CHAPTER II

LITERATURE REVIEW

A drug is a substance or a chemical agent that acts to prevent or cure some disease in human beings and animals, to relieve them from suffering or sickness. Natural drugs used plant roots, leaves, fruit, branches, peel, seeds, trunk or core, or the livers or gallbladders from pigs or cows were used to make drug, or white clay was used as a component in treatments for digestive diseases. Synthetic drugs were derived from laboratory chemical processes, and especially nowadays, drugs are provided commercially, with various brand names. An antibiotic agent (Kampol Sriwatanakul, 1978) is a drug to prohibit bacterial growth and kill bacteria.

The mechanism of an antibiotic agent may be bactericidal or bacteristatic. In general, it affects the cell wall or membrane of the bacterium. For it to affect the cell membrane, cell membrane is responsible for covering and retaining major substances in the cells, as well as the site that controls the migration of substances. The antibiotic agent normally generates membrane abnormalities that affect fat and protein composition, resulting in the external leakage of metabolites.

A good antibiotic agent for children should be a drug that acts specifically on the pathogen and has no effect on the user, such as drugs in the penicillin group, which act on the peptodiglycan synthesis in the bacterial cell wall; however, this structure is not found in mammals, and is probably safe for children.

Antibiotics for children, e.g., penicillin V, come from one kind of fungus, namely *Penicillium*, originally from *P. notatum*. Later, it came from *P. chrysogenum*, which generated more product. From the mechanism of its action, it is a drug that presents reduced potential toxic effects for human beings. This drug prohibits

bacterial cell-wall construction and has a bactericidal action, whereby people allergic to it may develop rash, urticaria or anaphylaxis, and sometimes patients would die suddenly. Penicillin V is in the penicillin group (Malin Julsiri, 1997).

Another drug in the penicillin group that is popular for children is amoxicillin, which has a broader spectrum of action than the other drugs in the same group. Its actions are bactericidal for both gram-positive and gram-negative bacteria. Its allergic action is similar to that of penicillin V. Cloxacillin also acts like other drugs in the penicillin group.

Besides penicillin, erythromycin (in the macrolide group) is absorbed well by the intestine, but pure erythromycin may be destroyed by stomach acids, so food helps retard absorption, which is one reason why the drug should be prepared in the form of a stearate or estolate. Most erythromycin is eliminated by the liver and absorbed into the cerebral spinal fluid (CSF). One disadvantage is that pathogens are frequently resistant this drug during the course of treatment. In general, erythromycin should be used in any infection that is sensitive to penicillin, but where the patient is allergic to penicillin. The side-effects of erythromycin are nausea, vomiting, and diarrhea.

There is no overall guideline for the number of days of antibiotic use, but in general, a sufficient dose should be taken regularly for at least 3-5 days. However, some cases may need longer, depending on the type and severity of disease. For instance, for tonsillitis, the physician or pharmacist may administer antibiotics, but after completing the prescribed amount, it is not completely cured, so the patient should continue taking the drug until completely cured.

Antibiotics for Children

Antibiotics for children are normally in a dry-syrup form in a bottle, and can be mixed with cooled boiled water to the level indicated on the bottle. It becomes a syrup or suspension after mixing, which makes it easier to consume; it should be kept under refrigeration and used within 7-10 days of mixing, because it deteriorates quickly once it has been mixed. Hence, the expiry date on the bottle applies only to

the dry syrup, not the mixture. This drug would normally be taken at the proper dose and time, and would be finished in 5-10 days, so there would be none left over. If there were any drug left over, its use next time is strongly prohibited, because it can be harmful to children's health and lives.

In the current study, it was normally found that the caretakers administered the antibiotic agent for 1-2 days, because they believed using the antibiotic agent for palliative purposes would be sufficient. The disease would be alleviated, but the patient would feel sick again after the drug action had ceased, and they could not use the same kind of drug again because of pathogen resistance.

