CHAPTER 3

METHODOLOGY

The objectives of this correlational descriptive study were to identify the level of computer knowledge, computer attitudes and computer skills of nurses, to compare the difference of computer knowledge, attitudes and skills of nurses receiving formal and those receiving informal computer training, and to describe the relationships among the three major variables.

Design of the study

A descriptive correlational design was employed in this study.

Population and sample

The population of this study consisted of 300 nurses who had been working as staff nurses at wards in People's Hospital affiliated to Beijing Medical University.

Selection criteria for the sample were as follows:

1. Having been working as staff nurses in four clinical units, including medical, surgical, obstetric and gynecological, and pediatric wards, during July of 1996 to January of 1998.

2. Being trained to use CHIS formally or informally, and have the ability to accomplish order entry task using CHIS.

3. Willing to participate in this study.

Proportionate stratified random sampling method was used to select 169 subjects from medical, surgical, obstetric and gynecological, and pediatric in this hospital.

Instrumentation

A questionnaire was used to collect data. It consisted of four main parts as follows:

1. Demographic Data Recording Form

Demographic Data Recording Form was developed to collect nurses' demographic data, including age, educational level, years of working in nursing, type of attending computer training, previous experience of computer use, computer use frequency.

2. Nurses' Computer Knowledge Questionnaire

Nurses' Computer Knowledge Questionnaire (NCKQ) was a 20-item true or false questionnaire, developed by the researcher of this study, based on the literature review and the computer training content. The instrument consisted of four sections: (1) the basic knowledge of computer (8 items); (2) the knowledge of CHIS use (6 items); (3) the limitations of CHIS (2 items); (4) system security (4 items). Each answer was given a value of 0-1 as follows: 0 = incorrect, and 1 = correct. Item scores were added to obtain a overall score for computer knowledge, range from 0 to 20. The scoring criteria of the overall computer knowledge and the subparts was divided into less than 70%, 70-90% and more than 90% of possible score was considered as low, moderate and high levels, respectively. The average time to complete this instrument was about 10 minutes.

3. Nurses' Computer Attitudes Scale

Nurses' Computer Attitudes Scale (NCAS) was an 18-item self-reported five-point Likert scale, which was modified from Burkes' Nurses' Computer-use Attitude Questionnaire by the researcher of this study. It consisted of three components: satisfaction (6 items), beliefs (6 items) and motivation (6 items). The questions were rated as: strongly disagree, disagree, moderate, agree, and strongly

agree. Answers were assigned a value of 1 - 5, which 1 indicating strongly disagrees; and 5 indicating strongly agree. Assigned value was inverted for negative statements. There were one half-positive items and one half negative items for each component. The positive items (1,2,5,8,9,10,15,16,17) were simply scored 1, 2, 3, 4, and 5; and the negative items (3,4,6,7,11,12,13,14,18) were scored 5, 4, 3, 2, and 1. Item scores were added to obtain a overall attitude score, ranged from 18 to 90. It was divided into three equal parts 18-42, 43-66, and 67-90; indicating computer attitudes of the subjects were negative, neutral and positive, respectively. The possible score for each part of computer attitudes was 6-30, and was divided into three equal parts 6-14, 15-22 and 23-30 indicating the subpart of computer attitudes was negative, neutral and positive, respectively. The average time to complete this instrument was about 10 minutes.

4. Nurses' Computer Skills Scale

Nurses' Computer Skills Scale (NCSS) was a 16-item self-reported scale developed by the researcher of this study, based on the literature review and formal computer training content. The instrument consisted of three sections: (1) basic computer skills for Windows operation (7 items); (2) the skills of using CHIS (7 items); (3) skills for system

security (2 items). It was used to measure the computer skills of nurses by using a four-point Likert scale: strongly disagree, disagree, agree, and strongly agree. Answers were assigned a value of 1 - 4, which 1 indicating strongly disagree; and 4 indicating strongly agree. Assigned value was inverted for negative statements. There were eight positive items and eight negative items. The positive items (1,3,5,6,7,10,11,14) were simply scored 1, 2, 3, and 4; and the negative items (2,4,8,9,12,13,15,16) were scored 4, 3, 2, and 1. Item scores were added to obtain an overall computer attitudes score, range from 16 to 64. It was divided into three equal parts 16-32, 33-48 and 49-64 indicating the overall computer skills was at low, moderate and high levels, respectively. The possible score of basic skills and CHIS skills parts was 7-28, and was divided into 7-14, 15-21 and 22-28 indicating the subparts of computer skills were at low, moderate and high levels, respectively.

