

CHAPTER 3

METHODOLOGY

Introduction

The objective of this methodological research was to develop and test the psychometric properties of the WHES that assesses the concept of empowerment regarding health for Thai female factory workers. Two research questions were proposed in the study including (1): What are the components of an empowerment scale related to the health of female factory workers in Thailand? and (2): How valid and reliable is this newly developed empowerment scale related to the health of female factory workers in Thailand?

This chapter consists of setting, population and sample, as well as the description of the development of an instrument and testing psychometric properties, protection of human subjects' rights, data collection, and data analysis.

Setting

The Kingdom of Thailand, which has an area of 542,372 square kilometers (198,456 square miles), is located in central Southeast Asia and is bordered by Laos and Cambodia on the east and northeast, Burma on the west and northwest and Malaysia on the south. (Richter & Yoddumnern-Attig, 1992; Srisontisuk, 2000). By the early 1990s, Thailand was widely viewed as an emerging member of the newly industrialized countries of East Asia. Exports and foreign investment capital drove the nation's economic expansion throughout the 1980s, transforming the economy from

agricultural to semi-industrial (Chandravihun & Vause, 1994).

In all parts of Thailand (central, northeast, north, west, east and south), a high percentage of women who are 15 years or older, have an educational level lower than final year primary school. Also, they have similar weekly working hours of between 40-49 hours per week (National Statistical Office, 2002).

In southern Thailand, the Ministry of Public Health divides the south into two regions, namely region 11 and region 12. Region 11 consists of 7 provinces as follows: (1) Chumphon, (2) Ranong, (3) Surat-thani, (4) Nakhon-Si-Thammarat, (5) Phangnga, (6) Krabi, and (7) Phuket. Region 12 consists of the following 7 provinces: (1) Trang, (2) Phthalung, (3) Songkhla, (4) Satun, (5) Yala, (6) Pattani, and (7) Narathiwat. This study focused only on the province from each region that had the highest number of female workers in manufacturing factories. Research carried out by the National Statistical Office in 2002 indicates that the two provinces that meet the research criteria are Nakhon-Si-Thammarat and Songkhla. Therefore, the two provinces included in this research were Nakhon-Si-Thammarat, (31,164 or 15.47 percent of female manufacturing workers in the south of Thailand) from region 11 and Songkhla (42,742 or 21.21 percent of female manufacturing workers in the south of Thailand) from region 12 (National Statistical Office, 2002) (Figure 1).

Population and Sample

The manufacturing industry has the highest number of female workers in factories in the south of Thailand. In 2003, there were a total of 117,242 females working in manufacturing in the south of Thailand (National Statistical Office, 2002).

The samples in this study were obtained from two studies; the qualitative and the quantitative. In the qualitative study, the samples were selected from 20 subjects employed at six manufacturing factories in Songkhla province of region 12. The samples of the quantitative study were divided into two different techniques. Step one of the sampling technique was purposive sampling. The samples were selected from provinces in region 11 and region 12 that had the highest number of female workers in manufacturing factories. The two provinces in this step were: (1) Nakhon-Si-Thammarat with 3,736 women in manufacturing factories, and (2) Songkhla with 28,421 women in manufacturing factories. Then, proportional sampling technique was used to find the factories and female workers from Nakhon-Si-Thammarat and Songkhla province. Criteria for the factories included those with the following number of employees; (1) 100-299, (2) 300-499, (3) 500-999, and (4) 1,000 and up in each factory. In Nakhon-Si-Thammarat province, subjects were randomly recruited from three factories with 162 female factory workers. Whereas in Songkhla province, subjects were randomly recruited from 7 factories with 1,222 female factory workers (Figure 1). The total number of women who were samples in this study was 1,384.

For a sample size, the larger the number of items to be factored and the larger the number of factors anticipated, the more subjects should be included in the analysis (DeVellis, 1991; Nunnally & Bernstein, 1994). Various investigators have offered rules of thumb for the determination of sample size in relation to the number of variables (Pedhazur & Schmelkin, 1991). For example Munro (2001) proposed a ratio of at least 10 subjects for each item is desirable to generalize from the sample to a wider population. With smaller ratios, the influence of relationships based on random

patterns within the data becomes more pronounced. Therefore, the sample size in this study is a ratio of 16 subjects for each item.