Pre-meal drugs

A pre-meal drug is one that needs to be taken one hour before a meal (at least 30 minutes), because its action is effective on an empty stomach. Many people failed to understand that a pre-meal drug cannot be taken and followed immediately by a meal, because this kind of drug is destroyed by stomach acid, so it should be taken at least 30 minutes or 1 hour before a meal. The study indicated that food stimulates the stomach to release acid, consequently destroying the drug and resulting in unsuccessful treatment. In addition, some drugs are absorbed well on an empty stomach, because the food interferes with absorption, which undermines effective treatment, such as with penicillin.

Post-meal drug

A post-meal drug is one that should be taken 15-30 minutes or immediately after a meal. Most post-meal drugs are not destroyed by stomach acid and food does not inhibit absorption of the drug.

Dry syrup needs to be shaken before pouring, because it is in the form of a suspension. Shaking enables the drug to be well mixed, and ensures that every measurement is the correct dose. It can separate into layers according to its suspension quality.

Use of a standard spoon

A standard spoon must be used to measure the drug volume. In general, a regular teaspoon or tablespoon is half a standard spoon. Zinc spoons used in urban areas have the same volume as a standard spoon.

A problem with pre-meal drugs that was frequently found was that the caretaker forgot to administer the pre-meal drug but usually remembered after 2-3 mouthfuls. In this case, the drug should not be taken at that moment, but 2 hours after the meal, instead. If the breakfast pre-meal drug is forgotten, but remembered before lunch, it is appropriate to skip the pre-breakfast one and take the pre-lunch drug as usual; it is not necessary to take a double dose to prevent over-dosing, which might harm the patient. Post-meal drugs should be taken 15-20 minutes after finishing the meal. (Umporn Janthara-arpornkul, 2002)

Drug storage and maintenance

The correct drug storage method for most drugs, which is not specific to antibiotics alone, is to keep them away from sunlight, heat, and humidity. The appropriate temperature for storage is 14-20°C. It is not appropriate to keep drugs in the car, because it may be parked in the sun for a long time, and high temperatures damage drugs. If any change in the color of a drug is noted, it should be thrown away immediately because it could change into a toxic agent and cause the death of any patient taking it.(Umporn Janthara-arpornkul, 2002)

Use of Antibiotics for Children

Antibiotics for children normally come in dry-syrup form, which needs to be mixed with water. The bottle should be shaken first to loosen up the dry syrup, then the bottle should be half-filled with cold boiled water, resealed, and shaken for thorough mixture of the drug. Then, the bottle should be re-opened and topped up with cold boiled water until the line indicating the appropriate level, re-sealed and shaken well again until well mixed. A standard spoon should be used to measure the drug according to the dosage prescribed by the physician. The remaining drug may be kept in a refrigerator for the next dose, but should not be kept in the freezer.

The drug expires (i.e. should no longer be used) around 7 days after mixing with water. It should be shaken before use for each dose.

Caretaker attitudes to drug use

Acceptance by the caretaker of an antibiotic depends on various factors, such as cognitive components, while the attitudes of caretaker to an antibiotic include knowledge of the antibiotic's quality, disadvantages and advantages, or side-effects. Some caretakers require more information before expressing their individual attitudes. Affective components comprise emotions, feelings of like or dislike, satisfaction or dissatisfaction, with the antibiotic. However, affective components generally relate to two other component categories, e.g., good knowledge of the antibiotic related to a feeling of like or dislike, and seem to be related to the action tendency or behavior component. The action tendency or behavior component will emerge when the caretaker gains some evaluative knowledge and a like or dislike of the antibiotic.

Duty of Attitude

Why a caretaker should have a particular attitude is another hint, since attitudes may be indicative of psychological benefits for the caretaker. Deeply believed that attitude was beneficial for self-justification and self-defense. Analyzed and clarified all duties relating to the attitudes of caretakers related to antibiotics into 4 characteristics, as follows:

1. Duty on adaptation of the caretaker or using the benefit as a tool or a way to achieve a goal. The caretakers adjusted their attitudes to their environment for a comfortable feeling, security and social acceptance, or they did it to reserve some objective to achieve the goal.

