CHAPTER 3

METHODOLOGY

This chapter describes the method used in the present study. The chapter consists of five sections. The first section describes the study design, followed by the second section: a description of population and sample. The third section presents the description of research instruments, construction and development of the instruments, and psychometric properties. The forth section involves ethical issues and procedures for data collection. In the final section, the method for data analysis is presented.

Research Design

A cross-sectional, correlational design was used to identify and explain predicting factors of dependent care behaviors in a sample of mothers of toddlers with CHD. In this study, the selected factors consist of parenting stress, perceived social support, perceived self-efficacy, CHD knowledge, educational background, and family income were examined for their relationships and predicting ability with dependent care behaviors among mothers of toddlers with CHD.

Population and Sample

The target population of this study was mothers of toddlers with CHD who accompany their child to attend pediatric cardiology clinic at Maharaj Nakorn Chiang Mai Hospital, Chiang Mai and Buddhachinaraj Hospital, Phitsanulok. A sample was

selected using purposive sampling method. Eligible mothers included mothers who met the following criteria:

1. Being mothers of children aged 1-3 years diagnosed with VSD or ASD or PDA
2. Being 18 years of age or older
3. Being able to communicate Thai language verbally
4. Willing to participate in this study and able to give informed or oral consent

Sample size determination

The estimate of sample size is crucial to the validity of study's results. According to Cohen (1988), the required sample size is based on a power analysis for partial correlation and regression analysis. The sample size can be calculated from the following function (Cohen, 1988): $N = \frac{\lambda}{f^2}$

When N = The sample size

λ = The noncentrality parameter which determined by the parameter of a, u, v, and desire power

a = Significance criterion

u = Degree of freedom of the numerator of the F ratio which is simultaneously the number of independent variables

v = Degree of freedom of the denominator of the F ratio

f^2 = Effect size for regression statistics can be calculated from the squared multiple correlation coefficeient (R^2) value

$f^2 = R^2 / (1 - R^2)$

Based on previous related studies, the significant correlations of the key research variables have been found between perception of CHD and maternal care behaviors for 3-6 years old children with CHD (r = .543; Asumpinzub, 1997), and perception of health of children with CHD and maternal care behaviors for children with CHD aged 6-12 years (r = 0.642; Chotibang et al., 2001). Thus, the effect size based on previous studies is,

$$F^2 = (.543)^2 / [\, 1 - (.543)^2 \,] = .42$$

In spite of Cohen (1988) proposed a power of .80 as reasonable for a study and a trial value of λ for $v = 120$ yield an N of sufficient accuracy. From a table used to compute the non-centrality parameter with significance level of .05, power of .80, 6 predictor variables, and the λ value is found to be 14.3 (Cohen, 1988). Given this criterion, a minimum subject that is necessary for this study is,

$$N = \frac{\lambda}{f^2} = \frac{14.3}{.42} = 34$$

As studies of correlations between the key research variables are limited, application of those results to estimate sample size for this study may have limitation. While an over estimation of effect size may lead to inappropriate sample size that consequently yields low power to detect the presence of the phenomena of interest. Thus, moderate effect as f^2 of 0.15 (Cohen, 1988) was used to estimate sample size in this study. With six predictor variables, a significance level of .05, a power of .80, and the moderate effect size of 0.15 by Cohen (1988), a sample of 95 mothers of toddlers with CHD was recruited for this study.

$$N = \frac{\lambda}{f^2} = \frac{14.3}{.15} = 95$$

Instrumentation

The following instruments were used in the study (see Appendix A):

1. The Demographic Data Form. The demographic information comprised of two parts. The first part requested data of the mother concerning with age, religion, marital status, occupation, educational background, family income, type of family, and number of children. The second part requested data of the toddler with CHD concerning diagnosis, age at diagnosis, sex, medications, history of having respiratory tract infection and CHF, and hospital admissions.

2. The Thai version of the Parenting Stress Index-Short Form (PSI-SF). The Thai version of the PSI-SF (Abidin, 1995) was used to obtain data of parenting stress in mothers of toddlers with CHD.