The sample consisted of Thai women working in manufacturing factories in the south of Thailand. The criteria for recruiting subjects were their ability to communicate in Thai language and that they had been working in a criteria factory.

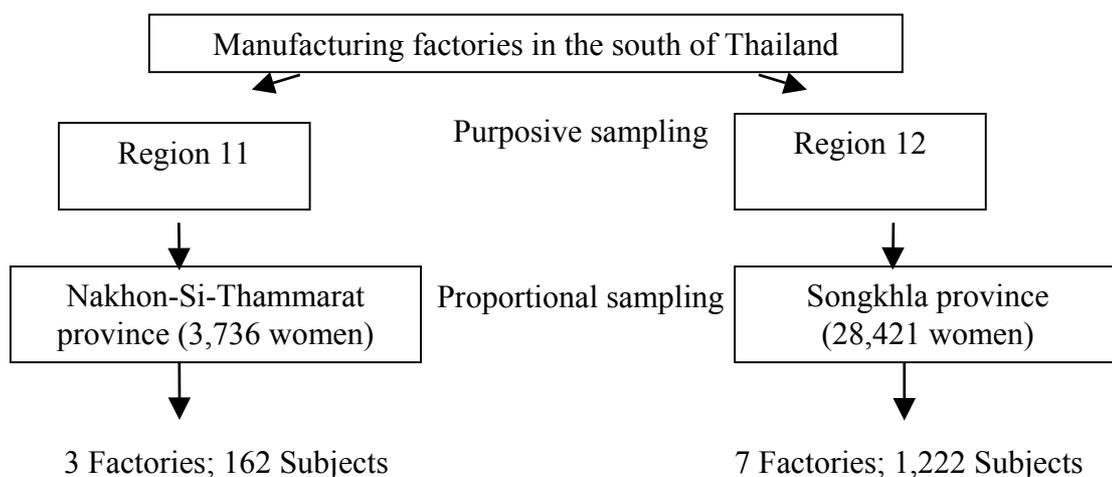


Figure 1. The Setting and Steps of the Sampling Technique

Development of an Instrument and Testing Psychometric Properties

The WHES was developed by the researcher using a two-phase process as follows: phase 1 (qualitative study) and phase 2 (quantitative study). Two instruments were used in this study: the Demographic Data Form, and the WHES. The Demographic Data Form was developed to provide general information and analyses with the resulting factors of the WHES for this study. The WHES was developed to explore its components and determine its psychometric properties.

Phase 1: Qualitative study. This phase was an overview of empowerment concept regarding health of Thai women in factories and to check for the feasibility of

the interview. Also it was to develop themes for the quantitative study. The details of the qualitative study were presented as follows.

First stage. The main objectives of this stage were: to develop the in-depth interview guideline of the Demographic Data Form and the components of the WHES. The specific objectives of this first stage of the qualitative study consisted of (1) to check the time and the place for in-depth interviews, (2) to develop a guideline for in-depth interviews in the second stage, (3) to determine if empowerment is a process or an outcome, and (4) to overview the themes of the WHES and report the information of female factory workers appropriate to Thai culture.

The steps in this stage began with a review of related literature to develop a guideline for in-depth interviews. The following demographic variables were examined by interviewed items including; (1) age, (2) religion, (3) marital status, (4) educational level, (5) income (6) family members, (7) family health background, (8) personal health history, and (9) economic background. The in-depth interviews of empowerment related to the health of women in factories focused on four dimensions including physical, psychological, spiritual, and social aspects. The following are two examples of the types of questions that the subjects were asked to respond to:

“I am interested in your experience with health; including physical, psychological, spiritual, and social status such as access to health services, source of providers, family planning, and control of sexually transmitted diseases. Please tell me about your experiences. (The woman will be encouraged to tell her story),”

“How do you take care of your health; including physical, psychological, spiritual, and social? Would you say this has had a major impact on your life? How would you describe this impact?”