2. Duty of self-preservation of the caretaker. In various situations, caretakers expressed attitudes that supported self-awareness or self-defense.

3. Duty to express the values of the caretaker, which reflect the profound individual beliefs and values.

4. Duty to give or take knowledge of attitudes that served self-needs.

Research on caretaker attitudes regarding the use of antibiotics cannot avoid measuring attitudes, because the major objective of a study on attitudes is to

understand caretaker behaviors. Attitude is a concept that is believed to impact upon behavior. The researcher established a research instrument to measure attitudes, to understand the causes and results of behaviors, to predict behaviors and seek solutions, motivating factors towards unexpected behaviors, and ways to modify the attitudes of caretakers.

Behavior refers to a reaction or any activity of living entities, whether observable or not. If those living entities are human beings, the behaviors will relate to any intrinsic or extrinsic reactions performed.

Healthcare Behavior Components

Cognitive Domain

This behavior relates to cognition, memory, and improvement in abilities and intellectual skills, including judgment used in decision making. The cognitive domain consists of efficacy at various levels, starting from simple ones, and increasing in complexity with thinking and intellectual improvement. Efficacy levels are as follows:

1. Cognition

In this meaning, it is initial behavior that caretaker remembers by recalling or vision or hearing. This cognition comprises knowledge of drug name, qualifications, characteristics, benefits and side-effects of the antibiotic. Memory and recall do not require complex thinking processes or there is no need for great mental capability. The caretaker should think more, using improved capabilities through complex mental processes.

2. Understanding

The caretaker has derived experience and information, whether from hearing, reading, or writing. The expectation is that persons, who may be hospital staff or others, understand this information, and what is understood may be expressed in the form of skills or capabilities, as follows:

a. Interpretation refers to the caretaker's ability to write down a description of the perceived information using their own words, so that it can be

exactly the same or perhaps different, or in another language, but with the same meaning.

b. Definition refers to the caretaker's ability to define the perceived information, which can be addressed in the form of an opinion or summary, according to that person's understanding.

c. Estimation refers to a caretaker's ability to estimate or expect what will happen next. This ability comes from understanding situations and trends explained in the information.

3. Utilization ability

The caretaker utilizes or modifies the knowledge, which is one step in the cognitive domain, requiring capability or skill in understanding. On the other hand, the solution is proper drug administration to children. It means understanding the theory and various methods that will be utilized for problem-solving.

4. Analysis refers to the caretaker's ability to analyze, which is one stage in the cognitive domain, of which there are 3 sub-stages: 1) the ability of the caretaker to distinguish components of the problem of drug administration for children, or a particular situation, for better understanding; 2) the ability of the caretaker to clarify the obvious relationship between problem components and situation; and, the caretaker comprehends the principles of combining components of the problem or situation. In summary, the ability to analyze involves the caretaker's ability to dissect the sub-components from the whole, for better understanding.

Affective Domain

1. Perception or attention is the stage in which the caretakers were stimulated to perceive some remaining event or arousal and they were willing to accept it with prompt psychological status. Perception, or paying attention, is an initial mental phase pursuant to the next phase. As of previous experience of caretakers, either from learning (formal or non-formal learning), they may have no need of stimulation because they already have knowledge about antibiotics and are interested in it.

As perception or attention, caretakers comprehend right or wrong, or the significance of the antibiotic. This feeling or acknowledgement of the antibiotic takes

places only in consciousness. For satisfaction with receiving information and choosing to take the antibiotic or pay attention, they usually chose one that generated satisfaction and refused whatever they disliked.

2. Response is a behavior that flows from perception or attention. Caretakers will pay full attention when they commit to information or a stimulating situation. They accept, are willing and satisfied to respond to a feeling of attachment as well as the initial feeling, without confirmation of the caretaker's attitude or evaluation of the situation or arousal.

