

CHEPTER V

CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

CONCLUSIONS

This study was a cross-sectional descriptive study with the aim to assess the prevalence rate of and factors affecting nosocomial urinary tract infection of the patients with indwelling urinary catheters in Thungsong Hospital, Nakhon Si Thammarat Province.

The samples of the study composed of 300 patients with indwelling urinary catheters. There were 223 females (74.3 %). One-third of them aged 20-29 years, 25 percent aged 30-39 years, and the average age was 39.44 years with the standard deviation of 19.28 years. The minimal age was 1 year and the maximal age was 91 years. About 91 percent were married while 6.7 percent were single.

Regarding medical treatment, it was found that some of the patients had underlying diseases that were risk factors of urinary tract infection, for example, diabetes and hypertension (26.5 %), followed by chronic obstructive pulmonary disease (20.4 %), and heart disease (16.3 %). The high percentage of the patients (94.0 %) received antibiotics. The indications of having indwelling urinary catheters were:- for getting surgery (74.3 %) and for evaluating kidney function (19.0 %). High percentage

of the sample (99.0 %) have never had instruments inserted in urethra and 99.3 percent did not have continuous bladder irrigation. Ninety-nine percent have to have urine measured every 8 hours. Regarding the urine bag, it was the bag with the valve (97.7 %), with no need to change the bag. For the size of the catheters used, 59.6 percent used size 14 F. and 39.0 percent used size 16 F. More than half the patients (62.7 %) kept the catheters for 1-2 days and 17.0 percent had indwelling urinary catheters longer than 7 days. The average day of 4.10 was found for having indwelling urinary catheters, with the standard deviation of 5.56 days, the minimal day was 1 and the maximal day was 60.

It was found that the prevalence rate of nosocomial urinary tract infection among the patients with indwelling urinary catheters in Thungsong Hospital during April – June, 2003 was 14.7 percent. The highest prevalence was found in April (16.0 %), followed by June (14.6 %) and May (13.0 %) respectively. The highest prevalence was found with the patients in the Special Ward where 2 patients had indwelling urinary catheters and both of them had urinary tract infection (100.0 %), followed by the Internal Medical-Surgical (Female) ward (39.0 %) and ICU (32.0 %) respectively, The factors affected nosocomial urinary tract infection were found as follows:

1. Personal characteristics of the patients. The urinary tract infection was found more in male patients than in female patients, 27.3 percent compared to 10.3 percent. Regarding age, 49.1 percent of infection was found most in patients aged 60 years and over, followed by the age of 40-59 years (21.7 %) and the age of 40 years and lower (3.0 %) respectively. The higher urinary tract

infection was found among the patients with underlying diseases (55.1 %) than the patients without underlying diseases (6.8 %).

2. Medical treatment. All of the patients who had ever been inserted the instruments into ureter had urinary tract infection than those who did not have experience (13.8 %). For the indications for urinary catheterization, among the patients whereby indication for assessment of kidney function was used, 42.9 percent of infection was found compared to 4.9 percent of those that the indication for operation was used. For the period of catheterization, 54.9 percent of infection was found among those who had indwelling urinary catheters for 7 days and longer, which was higher than the infection found among those who had indwelling urinary catheters less than 7 days. The patients with indwelling urinary catheters whose urine bag have to be changed, had urinary tract infection higher than those whose urine bags did not have to be changed (71.4 %) compared to 13.3 %). Regarding the size of the catheters used, urinary tract infection was found more among the patients who used the bigger size of the catheters (16 F.) than who used the small size (8-14 F.), 34.2 percent compared to 2.2 percent.
3. Nursing care. All of the nurses were females, the average age was 33.9 years, the minimum age was 20 years and the maximum age was 52 years. Seventy seven percent of them received Bachelor Degree and 23.0 percent received Diploma in Nursing whereby 77.0 percent of them were professional nurses and 23.0 percent were technician nurses. The average year of nursing experience of this group of nurses was 12.2, with the

standard deviation of 7.28, the minimum year and the maximum of nursing experience were 1 and 30 years respectively.

