

CHAPTER 2

RESEARCH DESCRIPTION

2.1 Objectives

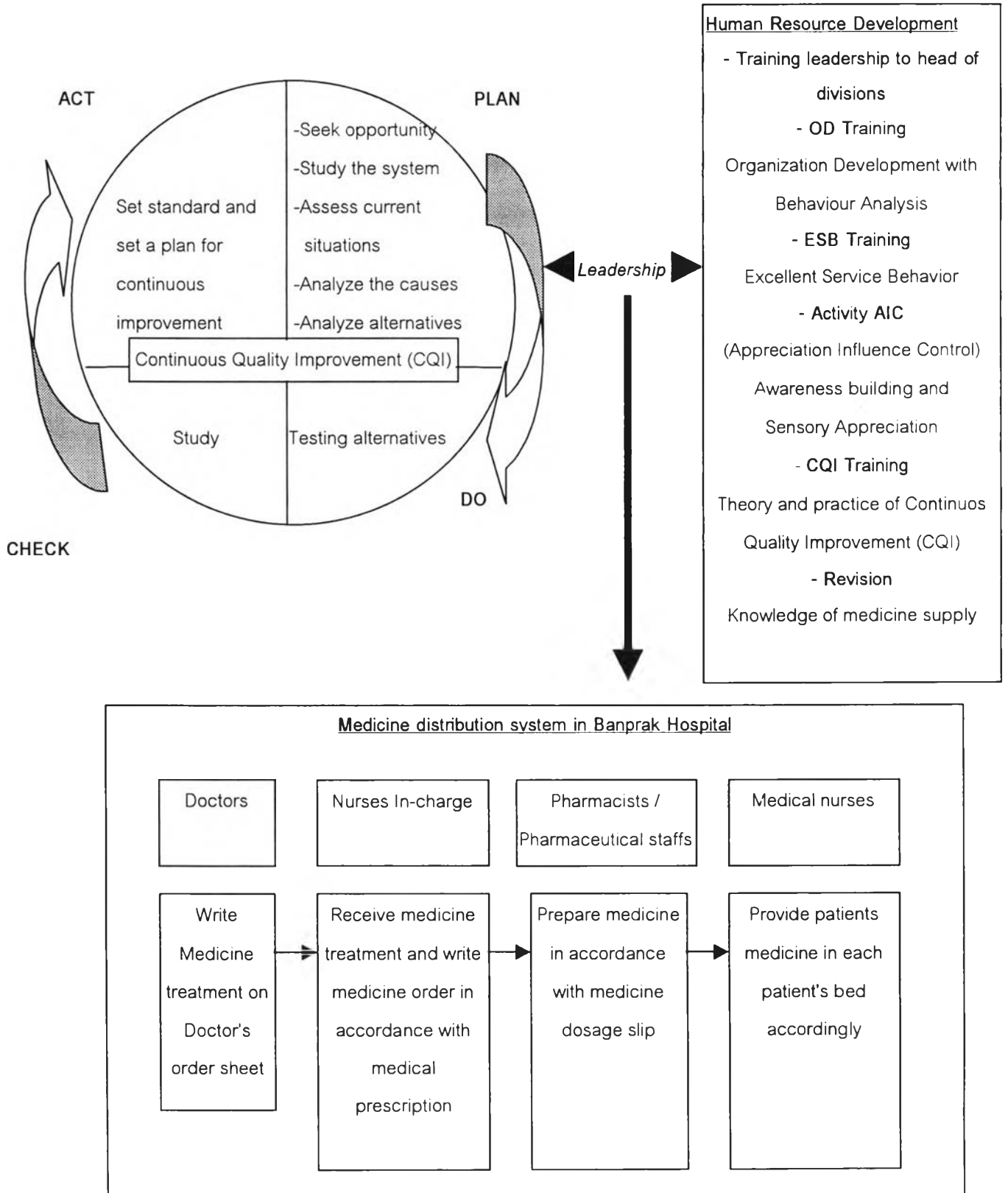
2.2.1 General Objective

To minimize the risks on medication error in the Inpatient Department of Banprak Hospital.

2.2.2 Specific Objective

1. To evaluate and analyze current risk situation in medication error in the Inpatient Department of Banprak Hospital.
2. To evaluate the effectiveness of the implementation of the CQI system in solving problem of the medication error. by comparison of the risk percentage on medication error between pre-implementation and post-implementation of the CQI system in the medicine dispensing process.