The Parenting Stress Index (PSI) was developed to identify specific sources of stress and overall level of stress in parent-child relationship. The construction of the PSI in 1976 was guided by a theoretical model of the determinants of dysfunctional parenting. The original PSI has 101 questions and is composed of a child and parent domain that includes respectively six to seven subscales. The PSI-SF is a derivative of the original PSI to reduce response burden in clinical settings (Abidin, 1995). The 36-item self-report instrument was developed from a series of replicated factor analyses and is divided into three subscales. The Parental Distress (PD) subscale determines the distress a parent is experiencing in their role as a parent as a function of personal factors that are directly related to parenting. The Parent-Child Dysfunctional Interaction (P-CDI) subscale focuses on the parent's perception that their child does not meet their expectation, and the interactions with their child are not reinforcing to

them as a parent. The Difficult Child (DC) subscale focuses on some of the basic behavioral characteristics of children that make them either easy or difficult to manage. The items are rated on a five-point Likert scale ranging from "strongly agree" to "strongly disagree." A score is obtained for each of these three areas. A summary total stress score provides an indication of the overall level of parenting stress an individual is experiencing. As suggested by Abidin (1995), the scores within the 15th to 80th percentile are considered within the normal range. High scores are considered to be scores at or above the 85th percentile. Mothers who obtained a total score at or above the 90th percentile (above a raw score of 90) are experiencing clinically significant levels of parenting stress.

Evidence of validity of the PSI-SF comes from the high correlation with the full scale PSI (r = .94), which has demonstrated associations with measure of family functioning, maternal adjustments and coping, and child adjustments (Abidin, 1995). Moreover, the construct validity of the PSI-SF was supported in the study by Reitman, Currier, and Stickle (2002). According to Burns and Grove (2001), the reliability coefficient of .80 is the lowest acceptable value for a well-developed psychosocial measurement. The internal consistency for PSI-SF reported by Abidin (1995) was .91, and a 6-month test-retest reliability coefficient was .84. The Thai version of the PSI is available under the license of the Psychological Assessment Resources, Inc. However, the translation method of the original English version into Thai has not been reported. After receiving permission from the publisher, the Thai version of PSI-SF was tested for the internal consistency reliability (the extent to which all the items in the scale consistently measure construct) by trying out with 10

mothers of the toddlers with CHD. The result found that the Cronbach's alpha coefficient was .89. Therefore, this instrument had acceptable validity and reliability

3. The Personal Resource Questionnaire (PRQ- 85- Part II). The PRQ-85 (Part II) was used to obtain data of perceived social support in mothers of toddlers with CHD.

The PRQ was developed by Weinert and Brant (1981) based on the theoretical concepts of Weiss (1974), incorporating aspects of social support such as intimacy, nurturance, social integration, assistance, and worth. The PRQ was revised as the PRQ-82 and PRQ-85 to measure situational and perceived social support (Weinert, 1987). The PRQ-85 consists of two parts. Part I of PRQ-85 consists of 10 life situations in which an individual might be expected to need some assistance and provide information concerning the person's resources and the person's satisfaction with the assistance obtained. Part II is composed of subscales that represent five dimensions of social support which includes intimacy, social integration, nurturance, worth, and assistance. In this study, only the PRQ-85 (part II) was used because this part is a 25-item that measures the person's level of perceived social support. The items are seven point Likert scale ranging from "strongly agree" to "strongly disagree." The possible scores range from 25 to 175 with higher scores indicating higher levels of perceived social support (Weinert, 1987). In the current study, the scores were categorized into three levels of low (25-75), moderate (76-125), and high level (126-175) of perceived social support by dividing the score equally into three ranges.

Weinert and Tilden (1990) reported that convergence, a component of construct validity, was supported by the correlation between the PRQ-85 and the

support subscale of the Cost and Reciprocity Index (r = .58, .53). The strength of these correlations provided evidence that both scales tapped the same construct. The discriminance was also evaluated by comparing the PRQ-85 with the measure of negative mood state (POMS: Profile of Mood States). The correlation of support as measured by the PRQ-85 with the total POMS was -.31. This finding lends further evidence that social support, as measured by the PRQ-85, is related to, but different from, the mental health concept of depression (Weinert & Tilden, 1990). Moreover, the intercorrelations among five subscales of the PRQ-85 (part II) were consistently obtained across studies and the internal consistency was at .87- .97 (Weinert, 1987).