Pilot testing eight individuals who had characteristics and experiences that were identical to those for whom the interview was designed then followed. Three of the eight were interviewed after their lunch on a working day at the factory; the remaining five were interviewed in their homes at a set appointment. By using two different settings for the interviews in the pilot study, it served for the main objectives and the specific objectives, such as to determine the time and the place for individual in-depth interviews.

Results from the pilot study were: (1) The day of the interview should be on a weekend or day-off and the place should be in their homes, (2) In-depth interview guidelines consisted of women’s health and empowerment dimensions such as (2.1) What are the health problems of the women in the factory? Who helps you when you have health problems? (2.2) How do you gain control over your health problems? Why? What happened? (3) Empowerment from this stage was displayed as a sense of thinking and doing, support in problem solving, and goal orientation. One participant said, “To gain control over my health problems, I must think and do it by myself. I do not have anyone to advise me,” and (4) Three themes emerged from the results of pilot testing and the literature review including; (4.1) Sense of thinking, doing, and gaining control over lives, (4.2) Critical awareness and having support in solving problems, and (4.3) Participation to meet goals (Figure 2).

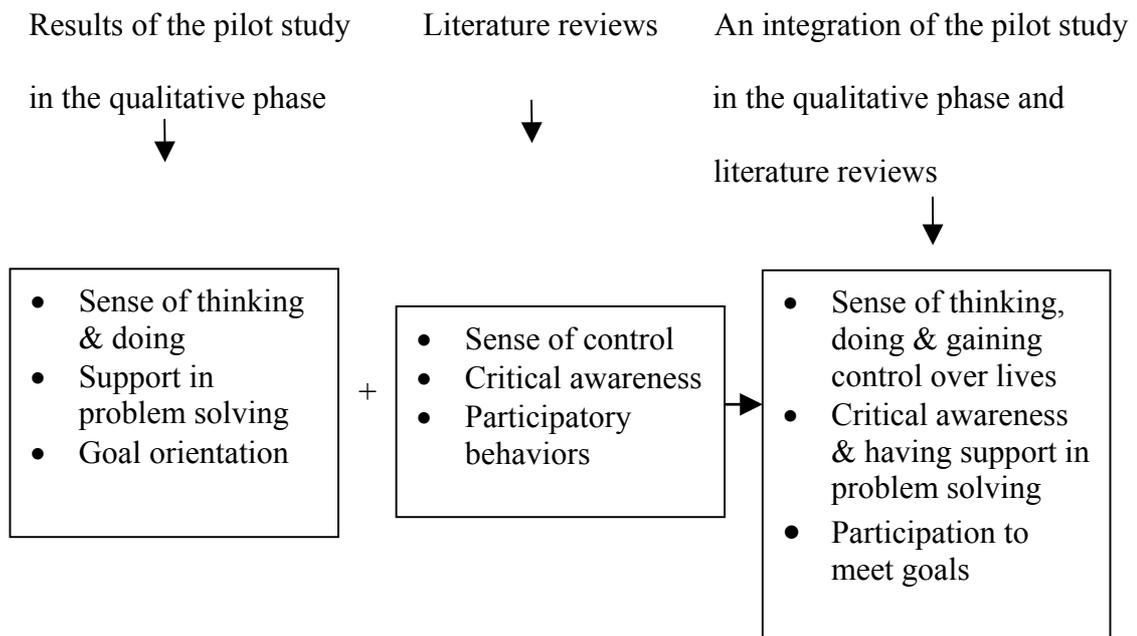


Figure 2. Results of the Pilot Study in the Qualitative Phase and Literature Reviews

The researcher developed in-depth interviews from the results of the pilot study in the qualitative phase and literature reviews. The in-depth interview guidelines consisted of both women's health and empowerment dimensions; such as (1) What are the health problems of women in factories? Who helps you when you have health problems? (2) How do you gain control over your health problems? Why? What happened?