Figure 2.1: Conceptual Framework



2.2.3 Explanation of Conceptual Framework

By applying Continuous Quality Improvement to solve medication error in Inpatient Department, all staffs in organization were reasonably involved in the human resource development. Supervision from head of each sector was also essential in order to achieve the goal were described as all patients receive right medicine and right treatment.

2.2 Definition

A. Medication error

Medication error (*Shaorasin, 1999*) is defined as any event that may cause or lead to inappropriate medicine usage while the medication is in the control of the health care professional, patient, or consumer. It can be categorized into 2 aspects as follows.

1. Prescribing Error

Prescribing Error is the situation that patients receive wrong medicines.

For example;

- Inappropriate nomenclature such as incorrect medicine name, inappropriate dosage, and inappropriate usage.
- Medicine is dispensed to those patients who are allergic to it.
- Dispense medicine with inappropriate dosage instructions or without instructions at all.
- Transcribe prescription incorrectly.

2. Dispensing Errors and Medication administration errors

It is described as the preparation, distribution and dispensing of medicine that have been performed incorrectly by health care professional which may cause or lead patients to receive medicine.

- Dispense medicine inappropriately and differently from doctor's prescriptions.
- Wrong manufacture
- Dispense medicine to wrong patient
- Patients do not receive medicine at all
- Patients still receive medicine despite a doctor has already cancelled his or her order.
- No follow-up action done to check the result of the medication, especially with medicines that can cause side effect or allergy

B. The risk to medicine error in the Inpatient Department in Banprak Hospital.

This is described as errors that occur in dispensing process that begins at diagnosis, medication and medicine dispensing (Assess from the dispensing process in dispensary). It can be categorized into a number of aspects as follows.

1. Error due to personnel and methodology

1.1 Errors related to doctors

1.1.1 Incorrectly Medicine names, medicine dose, and instructions of using medicine written in doctor's order sheet.

1.1.2 Order medicine for patients who are known allergic to it.

1.2 Errors related to pharmacists and pharmaceutical staffs

1.2.1 Preparation medicine for dispensing incorrectly, such as wrong type, wrong dose and wrong procedure of medication.

1.2.2 Error on label

1.3 Errors related to nurses

1.3.1 Nurses do not follow the universal rules of medicine dispensing, that is Right Time, Right Dose, Right Drug, Right Patient and Right Method. This concept is known as 5 Rights.

1.3.2 Nurses transcribe details from doctors' order into prescription incorrectly and forget to re-check the details or make the correction. In case nurses dispense medicines by only looking at medicine labels, medication error may occur.

1.3.3 Nurse transcribe details from doctor's order sheet into medicine cards incorrectly, such as medicine names, dosage, quantity, names of patients and bed numbers. Medication error may occur easily because Medical nurses who look after patients will strictly give patients medicine as specified in medicine card.

1.3.4 Patients do not have their medicine cards. This is because nurses fail to take doctor's order sheet and/or forget to write medicine card or forget to write "Order for One

Day” form. As the result, some patients may not able to take medicine they need.

1.3.5 Nurses forget to eliminate medicine card after receive the order from doctor to cancel his or her previous order for particular patients or forget to receive the order at the first place. As a result, medicine card still remain in time-stock and Medical nurses still provide medicines to those patients.

1.3.6 After giving medicine to patients, nurses who giving medicine to patient forget to put medicine card in next dose time-stock. This situation can be explained as follows.

- Put medicine card in a tray and leave for lunch and a nurse who remain in the patient room may bring the card to give patient medicine again.
- Put medicine card in the wrong next dose stock. Without careful checking, patients will receive medicine not in the right time.

1.3.7 Inappropriate preparations of medicine, for example some medicine may be needed to be diluted or mixed with other dissolves before giving an injection.

1.3.8 The nurses In-charge deliver details of treatment procedure to Medical nurses verbally. ” Because there is no written detail to refer to, this situation may lead nurses

not to provide patient right medicine as specified in medicine card or “Order for One Day. As the result, the above situation is considered as significant risk to face medical error.

2. Errors related to equipment

2.1 Medicine bags of patients who were transferred from emergency rooms usually do not contain patient’s details. It is considered as priority precaution because the medicine bags can be place in the wrong patient’s stock.