The PRQ-85 (part II) was translated into Thai with the double translation method in 1998 by Sinsuksai (Prasopkittikun, 2001). The Thai version of the PRQ-85 (part II) was used in a study with 76 Thai mothers of preterm-infants and internal consistency coefficient of the scale was .81(Prasopkittikun, 2001). In the current study, the reliability of the PRQ- 85 (part II) was assessed with 10 mothers of toddlers with CHD, the Cronbach's alpha coefficient was .96. As the PRQ-85 (part) II has satisfactory psychometric properties with an appropriate translation method, this scale was selected to measure perceived social support for this study.

4. The CHD Knowledge Scale. The CHD Knowledge Scale was a self-reported questionnaire developed by the researcher to assess knowledge related to care for toddlers with CHD.

This instrument was developed based on the Self-Care Deficit Nursing Theory (Orem, 2001) and literature review. The process of instrument development guided by Burns and Grove (2001) consists of five steps: concept identification, designing the scale, item review, validity testing, and reliability testing. The scale was

designed to assess knowledge regarding CHD with increased pulmonary blood flow in four categories: general knowledge related to etiology and physiology of the defects, knowledge related to universal self-care requisites, knowledge related to health-deviation self-care requisites, and knowledge related to developmental self-care requisites of the CHD toddlers. The scale consisted of 23 true-false questions. Nineteen items were positive statements and four items were negative statements. The score of one point was given to a correct answer, while the score of zero was given to either an incorrect answer or "I don't know." Higher scores indicated higher level of CHD knowledge possessed by the subjects. The possible scores ranged from 0 to 23 and were classified into three levels of low (scores = 0 - 7.67), moderate (scores > 7.67 - 15.34), and high (scores > 15.34 - 23.00) by dividing the scores equally into three ranges.

Content validity of the CHD Knowledge Scale was determined by a panel of five experts: three nurse instructors with expertise in children with CHD, one nurse instructor with expertise in instruments development, and one pediatric cardiologist. The experts were asked to review and to rate each for the appropriateness, clarity, and relevance to the corresponding categories. The 4-point rating scale was 1 (not relevant), to 2 (somewhat relevant, needs revision), 3 (quite relevant, needs minor alteration), and 4 (very relevant and succinct). The rating scores of 3 or 4 were accepted (Lynn, 1986). Thus, the items that received the rating lower than 3 and suggestions were discussed and revised based on the experts' recommendations. The revised questionnaire was again sent to the experts to evaluate for content validity. As a result, the CVI of the total scale was 1.00 (see Appendix B), meeting the criteria for judgment of content validity (≥ .80; Davis,

1992). The internal consistency reliability of this scale was tested in 10 mothers of the toddlers with CHD. Since the items in this scale are dichotomous, the Kuder-Richardson formula (KR-20) was used in this process and the coefficient value was .73. According to Burns and Grove (2001), the reliability coefficient of at least .70 is adequate for a newly developed instrument. Therefore, this scale had acceptable reliability.

5. The Dependent Care Behaviors in Mothers of Toddlers with CHD Scale. This instrument was used to obtain data of dependent care behaviors among mothers of toddlers with CHD.

This instrument was developed by the researcher based on the Self-Care Deficit Nursing Theory (Orem, 2001) and literature review. Based on Orem's Theory (2001), the scale covers three types of self-care requisites for toddlers with CHD: universal self-care requisites, developmental self-care requisites, and health deviation self-care requisites. The scale composes of 46 items with four-point Likert-type response format. The responses for the four-point Likert scale range from 0 = never experienced the reported behavior, 1 = never perform the reported behavior, 2 = some time perform the reported behavior, and 3 = always perform the reported behavior. Since some of the reported behaviors did not experience by some mothers, the final score was calculated by divided total score with number of experiencing items. The possible final scores ranged from 1 to 3 and were classified into three levels of low (1.00 - 1.67), moderate (> 1.67 - 2.34), and high (> 2.34 - 3.00) by dividing the scores equally into three ranges. Higher scores reflect better dependent care behaviors.

Content validity of the instrument was used to validate the scale. The process of validity testing was the same as aforementioned process of validity testing

of the CHD Knowledge Scale. The CVI of the entire scale was .95 (see Appendix B). The internal consistency reliability of this scale was tested in 10 mothers of the toddlers with CHD. The Cronbach's alpha coefficient was .74, indicating acceptable reliability.