The comparison of the data collected through self-evaluation and observation of nursing activities regarding urinary catheterization and patient care for patients with indwelling urinary catheters showed as follows:

Self – evaluation of the quality of the urinary catheterization procedures revealed that the wards where all nurses evaluated themselves as performing a good level were the Intensive Care Unit, the Medical and Surgical (Male) Ward, Special Ward, the Medical and Surgical (Female) Ward, Emergency Room, and Operation Room, followed by the Obstetric – Gynaecology Ward (72.7 %), and Pediatric Ward (66.7 %) respectively. For the total score of all wards it was found that 93.1 percent evaluated their performance as good and 6.9 percent as moderate level. Regarding the self – evaluation of nursing care provided for the patients with indwelling urinary catheters, the wards that the nurses evaluated their nursing care performance as good were the Emergency Room (84.6 %), followed by Medical and Surgical (Female) Ward (71.4 %) and the Medical and Surgical (Male) Ward (62.5 %). For the total score of all wards, it was found that 55.2 percent evaluated their performance as good, 27.6 percent evaluated their performance as moderate, and 17.2 percent indicated that their performance need to be improved respectively.

Regarding the evaluation of urinary catheterization of the nurses through observation it was found that the ward where all nurses performed the activities at a

good level was the Operation Room, followed by the special Ward (75.0 %) and the Intensive care Unit (70.6 %) respectively. For total score from observation of all nurses, it was found that 62.1 percent performed the activity as good and 37.9 percent as moderate level. For the data about nursing care collected through observation, it was found that all nurses (100.0 %) of the Emergency Room and the operation Room performed nursing activities at the good level, followed by the nurses of the ICU (76.5 %). The wards where the nurses needed to improve their nursing care were the Medical and Surgical (Male) Ward (75.0 %), followed by the pediatric Ward (55.6 %) and the Special Ward (50.0 %). For the total score of the performance, it was found that 51.7 percent performed at the good level, 23.0 percent were at the moderate level and 25.3 percent needed to be improved.

The data from the self – evaluation of the nursing care, both urinary catheterization and patient care, by the nurses themselves showed that all of the nurses from the Operation Room evaluated their performance as good, followed by the nurses from the Medical and Surgical (Female) Ward (92.9 %) and the Emergency Room (90.9 %). For the total score, it was found that 80.5 percent of them evaluated their performance as good and 19.5 percent evaluated their performance as moderate. Through observation of the urinary catheterization and patient care activities, all nurses from the Emergency Room performed their activities at the good level, followed by the ICU(94.1 %). For the total score, it was found that 67.8 percent performed the activities at the good level and 32.2 percent at the moderate level. The nursing activities, from observation, that the nurses should be improve in regard with urinary catheterization were explaining the patients about the objective of having indwelling urinary catheters,

pevidine scrub and drying, flushing with saline, and changing globes before inserting urinary catheter. Regarding nursing care provideing for patients with indwelling urinary catheters, the following activities should be improved: handwashing before and after pouring urine of each patient, and cleansing with Alcohol 70 % before and after opening – closing the urine bag.

4. Procedures of disinfection and sterilization of the urinary catheterization set and flush set at the Central Supply Unit. It was found that, through observation, the appropriat procedures were performed throughout the 3-month study.

DISCUSSION

This research was the study of 300 patients with indwelling urinary catheters admitted in the In-Patient Department, Thungsong Hospital, during April 1 – June 30, 2003. It was found that the prevalence rate of nosocomial urinary infection of the patient with indwelling urinary catheters was 14.7 percent, it was higher than indicator of nosocomial urinary tract infection in Thungsong Hospital, whereby 81.8 percent were asymptomatic infection and 18.2 percent were symptomatic infection. The highest prevalence rate was found in the Special Ward (100.0 %), because of the two patients with indwelling urinary catheters in Special Ward were elderly and had underlying disease both of them had urinary tract infection, followed by the Medical and Surgical (Female) Ward (39.0 %) and the ICU (32.0 %) respectively. Throughout 3 months of study, it was found that the highest prevalence was found in April (16.0 %) whereby 14.6 and 13.0 percent were found in June and May respectively.