2.2 Amount of medicine, such as number of mg, specified in label may be not the same as the actual amount. This causes patient to have inappropriate medication.

C. Doctor’s Order Sheet

It is a piece of paper containing details of treatment procedures. Doctor’s order sheets comprise of Order for One Day and Order for Continuous.

D. Order of One Day

It is a doctor’s order sheet that is used by nurses In-charge on duty for medication and treatment of patients for a specify time only.

E. Medicine card

Medicine card is a card that contains a list of medicine each patient should have. Details in a medicine card also include patient’s name, name of medicine, medicine

type, dose, procedure of medication and duration that a patient will have medication. Medicine cards are useful for preparation and record of medication for each patient.

F. CQI (Continuous Quality Improvement)

It can be described as a technique or strategy used by an organization whose individuals including executives, staffs and all employees reasonably involve and share effort to create streamline operations. The outcomes of services are the fruits of statistical application and tools of group operation that is implement for minimizing the redundancy and inconsistency of process. The goal of CQI is to deliver services in accordance with the expectation of patients, professionals, suppliers and communities and also consolidating their brand equity around quality services (Anuwat Suphchutikul, 1998).

Concepts of CQI are describes as follows.

- 1. Customer Focus.** Customers or ones who receive products or services are the reason why the organization exists. The quality of products is the ability to satisfy customer's need. Therefore, the goal of the hospital is to pursue the best way to carry out quality services that satisfy customers.
- 2. Common Vision.** It is the virtual form of ability to build creativity by the all members in a group. All members are involved in setting objectives and proceeding to achieve these objectives.
- 3. Teamwork and Empowerment.** It is the involvement and group-oriented format agreed by all members. Quality is not the created

from only one individual but it comes from the effectiveness of action and coordination from all member of the group. This is usually achieved by building up internal power through training and gaining information to discover the real capability of each individual.

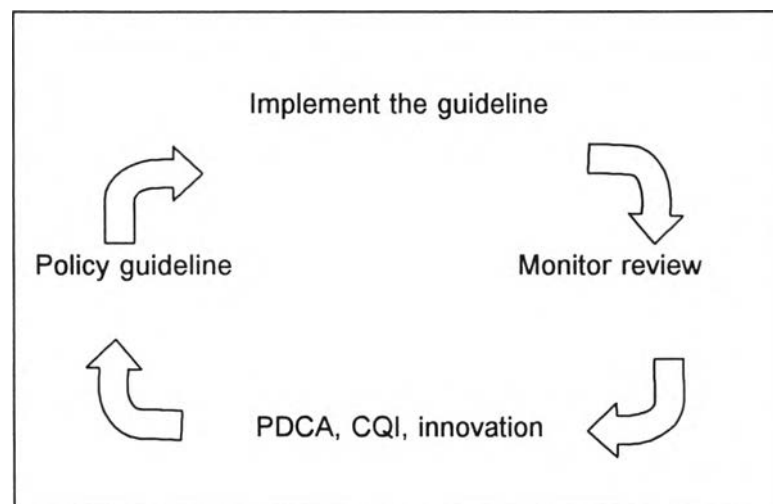
4. **Process Focus.** It is the manner of looking at unorganized processes as the causes of problems. Quality improvement the methodology that helps to develop processes to be organized, easy to apply and maintain. Such processes should act as shield to protect and lead manpower to yield the best capability.
5. **Problem Solving Process.** The process that take advantage of scientific method or cause-effect approach as the process to solve problem in hand. This starts from realizing the problems, analyzing causes, evaluating alternatives, testing alternatives and putting to work.
6. **Leadership Support.** Leaders play an important role in contributing to the changes in organization. Leaders should share common attitude with all staff and leaders in all level will have to change their roles from leaders or controllers to supporters.
7. **Continuous Improvement.** It is the way of looking at quality by setting the endless goals, which means that when the present goal is achieved, new goal will be set and to be achieved. The process

repeats endlessly. Therefore, quality will not stay at the same stage the whole time.

Steps of Continuous Quality Improvement.

It is the process of problem solving as presented in Plan-Do-Check - Act circle below.