6. The Maternal Perceived Self-efficacy Scale. This scale was used to assess perceived self-efficacy of the mothers in providing care for her toddler with CHD.

The Maternal Perceived Self-efficacy Scale was developed by the researcher based on Bandura's self-efficacy theory (1997), Orem's theory (2001), and literature review. The scale was designed to measure the mothers' confidence in providing care for her toddler with CHD covers three types of self-care requisites as measure in the Dependent Care Behaviors in Mothers of Toddlers with CHD Scale. The Maternal Perceived Self-efficacy Scale was a 38-item with five-point Likert-type format scale. Responses to the statements ranged from 1 (Not at all confident I can do that), 2 (somewhat confident I can do that), 3 (moderately confident I can do that), 4 (very confident I can do that), and 5 (extremely confident I can do that). The higher scores indicated higher self-efficacy. The possible scores ranged from 38 to 190. In this study, the scores were classified into three levels of low (scores = 38.00 - 88.67), moderate (scores > 88.67 - 139.34), and high (scores > 139.34 - 190.00) by dividing the scores equally into three ranges.

The Maternal Perceived Self-efficacy Scale was evaluated for content validity using the same process of validity testing as aforementioned scales. The CVI of the total scale was 1.0 (see Appendix B). Also, the internal consistency reliability of this scale was tested in 10 mothers of the toddlers with CHD. The Cronbach's alpha coefficient was .96, indicating acceptable reliability.

Protection of Human Rights

Prior to conducting the study, the project proposal and research instruments were reviewed and approved by the Research Ethics Review Committee of the Faculty of Nursing, Chiang Mai University. Ethical approval for the study were also obtained from the Research Ethics Committee of the Faculty of Medicine, Chiang Mai University and Buddhachinaraj Hospital. Prospective respondents were informed about the purposes, procedures, and benefits of the study. They were assured about the confidentiality of their information that would be used only for the purpose of this study. In addition, participation in the study was on voluntary basis. They could refuse to participate or withdraw from the study at any time without any effects to themselves, their CHD child, or hospital services. After the respondents agreed to take part in the study, they were asked to sign a consent form. Nevertheless, if the respondents were not comfortable to sign the consent documents, verbal consent was obtained before data collection began.

Data Collection Procedures

The data were collected from August 2007 to September 2008 with the following steps:

1. After the permission to collect data at the Pediatric Cardiology Clinic, Maharaj Nakorn Chiang Mai Hospital was obtained; the researcher contacted the head nurse and staff of the outpatient clinics to give information about the research study and the data collection procedure.

2. The medical records of all patients were examined by the researcher to recruit for potential respondents who met the inclusion criteria.

3. While waiting to see the doctor, the prospective respondents were approached personally by the researcher and were given an information sheet explaining the purposes, nature of the study, confidentiality of the data, and the right to withdraw from the study at any point in time.

4. The mothers who were willing to take part in the study were invited to sign a consent form in a room nearby the waiting area. For the respondents who were not comfortable to sign a consent document, verbal consents were obtained instead.

5. After the consent was obtained, the prospective respondent was structurally interviewed as follows: the Demographic Data Form, the CHD Knowledge Scale, the Maternal Perceived Self-efficacy Scale, the Dependent Care Behaviors in Mothers of Toddlers with CHD Scale, the PSI-SF, and the PRQ-85 (part II). The interview took approximately 40 minutes to complete the whole set of instruments. Concerning the exhaustion, the respondent was free to have refreshments served during the interview.

6. After all of the six scales were completed, a gratitude letter and a token were given to the respondents for their participation.

After six months of collecting data, only 55 mothers joined in the study. A number of prospective respondents were not included in the study as depended on many reasons, including having complex CHD, having other underlying diseases, and having problems with communication. In order to increase number of participants, the subject recruitment site was extended to Buddhachinaraj Hospital, Phitsanulok. Data collection was done after receiving permissions from the administrator of the hospital. The data collecting procedures was summarized as follows:

1. The researcher contacted the head nurse and staff of the outpatient clinics

to give information about the research study and the data collection procedures. At this setting, two research assistants (one graduate nurse and one healthcare professional) assisted in collecting the data. Prior to collecting data, the research assistants were informed about the study objectives and data collection procedures.

2. The medical records of all patients were examined by the head nurse and research assistant to recruit for potential respondents.