The results of the analysis of the factors affecting nosocomial urinary tract infection among the patients with indwelling urinary catheters revealed the significant relationship between nosocomial urinary tract infection and the following factors: 1) personal characteristics regarding sex, age, and underlying diseases; and 2) medical treatment regarding experience of having instruments inserted through the urethra, indication for urinary catheterization, duration of catheterization, changing the urine bag, and the size of the catheters used ($p < 0.05$).

The detailed discussion of the factors affecting nosocomial urinary tract infection were presented as follows:

1. Personal Characteristics of the Patients.

It was found that there was a relationship between urinary tract infection and the patients' characteristics regarding sex, age, and underlying diseases. This finding was similar to the studies of other researchers (Platt et al. 1986; Stamm, 1991; 1992), whereby the studies showed that among the patients with indwelling urinary catheters, the factors regarding sex, age, and underlying diseases were the risk factors of nosocomial urinary tract infection.

- 1.1 Sex. The study showed that there was a significant relationship between patients' sex and nosocomial urinary tract infection ($p < 0.01$). But finding contradicted with the finding of Platt et al. (1986), which found that female had higher nosocomial urinary tract infection rate than male, this study however found that 27.3 percent of infection were found among male patients and 10.3 percent in female patients

.This finding may be due to most of the female patients had indwelling urinary catheters for preparing them for delivery-surgery and they did not have underlying diseases. The duration of catheterization of these female patients was short only 1-2 days. But for male patients, most of them had underlying diseases and the duration of catheterization longer than that of the female patients, 42.3 percent kept the catheters for longer than 7 days. This finding was not congruent with the study of Garibaldi et al. (1974) who found that the urinary infection was found most in the females than males and significant relationship between sex and nosocomial urinary tract infection ($p < 0.05$). This may be due to the larger sample size was used in the study of Garibaldi et al. and all of the sampled patients were in the Internal Medicine and Surgery Departments while the characteristics of the samples in this study were mainly from OBGYN.

- 1.2 Age. The result of the research showed that the mean age of the patients with the indwelling urinary catheters was 39.4 years and significant relationship was found between age and nosocomial urinary tract infection ($p < 0.01$). The high incidence of urinary tract infection was found in the group of patients aged 60 years and older, with the prevalence rate of 49.0 percent and the lowest prevalence was found in the group of patients aged 40 years and younger, with the prevalence rate of 3.0 percent. This can be explained that the elderly have the degeneration of body organs resulting in lower body's immunity, therefore they were highly susceptible to urinary tract infection

(Somwang Danchaiwijitr et al. 1989). This finding was similar to the finding of the study carried out by Garibaldi et al. (1974) which found that there was a significant relationship between age of the patients with the indwelling urinary catheters and the number of bacteria in urine ($p < .05$) whereby the highest number of bacteria was found in the patients aged 50 years and older, 30.2 percent of bacteria found compared with 15.5 percent of bacteria found among patients aged younger than 50 years.

- 1.3 Underlying diseases. The finding showed that 55.1 percent of urinary tract infection was found among the patients with indwelling urinary catheters who had underlying diseases compared to 6.8 percent of urinary tract infection found among patients who did not have underlying diseases. This relationship was statistically significant ($p < .001$). Among the sampled patients, 55.1 percent had underlying diseases and the urinary tract infection rate found with those who had underlying diseases were as follows: diabetes (69.2 %) and hypertension (53.8 %). Therefore this finding was congruent with the study of Platt et al. (1986) who found that there was a significant relationship between being sick with diabetes and urinary tract infection ($p < .001$).