3. Valuing is a behavior that can be clearly explained by using the words "having knowledge" or "having attitude". Caretakers will react or possess behaviors that express their perceptions on a thing that is of value to them, or which they value in some way. In this phase, caretakers develop or modify their perceptions and are ready to respond to something under their control or actually belonging to them.

4. Group activities should be provided because various existing values need good grouping by considering the relationships among those values.

5. Expression with regard to the seized values the final phase of behavioral component that caretakers express their feelings and attitudes. It can be observed from their philosophy of life or the establishment of various rules for their behavior.

It means that this phase of behavior is a practical guideline for the caretakers, but they will pursue or achieve it depending on various factors.

The components of the affective domain consist of several characteristics or psychological statuses, depending on the mentioned changes. Psychological statuses are attention, satisfaction, attitude and value. Kwathwal (Bloom and Macia) stated that before caretakers had attitudes, they had to pass through various situations, e.g., attention and satisfaction. The possession of attitudes and values will be a sign of personal improvement.

For general hygiene, the affective domain is behavior relating to attitudes and beliefs, including the feelings of caretakers about anything. They show the trend

of caretaker behaviors. Caretakers with good attitudes to health usually possess appropriate health behaviors, but it also depends on other factors .

Caretakers who pay attention to the appropriate perception of children will respond and value children's medication-taking behaviors. Knowledge and good attitudes will be expressed as appropriate nursing care behaviors at all stages e.g. preparing the dried syrup for mixing, shaking the bottle before pouring, the dose of medication, appropriate drug administration (before meals and after meals), keeping the drug in an appropriate way and continuing the drug until done. These activities produce the highest efficacy of antibiotic administration.

Psychomotor Domain

The psychomotor domain is involved with physical capability, including the practices or behaviors that can be noticed or observed in any situation, or in delaying behaviors, such as caretakers' not immediately reacting, but doing so in the future. This psychomotor domain is the final behavioral domain that will be the focus of this study, which would require the mentioned domains as components. The cognitive and affective domains are easy to evaluate, but the psychomotor domain requires time for the several steps oin decision-making, which can be the operational problems of the relevant units (e.g., education, public healthcare, etc.). Experts believe that the education process inherent in the education system creates this psychomotor domain.

Social and Health Components

Gender

The relationships between the gender factor and health behavior have been studied abroad and it was found that females had more appropriate health behaviors than males, in both prevention and treatment. Research on the gender factor and health behavior in Thailand yielded similar findings. However, sôme research findings differed. Gender factors had no correlation with health status, drug administration and cooperation with treatment. Gender was a factor expressing physical difference and it generated different values. Gender also provided roles and characters in the family, community and social.(Prasong Theerapongnaphalai, 1999: 75).

Most students were under the care of female caretakers. Consequently, this research will not take gender into account in this study.

Age

Kasl and Cobb (1966: 249) expressed the view that age had an influence on individual health perceptions, which was consistent with the study by Brown and McGreedy, who found a correlation between disease-prevention behaviors and age. Also stated that most young patients felt drugs did not have a bad taste, such as bitterness.

The study of Pitaksaworakarn (1993) revealed that patients aged > 60 years had more inappropriate drug use behaviors than those in other age groups. Young adults and middle-aged adults had more regular self-care treatment than older adults. However, the results of other research work were different, and age had no correlation with drug-use behaviors.

Education

Highest level of education was related to health behavior; in particular, people with high education levels gained better knowledge, attitudes, and general hygiene practices than people with lower education levels. In addition, people with high education levels had more appropriate drug-use behaviors than people with low education levels (Pisamai Pitaksaworakarn, 1993).

Some international research studies consistently revealed that people with high education levels had more self-responsibility and healthcare goals than people with low education levels. Kasl and Cobb (1966: 250) found that highest level of education closely correlated with cooperation behavior. People with high education levels tended to have higher levels of cooperation in health care. That highest level of education was related to preventive behavior and affected individual health behaviors. In general, people with high education levels should have better knowledge, attitudes and more appropriate general hygiene practices than people with low education levels. Education levels tend to correlate with economic status; people with good education

levels have careers with higher incomes than people with poor education levels. Income levels influence health behavior. Most of the study population (76%) had graduated only from elementary school (primary school). The results indicated that people with lower education levels who were also poor had more health problems than people with higher education levels. Health problems accumulate because of the surroundings, such as increased numbers of people and low national and public income; the greater the health problems, the greater the expenditure on national healthcare and health promotion.

