drug treatment due to not having enough drug supply all time including DM drugs. He solved this problem by borrowing drugs from other hospitals or spending his own money to buy drugs. Thus he was irritated and bored with the system in this hospital.

" In this period the lack of drug was severe; I was very irritated."

" If the other drugs were unavailable and the DM drugs would also be unavailable."

" The pharmacy personnel don't do anything; they have appointments with the patients to take drugs next week. It is a long way from the hospital to their homes. It is 30 Kilometers, I suppose."

" I need to borrow drugs from the other hospital."

" Sometimes I spend my own money to buy but don't expect to get it back. The patients should be sympathized."

(Doctor in the Community Hospital)

3.4 The Other Problems

1. There are only 2-3 personnel staffing the health center, not enough to do their burdens, so each of the staff must work many duties.

2. The health education support was not enough; brochures, rotatable pictures, DM patient's handbooks and video etc. are need.

3. In some districts, the administrators and responsible personnel were usually rotated, thus work was not continuous.

4. The staffs could not supervise in accordance with their plans because their spare time was not at the same period.

5. Urine strips of each company were not same standard and the technical checking of staffs or VHVs was different, thus the interpretation of urine sugar results may be in error.

4. Suggestions

4.1 Screening

4.1.1 Concerning public relations, most of the VHVs agreed that if the health personnel made announcements by themselves it would be interesting and the target groups would understand and there would be an increase in people screened.

> " *If the health personnel speak through a broadcast tower, it will be more interesting.* "
>
> " *The health personnel will tell complete details, but the village headman will speak in accordance with the letter that the health personnel send to him, sometimes he doesn't understand.* "

" In most of the public relations; if the health personnel speak, the people will listen."

" We want to offer the province level a campaign day twice a year. The month when it is held should be fixed as a norm. Then the people will know."

(VHVs Group)

4.1.2 If the urine sugar is abnormal, the blood sugar should to be checked in the community before referring the patients to confirm the blood result at the hospital because they would not waste time and their expenses by being checked at hospital.

" Glucometer should be brought into the community to be used in checking. If urine sugar is abnormal, it will confirm before going to hospital. If it is normal, they will waste time (to work) and money. Moreover, the mental health is not so good."

" To confirm the puncturing blood should be first done at health centers or villages. The people can see the personnel work: the follow up results make them rely on the health centers and then they will go to or attend them if they have trouble concerning any illness- even taking part in activities.

(DM Responsible Persons in the District health Office Group)

4.1.3 We should buy blood strips from a company that has the same standard because it would be more confident to check urine by asking the lab investigator.

" Urine strips produced by companies are not all the same; I work in a laboratory room, so I can confirm that the standard is not equal. The experience staffs know whether it is good or not."

(Lab Investigator in Community Hospital)

4.2 Treatment

4.2.1 We should review the criteria to refer patients back to the community hospital and from the community hospital to the general hospital. It would be convenient for the staffs and suitable for the situation, especially the criteria to refer patients who had eye complications.

" These criteria were used four or five years ago. I think we should revise because new knowledge always occurs."

" We should have clear criteria showing the complication levels to have referrals."

" The referral criteria for eye checking, should include talks between the doctors in the community hospitals and a general hospital."

(Doctors in the Community Hospital Group)

4.3 Material Supporting

4.3.1 We should support the health education media increasingly with brochures, manual of patient caring or project the video as the patients wait to be given service.

4.3.2 The posters with directions of DM caring in health center are now deteriorated. Thus the province level should do new ones by adjusting the paper as A4 paper and having them framed- easily seen.

4.3.3 The provincial level should improve the morale of the responsible personnel because when they went to screen, there was no supporting budget.

Limitation

This study was focused on process of model for DM prevention and control but the samples were the health personnel and VHVs. Some of them have just lately moved to work in Yasothon Province, therefore may misunderstand about the model. Consequently, process evaluation may have incomplete information. Besides, techniques to collect data namely, focus group discussion and in depth interview might be not appropriate for process evaluation because the researcher didn't seen the real implementation.