The possible score of system security was 2-8, and was divided into 2-4, 5-6 and 7-8 indicating system security skills was at low, moderate and high levels, respectively. The average time to complete this instrument was about 10 minutes.

Reliability and validity

The original Burkes' Nurses' Computer Attitudes Questionnaire developed by Burkes was considered valid and reliable. The modified Nurses' Computer Attitudes Scale was used in this study. The content validity of NCAS in English versions was tested by five experts (Appendix C) including one expert in Nursing Administration Department, one expert in Public Health Nursing Department, one expert in Medical Nursing Department, one expert in Anesthesiology Department, and one expert in Family Medicine Department of Chiang Mai University, Thailand. The content validity index (CVI) of NCAS was .93. A test of internal consistency reliability in Chinese version of NCAS was conducted among 20 nurses who met with the same subjects' criteria, in People's Hospital of BMU. The Cronbach's alpha coefficient for NCAS was .72.

The content validity of Nurses' Computer Knowledge Questionnaire, and Nurses' Computer Skill Scales developed by the researcher in English were tested by the above five experts (Appendix C) at Chiang Mai University, Thailand. The questionnaires were rewritten according to those experts' suggestions. The questionnaires were translated into Chinese by the researcher. The Chinese versions were considered the adaptability and utility in Chinese population, and also the

accuracy, readability and clarity of translation were examined by two nurse experts, and two computer experts (Appendix C) in People's Hospital of Beijing Medical University who were both good in English and Chinese. Their suggestions were incorporated. The CVI of NCKQ and NCSS were .98 and .95 respectively. The reliability of NCKQ and NCSS were tested among 20 nurses who met the same subjects' criteria, in People's Hospital of BMU. The test-retest reliability was used to test the consistency of NCKQ. The NCKQ included four main aspects, a score on one aspect may not necessarily predict a similar score on other aspects, therefore, the most common measure, KR-20 was less appropriate for this instrument (Staggers, 1994). The test-retest reliability for NCKQ was .90. The internal consistency reliability of NCSS was calculated by using Cronbach's alpha. The Cronbach's alpha coefficient for NCSS was .83.

Data collection procedures

The questionnaires of NCKQ, NCAS and NCSS as well as Demographic Data of Recording Form were collected by the researcher in People's Hospital of BMU, following the sequences:

1. Obtained the approval for the study from the Research Committees of People's Hospital of BMU.

2. Obtained the permission for data collection from the hospital's administrators.

3. Reviewed the records of nurse's formal computer training, obtained the name list of every ward, and identified the potential subjects.

4. Selected samples according to the subjects' criteria.

5. Explained with the subjects about the nature, purpose, and procedures of the study.

6. Got verbal informed consent from subjects.

7. Distributed the questionnaire to subjects.

8. Collected the questionnaires back in one week.

9. The researcher reviewed all the questionnaires, and excluded the incomplete questionnaires.

Analysis of data

All data were analyzed by using Statistical Package of the Social Science (SPSS) for Windows. The purposes of the study, the nature of the data, and the level of measurement of the variables dictated the procedures used. Both descriptive and inferential statistics were used for data

analysis. The analyses were divided into six major parts:

1. Demographic data were shown in tables for describing the subjects by using frequency distribution, percentage, mean and standard deviation.

2. Range, percentage, mean and standard deviation were used to describe the scores of nurses' computer knowledge, computer attitudes, and computer skills.

3. T-test was conducted to compare the difference of computer knowledge, attitude and skills between two group nurses receiving formal and informal computer training.

4. Partial correlation coefficient was performed to test the relationships among nurses' computer knowledge, attitudes, and skills.

The researcher set the significant level at .05 for all analyses. The level of correlation used in this study was based on Pearson's r: r equals to 1 or -1 means perfect correlation; r more than .70 to 1 or -.70 to -1 means strong correlation; r more than .30 to .70 or -.70 to -.30 means moderate correlation; and r equals to 0 to .30 or -.30 to 0 means slight correlation (Polgar & Thomas, 1991).