2. Factors Regarding Medical Treatment

- 2.1 Experience of having instruments inserted through the urethra. The result showed that all patients who ever had instruments inserted

through the urethra had urinary tract infection, whereas 13.8 percent those who never had instruments inserted through the urethra had urinary tract infection. This was statistically significant ($p < .01$). These, experience of having instruments inserted through the urethra was the risk factor for urinary tract infection. The insertion of instrument through the urethra and urinary catheterization make the patients be susceptible for getting urinary tract infection because those instrument oftenly damaged or injured the tissues easily and leading to infection. Besides, the use of contaminated instruments is the easy way to bring bacteria directly into the urinary tract system. The study of Degrot and Kunin, 1975 showed that there was a relationship between the use of instruments and nosocomial urinary tract infection and the insertion of the instruments through the urethra was susceptible to get urinary tract infection, 75.0 percent of all urinary tract infection occurred.

2.2 The indications for indwelling urinary catheters. Significant relationship was found between having urinary catheterization and nosocomial urinary tract infection among the patients with indwelling urinary catheters ($p < .001$), It was found that 42.9 percent of the patients who had indwelling urinary catheters for the purpose of evaluating kidney function had urinary tract infection. For the patients who got urinary catheterization in order to prepare them for operation, 4.9 percent of them had urinary tract infection. This revealed that urinary catheterization was the important factor affecting urinary tract

infection. This finding was similar to the finding of Hustrinx et al. (1991) which was found that 40-70 percent of all urinary tract infection caused by urinary catheterization.

2.3 Duration of catheterization. It was found that there was a significant relationship between duration of indwelling urinary catheters and urinary tract infection ($p < .001$). The result of this research showed that 54.9 percent of the patients had indwelling urinary catheters more than 7 days had urinary tract infection compared to 6.4 percent of those who had indwelling urinary catheters less than 7 days. Therefore, duration of catheterization was the risk factor for getting urinary tract infection which was similar to the studies of other researchers (Platt et al., 1986; Stewart et al., 1995; and Warren, 1991). However, Warren (1991) suggests that short term catheterization should be about 3 days and the 8th day of catheterization is the day that the highest number of bacteria was found in urine.

2.4 Changing of the urine bag. Significant difference was found between the change of urine bag and urinary tract infection ($p < .01$). The result of this study showed that 71.4 percent of the patients with the indwelling urinary catheters whose urine bags were changed had urinary tract infection, compared with 13.3 percent of those whose urine bags have not been changed. Therefore, the change of urine bag is the risk factor for getting urinary tract infection. This finding was congruent with the studies carried out by Schueffer (1986) and Warren (1987) which was found that the higher susceptibility of urinary tract

infection was found with the use of open drainage system, whereby 100.0 percent of urinary tract infection will be found within 3-4 days. But for the closed drainage system, the infection rate will be decreased about 5.0 percent a day. Warren (1987) suggests that the closed drainage system will delay bacteriuria for 30 days.

- 2.5 The size of the catheterization used. Significant difference was found between nosocomial urinary tract infection and the size of the catheters used ($p < .001$). The research result showed that among the patients that used the catheters size 16 F. 34.2 percent had urinary tract infection compared with 2.2 percent of those who used the catheters size 8-14 F. It revealed that the size of the catheters used was the risk factor of urinary tract infection. If the size of catheter used was the same of the size of the urethra, the obstruction of the secretion from the paraurethral gland which will be the good media for the bacterial growth and will lead to urinary tract infection. However, the use of the bigger size of the catheter may oppress any parts of the urethra especially the curve – part. Besides, the selection the size of the catheter that is not appropriate with the gender of the patient may cause contraction and pressure (Susan, 1983). Therefore, the size of the catheter selected should be appropriate accordingly with the purpose and with the patient (Poonsupaya Soparatana, 1994).