Marital status

Married status was a factor affecting drug-use behavior with regard to the physician's recommendations, which could count as social support for the patient. Unmarried patients would have more inappropriate drug-use behavior than patients with spouses. In addition, married patients cooperated better than divorced or separated patients.

Occupation

Type of occupation was related to health behavior. Patients with full-time jobs had better health behaviors and cooperation with treatment than patients who had uncertain jobs or jobs with unspecified durations. That hypertension patients who were laborers normally did not cooperate with treatment due to the following behaviors: missing appointments or stopping treatment, with the reasons wasting working time and being normal. For preventive behaviors, laborers who worked in Victoria, Columbia, stated that occupation was related to health check-up and individual- and family-perceived immunity.

Income

The family was closely correlated with prevention and treatment. Davis's study (1968: 274-275) addressed the correlation of economic status with health behavior. Who reported that mothers with low incomes had inappropriate childcare behaviors.

Income is a significant factor affecting the ability to reach a health service center. Economic status was related to health behavior and cooperation with treatment. People with low economic statuses would have poor health behaviors and poor cooperation with the treatment. People's incomes affected their health behaviors. Furthermore, gross national income had an indirect effect on people's health behaviors because people would have appropriate health behavior or not depending on, besides interest, willingness to use services, disease prevention or treatment, and the adequacy and availability of medical and public health services that the government provided. Those services were significantly reliant on the nation's economy.

Regarding the economic status of the population, if the people have poor economic statuses, it affects their having inappropriate or improper health behaviors, for instance, having no money to buy good food, having no money for medical expenses, having to stay in a bad environment, and poor hygiene. Wealthy people can afford good food, if they prefer it.

In addition, economic status is directly correlated with highest level of education. If people have poor economic statuses, they will lack knowledge and correct understanding about health. They may also have bad attitudes and inappropriate behaviors. In Thailand, the majority of the population is poor and has a low education level. This group has more health problems due to lack of knowledge and improper behaviors, causing illness. When they are sick because of insufficient knowledge, they consequently lose their incomes, which occasions them difficulties in receiving appropriate and correct healthcare. Sickness causing absences from school will occur, and this cycle was found most among Thai people. On the other hand, good economic status offers better opportunities for a good education. Education assists people to gain correct knowledge and implementation of health promotion, disease prevention, and the existence of disease.

Correlating factors for caretakers and children

The family is an important institution and a social unit having close relationships and cooperation among its members. In every society, the family decrees the interaction roles for each family member, such as loving and caring for each other, commanding, teaching, bonding, joining activities, helping others, etc. It is not supposed to be separated. Family members will pass on and imitate behaviors, actions, and various beliefs.

Social groupings influence behavior, such as youths normally have similar beliefs, thinking and behaviors, particularly teenagers. Health behaviors, with regard to beliefs, can yield either advantages or disadvantages. One obvious disadvantage is drug addiction. The problem of drug addiction among teenagers generally stems from bad role models, as well as their friends. Group influence on behavior will be greater or less depending on the relationship or group bonding. The greater the bonding among group members, the greater will be the influence upon behavioral changes in knowledge, attitudes and actions.

The differences in social status of individuals impact upon different individual health behaviors. For instance, if a female's status in the house is caretaker of the children, her tendency is to have many children, because she has time care for them. However, if women have to work outside the home, the roles should be changed, resulting in a demand for fewer children or some method to control the number of children to the number desired.

Demographic factors

The demographic factors in this study consisted of age, marital status, highest education level achieved, occupation, family income/month, number of family members, relationship between caretaker and child, number of children under caretaker's care, and attitudes of caretakers towards antibiotic-use behaviors.