Figure 2.2: Plan-Do-Check-Act Circle (Anuwat, 1999)

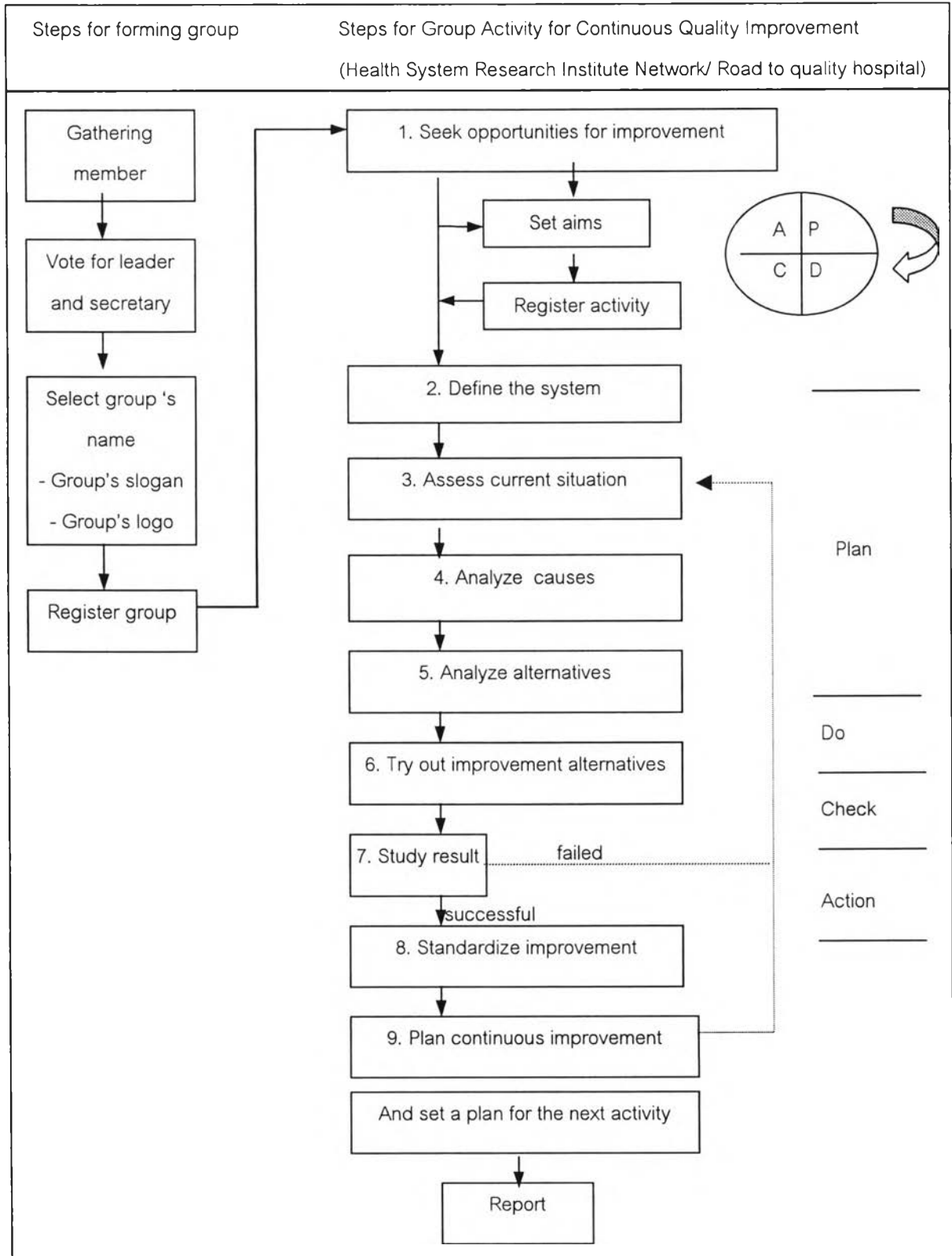


Plan is setting a standard system. Do is doing as planned. Check is the measurement, revision and verification of system and its result. Act is the improvement of a system. The development process will start from the revision or checking whether the existing activity can effectively serve customers or not, followed improvement and setting standard. To keep standard is equally to guarantee the quality.

G. Group activity for Continuous Quality Improvement

It is a collaboration of a group of three to ten people in an organization set to perform given tasks, which everybody in group is involved, in order to seek for the improvement of quality of work flow and, therefore, to increase quality of services (Withoon Simachockdee, 1998). The following figure illustrates the Flow-Chart of group activity for CQI.