3. Data collection was done using the same steps of data collecting procedures as Maharaj Nakorn Chiang Mai Hospital.

Data analysis

Prior to data analysis, the data of each variable were examined for accuracy of data and missing value. The outliers, data points that distinct or deviate from the rest of the data (Pedhazur, 1997), were also detected. In the current study, the statistical testing showed that one case of family income was beyond acceptable values (4.22). This outliers was omitted and another case was added into the study. After the data were re-examined, the scores of this variable were acceptable. Thus, 95 participants were included in this study.

The violation of statistical assumptions for a multivariate analysis was checked before multiple regressions were calculated. These assumptions were outliers, normality, linearity, and homoscedasticity. Moreover, multicollinearity was also used to check the possibility of high correlation among the predictors.

The multivariate outliers were assessed by the criterion of Mahalanobis distance at $p < .001$ (Tabachnick & Fidell, 1996 as cited in Mertler & Vannatta, 2002). The evaluation showed that no multivariate outliers were found within the data of

variables in this study. A statistical test of skewness and kurtosis coefficients, were used to assess univariate normality in this study. The test revealed that the distributions of family income had a positive skewness and the skewness coefficient value was not in an acceptable range (1.15; see Appendix F). However, West, Finch, and Curran (1995) suggest that the standard error of parameter estimations is underestimated when variables are "highly non-normal" (e.g., skewness = 3; kurtosis = 21). In this study, the skewness coefficient of family income was close to 1. This variable was kept in the original form without transformation.

The assumptions of multivariate normality, linearity, and homoscedasticity were screened through the residual scatterplots. The visual examination showed that the values in this study fell along the diagonal line with no substantial departure. Also, the residuals distributed both above and below the reference line. Thus, the residuals plot showed no violations of those assumptions (see Appendix G). Regarding the multicollinearity, the results in this study showed that the correlations among predictor variables ranged from 0.05 to 0.55 (see Table 4-6), and tolerance values in the regression equations ranged from 0.81 to 1.00 (see Appendix H). These indicated that multicollinearity was not serious for an interpretation of the results from this multiple regression study.

Data were analyzed as following:

1. Descriptive statistics (means, frequencies and percentages) were used to describe sample with respect to individual information. Descriptive statistics (means, standard deviations, and percentages) were used to depict the sample's level of

parenting stress, perceived social support, perceived self-efficacy, CHD knowledge, dependent care behaviors.

2. Multiple regression analysis was used to obtain the partial correlation coefficients of dependent care behaviors among mothers of toddlers with CHD and each study's variable (parenting stress, perceived social support, perceived self-efficacy, CHD knowledge, educational background, and family income). As the variables in this study are correlated, the partial correlation coefficient can be used to reveal the strength of the relationship between dependent care behaviors of the mothers and a single study's variable when the effects of the other variables are held constant (Hair, Anderson, Tatham, & Black, 1998).

3. Stepwise multiple regression analysis was used to evaluate the predictive power of parenting stress, perceived social support, perceived self-efficacy, CHD knowledge, educational background, and family income on dependent care behaviors among mothers of toddlers with CHD.

Stepwise multiple regression analysis is appropriate for this research question due to the nature of questions. Multiple regression is a widely used multivariate statistical technique that examines the relationship between a single dependent variable and a set of independent variables. Multiple regression can be used to predict or explain relationships. With prediction, multiple regression is used to predict the dependent variable with a set of independent variables, which maximizes the overall predictive power of the independent variables as represented in the variate. With explanation, multiple regression provides a means of objectively assessing the degree and character of the relationship between dependent variable and independent variables by forming the variate of the independent variables. The

independent variables, in addition to their collective prediction of the dependent variable, may also be considered for their individual contribution to the variate and its predictions. Moreover, multiple regression also affords a means of assessing the nature of the relationships between the independent variables and dependent variable (Hair et al., 1998).

Selection of a particular multiple regression procedure is based on the purpose of the study. In an exploratory procedure when the researcher may not have sufficient information to determine which variables are effective predictors of the dependent variable, stepwise multiple regression analysis is often used (Burns & Grove, 2001). In this approach, the independent variable with the greatest contribution is added first. The independent variables are then selected for inclusion based on their incremental contributions over the variable(s) already in the equation (Hair et al., 1998).