3. Nursing activities. The comparison of Self-evaluation and Observation to inserting urinary catheterization showed that Observation was 76.5 percent

and 64.6 percent of them evaluated their performance as good and 23.5 percent on Observation, 17.7 percent on Self-evaluation as need improvement. The comparison of Self-evaluation and Observation to nursing care for the patients with indwelling urinary catheters was 62.5 percent on Observation, 25.0 percent on Self-evaluation as good and 37.5 percent on Self-evaluation, 25.0 percent on Observation as need improvement. The Self-evaluation to inserting urinary catheters among all of the sampled wards in Thungsong Hospital showed that 86.2 percent of them evaluated their performance as good and 6.9 percent evaluated as fair and need improvement. It was found that all nurses (100.0 %) of the Operation Room, Emergency Room, and Medical-Surgical (Male) ward evaluated their nursing activities as good, followed by the nurses of the Medical and Surgical (Female) Ward (92.9 %) and ICU. (88.2 %). The data from the observation showed that 62.1 percent of nurses performed their nursing activities as good and 37.9 percent as need improvement. Among all of the sampled wards, the data from the observation showed that all of the nurses (100.0 %) of the Operation Room perform good nursing activities, followed by Special Ward (75.0 %). The nurses from Obstetric-Gynaecology Ward performed their nursing activities at need improvement level (72.7 %) and 75.0 percent of the nurses of the Medical and Surgical (Male) Ward performed need improvement level of nursing care. This finding may be due to these two wards admitted too many patients compared with the small number of nursing staff available. However, the observation was performed only once therefore the data collected may not

be the actual performance. The activities that the nurses did not perform or performed inappropriately regarding the procedures of urinary catheterization were the change of globes before inserting the urinary catheters (83.9 %), handwashing with povidine scrub (74.7 %), flushing with sterile water (69.0 %), and explaining the patients regarding objectives of inserting urinary catheters (51.7 %). The nursing activities that the nurses did not performed or performed inappropriately were as follows: cleansing with Alcohol 70 % before and after opening-closing the urine bag (80.5 %) and hand-washing before and after pouring urine of each individual patient (63.2 %). These activities found have been presented in the meeting of the Nosocomial Infection Committee of Thungsong Hospital for improving.

4. Disinfectant and sterilization procedures of the urinary catheterization set and flush set. Through observation of the procedures performed at the Central Supply Unit of Thungsong Hospital for 3 months, it was found that all procedures performed were good. Therefore, it may be concluded that the urinary catheterization set was not the cause of urinary tract system infection. One of urinary catheterization activity that needed to be improved was handwashing with antiseptic solution which nurses should realize and practice strictly. Hygienic handwashing must be done by washing hands with aseptic solution and then washed hands by faucet water, scrubbing hands throughly for 10 minutes by following the six steps as shown in the Appendix, Figure 2 (CDC, 2002). Another activity that should be improved was flushing the genital area with sterile water. This activity was aimed to

ensure the cleanliness of the area that the catheter will be inserted in order to prevent the infection of the urinary tract system. Regarding the explaining the patients and their relatives about the objectives of having indwelling urinary catheters, this activity will help decreasing the anxiety of the patients and their relatives. According to the study carried out by Chadanundh Prasertpun (1998) regarding nursing care of the patients with indwelling urinary catheters, it was found that the patients who never had experience about urinary catheterization responded some reactions during operating this activity, for example, holding their legs together, covering the genital area with their clothes, etc. which may cause contamination of the instruments used and inconvenience. During the insertion of the urinary catheter, the nurse should start with creating the good relationship with the patients in order to help the patients released shyness and be relaxed. The understanding of the objectives of catheterization will help the patients and their relatives make the appropriate catheter care regarding cleanliness, being cautious about not – moving the catheters, and other inappropriate situations. These cooperative practices will be the good measures in preventing urinary tract infection. Regarding the change of gloves before inserting the catheter, it was found that most of the nurses did not practice this step because in the set there is a transfer forcep whereby with the sterile gloves, the nurse will use the transfer forcep to get the cotton with aseptic solution to clean the genital area before inserting the catheter. The activity that the nurse should improve was the use of alcohol 70 % to clean the outlet of the urine bag before and after opening-closing the urine bag. The