Figure 2.3: Group activity for Continuous Quality Improvement (CQI)



H. Human Resource Development

Human resource development consists of attitude adaptation and preparation of personnel to development This include:

1. A 5 Day training on leadership skills in CQI for the Inpatient Department heads
2. A 3-day seminar on Organization Development (OD) which is based on the curriculum of Prof. Sunthad Sinthuphanprathum and a team expert from The Institute of Development of Education Administration, Ministry of Education. The seminar concentrates on Behavior Science (Anuwat et al, 1998) to mold attitude and behaviour of staff toward positive way of thinking. It is expected that the seminar will be able to escalate their compassion, optimism, a better understanding of human nature, teamwork and creativity by using group activity and as a tool (Teeam Angsachon, 1998). This will lead to unity, pound, enthusiasm, and agreement of all staffs to the transformation of organization.
3. A 2-day training called Excellent Services Behavior (ESB) is a training that aims to develop the quality of service behaviour and to form positive attitude of staff in the hospital toward their customers. This will increase overall performance of healthcare services. The training is hosted by Prof. Oath Areeraksa and colleges (Anuwat el al, 1998).
4. Appreciation-Influence-Control (AIC) activity which helps to develop an awareness of staff to the changes in organization, vision

building, and commitment to group tasks. The activity fosters a full capability of staffs' brains, i.e. using left-side brain as scientific processing and right-side brain as creativity. By doing this, staffs will be able to create imagination based on logic in the real world. This training is expected to help reduce conflict among staff because they are able to combine love, unity and compassion among individuals into the process of vision building, commitment, and strategy of that hospital (Chatree Banchuen, 1998).

5. Theory and practice of CQI training consists of;
 - 5.1 Concept of Continuous Quality Improvement defined by Dr. Deming
 - 5.2 Concept of CQI
 - Definition
 - Objectives
 - Format of CQI group activities and the 9 steps of quality improvement
 - Quality improvement tools necessary for the 9 steps of quality improvement, e.g. brainstorming, causes and effects diagram.
 - Practical skill training of the 9 steps of quality improvement
6. The revision of professional skills, especially medicine dispensing, for all nurses in the Inpatient Department.

Research Design

Research design is categorized regarding to methods of research. Natural-Experimental Research was used.

Research methodology

1. Population and Target Population

Population and Target Population are the internal factors of medicine dispensing process in which is considered as risk for medical error. There are 3 main factors.

Table 2.1: Study factors and sources

Factors vulnerable to inappropriate medicine delivery	Quantity of samples (n)	Sources (compared with)
1. Document and equipment 1.1 Medicine card (1 item = 1 time, n = 1) - Details error - Wrong time-stock 1.2 Label on medicine bag (1 item = 1 time, n=1) 1.3 Order for One Day for nurses sheet (1 item = 1 time, n=1) 1.4 Doctor's Order Sheet (1 item = 1 time, n=1) - Wrong dose, wrong time, wrong format - Provide medicine to patients who are allergic to it	All samples on the day of experiment All samples on the day of experiment All samples on the day of experiment All samples on the day of experiment	Doctor's Order Sheet The number on time-stock Doctor's Order Sheet Doctor's Order Sheet Standard procedure of medicine Dispensing for each type of medicine Patient's record
2. Medicine preparation 2.1 Drug mixing (1 item = 1 time, n=1) 2.2 Medicine that is ready to deliver but not yet delivered to patients (1 item = 1 time, n=1) 2.3 Medicine prepared in accordance with the instructions of given by nurse In-charge (1 item = 1 time, n=1)	All samples on the day of experiment All samples on the day of experiment All samples on the day of experiment	Information on method of medicine preparation, mixing, and diluting of each medicine type available in hospital. Medicine card Order for One day form
3. Techniques of medicine dispensing 3.1 Last medicine check prior to delivery (1 dispensing time = 1 time, n=1) 3.2 Method of checking the patient's names whom medicine should be provided (1 dispensing time = 1 time, n=1)	All samples on the day of experiment All samples on the day of experiment	Inspection method for medicine type and medication procedures respected to medicine card prior to delivery, in accordance with delivery Standard. Methods of checking patient's names and medicine card at patient's bed in accordance with delivery Standard.

Study Population

Study of vulnerable factors involved in medication error during delivery process was conducted within a period of one month. This is because there is a limitation of research time and, according to the past 3 year statistics, It was found that the difference in numbers of patients who came for services in the hospital each month was not significantly. Also the numbers of patients in the same month from each year were similar. In, The samples were chosen from only 21 days through the process called stratified Random Sampling. It means a slip shall be drawn separately 3 times a day; Monday, Tuesday, Wednesday, Thursday Friday, Saturday. The condition was that the first draw day was conduction in the morning shift (8.30 a.m.-4.30 p.m.), the second draw was at the afternoon shift (4.30 p.m.-00.30 a.m.) and the third was in the night shift (00.30 a.m.- 8.30 a.m.)

2. Observation and Measurement

In this research, assuming that, if the existing management system is replaced by a new system, namely CQI system, for which everyone participates in problem-solving and development process, after the implementation of such system, the percentage of medical error would significantly decrease until it reaches 5% or lesser. To prove this assumption, the percentage of medical errors had to be collected by the nurse from inpatient before and after the implementation of CQI system. The data collection was be done by;

- Using specially designed Record Form with document checking and Double Checking of all medicine items in the shift by In-charge, chief of nurses and pharmacists.

- Using Observer Technique. This means nurses who were In-charge of each shift, chief of nurses and pharmacists observed and recorded the method of medicine preparation and delivery to all patients each time a Medical nurse gives medicine to a patient. Noticed that the above observation and record would be done in a record form, which was also especially designed for this purpose.

After the data collection was completed the percentage of medication errors were then calculated as follows.

1. Document and equipment

$$\text{Error (\%)} = \frac{\text{Number of times of errors due to document or equipment}}{\text{The total of number of items of medicine}} \times 100$$

2. Preparation of medicine

$$\text{Error (\%)} = \frac{\text{Number of times of errors due to the preparation and dispensing}}{\text{The total of number of preparation or dispensing items}} \times 100$$

3. Techniques of medicine dispensing

$$\text{Error (\%)} = \frac{\text{Number of times of errors due to the dispensing techniques}}{\text{The total of number of medicine items that have been dispensed}} \times 100$$

1. Errors due to document and equipment are described as

1.1 Details about medicine type, dose, and medication procedures written on Doctor's Order Sheet are not correct.

1.2 Details on medicine card, label or Order for One Day sheet are different from details specified in Doctor's Order sheet.

- 1.3 Medicine card has been lost
 - 1.4 Medicine card is still in time-stock despite doctors has already canceled it.
 - 1.5 The Medicine card is left in tray as if it was being prepared even though the medicine had been already given to a patient.
 - 1.6 The medicine card is placed in the wrong time-stock and it leads to inappropriate treatment procedures.
2. Errors due to the preparation and dispensing of medicine are
 - 2.1 Medicine for injection and other drugs which need mixing preparation
 - Inappropriate procedures including preparation, mixing, diluting, amount, method and time.
 - 2.2 Tablets and pills
 - The preparation of medicine is done not in accordance with medication procedures (amount, time and type of medicine)
3. Errors due to dispensing techniques are
 - 3.1 The medicine card is not attached with the medicine while delivering to patient's beds.
 - 3.2 Medicine and medication procedures are not verified and compared with the previous record.
 - 3.3 Names of patients are not verified and compared with the previous record.

3. Method or Intervention

Intervention was defined as the CQI System implemented together with human resources development. It was performed as explained below.

3.1 Preparation

- 3.1.1 Supervisor of each section undergo a 5-day leadership training to develop their skills in the format of Bottom-Up style of management as well as quality development.
- 3.1.2 A 3-day OD training for the concerned staffs based on the curriculum of Prof. Santhad Sinthuphanprathum and colleges. The training was aimed to help develop the consciousness and attitude of staff and will, consequently, help to prepare them to accept new ideas as well as to improve communication skills, creativity and sincerity toward colleges and organization.
- 3.1.3 A 2-day ESB training for the concerned staff. The training, which was held by Prof. Oath Areeraksa and colleges, was set to develop a better attitude toward service roles and to amplify their service manners. Furthermore, besides the quality of medical treatment and effective communication between staffs and patients, the training was expected to increase quality of service and build up customer-oriented thinking for all staff in organization. By performing and achieving the tasks above, therefore, customers would be able to distinguish

and recognize the feature and characteristics of quality service from the hospital.