opening-closing the urine bag will damage the close drainage system. The use of alcohol 70 % to clean the outlet of the urine bag will prevent the bacteria get into the urinary system. Handwashing before and after pouring urine of each patient is the effective measure to prevent bacteria from nurse's hands to the patient and from one patient to another whereby the nurse is a carrier. Therefore nurses should wash their hands before and after contact or providing nursing care. According to the report of the 5-year-investigation of nosocomial urinary tract epidemic infection by the Center for Disease Control of the United States, the cause of the epidemic was Gram – negative bacteria that resisted to various types of the investigation evidenced that those bacteria were from nursing personnel's hands (Schaberg, Weinstein & Stamm, 1976 cited in Chadanundh Prasertpun, 1998).

In this study, the patients who had been inserted the urinary catheters for the purpose of evaluation of the kidney function were the older persons who had difficulty in urination caused by the conditions of the underlying disease and the physician needed to know the quantity of urine each day in order to evaluate the patients' signs and symptoms and treat the patients effectively.

RECOMMENDATIONS

This study indicates that the urinary tract infection of the patients with indwelling urinary catheters has still been a severe problem, so the researcher would like to make a suggestion that this research should be used to be a guideline to effectively control the infections of the patients with indwelling urinary catheters namely :-

1. The hospital's executives should make use of the result of the research to regulate the policy for the medical personnel to practise against and control the infections of the patients with indwelling urinary catheters.
2. The result of this research should be used to set up a practice guideline by making both the distinct short-term and long-term plans which are relevant to the problems of urinary tract infections in the hospital.
3. A standard medical manual for indwelling urinary catheters should be made so that all the medical personnel can hold to the same guideline in doing the medical practice.
4. The project of knowledge revision for caring the patients with indwelling urinary catheters should be regularly held for every level of medical personnel.
5. A curricular should be designed to give knowledge to the new medical staff so that they should realize and learn of the problems and the procedures to prevent and control the urinary tract infections of the patients with indwelling urinary catheters.
6. There should be a plan to evaluate the medical practice which is based on the medical policy and the follow-up of the medical practice on the basis of

the medical standard of treating the patients with indwelling urinary catheters.

7. The medical personnel should improve and develop themselves to have sufficient knowledge on the urinary tract infections of the patients with indwelling urinary catheters in order that they will be able to set up an appropriate plan to take care of these patients.
8. The medical personnel should realize the significance of the urinary tract infections of the patients with indwelling urinary catheters, comply with the policy of preventing and controlling the infectious urinary catheterization, and cooperate with every staff involved in preventing and controlling the urinary tract infection.
9. The result of this research should be used as the basis of setting up a plan to take care of the patients with indwelling urinary catheters.
10. The result of this research should be used as a guideline to set up a standard criteria to check the medical practice standard in preventing and controlling the urinary tract infections.
11. The academic department of the hospital should use the result of this research to be a basic guideline in organizing learning activities in both theoretical and field trainings for the medical and nursing students who do the trail training in the hospital.
12. The result of this research should be used as a basis to organize a program to prevent and control the other infections in the hospital.

THE COMMENTS ON FURTHER RESEARCH

1. There should be a study of the behaviors of the medical personnel who are responsible for urinary catheterization.
2. There should be a study of the medical strategy that will help the medical personnel to carry out the prevention and the control of infections precisely and permanently.
3. There should be study of administering the antibiotic to the urinary tract infection patients to learn of the medicine expenditure of each patient.