3.1.4 Arranged AIC activity for the concerned staff to make them understand the current situations of the hospital by the analysis through creative ideas and imagination. Also to make themselves prepared for necessary changes and to build vision through the process of logic imagination, commitment self-importance toward organization. All supervisors will do the 2 hours activity.

3.1.5 A 2-day CQI system training along with CQI activity which comprises both theory (2 days) and practice (1 day), and training with all staff in hospital for one day. The training was hosted by a distinguished organization development expert, Dr. Watcharaphol Phoonual.

3.2 Perform the 9 steps of CQI in accordance with the program formulated by Healthcare System Research Institute. The objective was to minimize medical error in the IP Department, which is under the supervision and guidance of sectional supervisors until the entire process satisfy the pre-specified standard. This standard is a standard that is applicable and widely accepted. The 9 steps of CQI are described below.

- **Step 1 Seek opportunity.** Opportunity was obtained from the outcomes of a brainstorming process, which had been

performed in order to rank the priority of problems in the hospital by 11 nurses from the Inpatient department.

- **Step 2 Define the systems.** It was the study of the big picture of overall processes concerned with the subject.
- **Step 3 Assess current situations.** Collecting data and assessing the present situations of the risk to medical errors.
- **Step 4 Analyze causes.** Finding out the root cause of the problems using appropriate analysis methods.
- **Step 5 Analyze alternatives.** Considering and evaluating all possible solutions medical errors and improve the quality of medicine dispensing. Choose the best alternative.
- **Step 6 Try out improvement alternatives.** Using the result from step 5 as the basis of the implementation plan. Commenced practice as specified in implementation plan.
- **Step 7 Study the result.** Apparition of what had been learnt.
- **Step 8 Standardize improvement** Collaborate all information from the result and improving the process as sustainable solution. After the outcome was satisfied all concerns, set the process as the standard system for medicine dispensing in Inpatient department.

- **Step 9 plan for continuous improvement.** Study what else could be improved or what next priority issue whose outcomes should be improved.

3.3 Effective coordination between other professionals because the medicine dispensing process in the Inpatient department was also related to professionals in other fields, i.e. doctors and pharmacists, there was a need to have effective coordination between these professionals. Especially, the cooperation from pharmacists was essential for the assessing and collecting information of specifications and usage of each type of medicine.

2.3 Data Collection

Data collection was done by a nurse who acts as an assistant of the Chief of nurses in the morning shift. By doing this, he or she collected all the record forms from all other In-charge nurses in all shifts. Then he or she performed the second check and delivered the Chief of Department every week for the third check. Thus, prior to the above task, the other In-charge of nurses were expected to complete the first check.

2.4 Data Analysis

The data analysis was made via Qualitative Data approach which is based on the comparison of the percentage of medication errors between the error value measured before and after the implementation of CQI system. The result was represented through Bar Graph. However, in case there is missing data, this missing data was neglected and was not formed part of the analysis.

2.5 Expected Outcomes

1. To apprehend the present situation of the risk to medication error in the Inpatient department of the Banprak Hospital.
2. Leaders in organization are simulated to advice and support their staffs to in problem-solving and development process. Intuitively, they will gain a vast degree of leadership skills.
3. All staff in organization perform their duty with enthusiasm, happiness and be more effective when working as a team. Furthermore, they CQI encourage all staff to be more moral toward their colleges, more creative and more self-confident.
4. The improvement of medicine delivery service of Inpatient Department through the reduction of medication error. As the result, patients are able to obtain right medication and their health safety will increase.

5. The adjustment of organization structure from Top-Down style to Bottom-Up style. There is an involvement of all individuals in organization through the group discussion and meeting whose results can be reported to executives.

2.6 Potential Problems, Conflict and Possible Means for Resolution

The work process in the Banprak Hospital has staff-rotation every six months. Therefore, upon the completion of the study, it is necessary to set the constraint of the study only one of these departments. If the above condition is not achieved, all procedure of the study has to be stop and reset. This condition causes the 9 steps to have be performed and completed within a period of 6 months, i.e. April to September or October to March.

As there is staff rotation between outpatients an Inpatient Departments every 6 months, the study had planed to operate dewing that 6 months period which was April to September to maintain continuity.