Second stage. The objective of this stage was to confirm themes and develop new themes for items to be tested in a quantitative study. This step started by integrating the result from the pilot study in the first stage of the qualitative study with the literature reviews. Five measurement and content experts reviewed the questions for the interview guide. According to the suggestions of these experts, the focus of the in-depth interview guidelines was expanded to cover both the Demographic Data

Form and the in-depth interviews of empowerment regarding women's health. The followings were some examples: (1) the importance of religion to daily life, (2) duration of working in a factory, (3) thinking, feeling, and behavior related to health in four dimensions including physical, psychological, spiritual, and social aspects, (4) factors of health and concepts and ways to solve health problems, and (5) women's health issues in factories which separate each four dimensions of health precisely.

After five measurement and content experts reviewed the in-depth interview, the committee-version of the in-depth interview was developed (Appendix A). Then, it was used to interview 12 Thai female factory workers, 10 of these same workers then acted as the interviewees in the focus group interview. This methodological triangulation technique, an individual in-depth and a focus group interview, was relevant for the content analysis (Waltz et al., 1991). Information from these various interviews was used to create four components on a scale of empowerment. These were: (1) Awareness of health, (2) Support in solving health problems, (3) A will-power to be healthy, and (4) A sense of good health. Moreover, when these four components were integrated with information from the literature reviews, four new components were presented as follows: (1) Increasing awareness of health, (2) A reciprocal community support in solving health problems, (3) A will-power to achieve visions and goals of health, and (4) A sense of achievement to well-being (Figure 3).

Results of the second stage

Literature reviews

An integration of the second

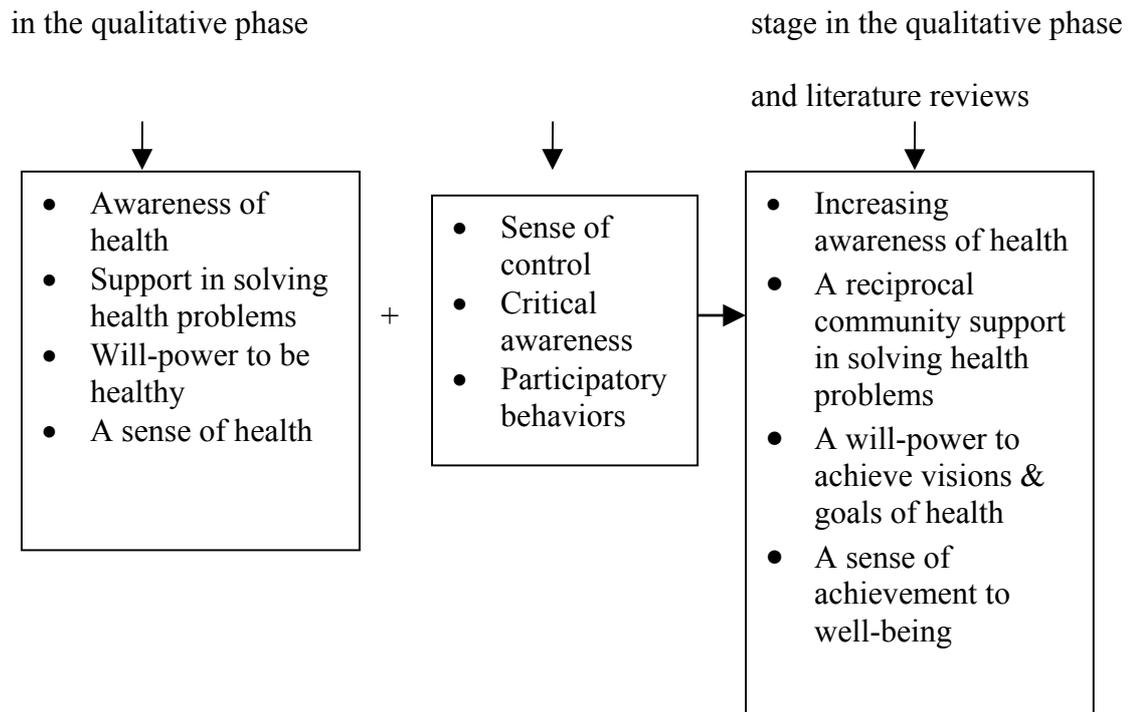


Figure 3. Results of the Second Stage in the Qualitative Phase and Literature Reviews

Phase 2: Quantitative study. This phase was concerned with using the guidelines of DeVellis (1991) to develop the WHES for Thai female workers in factories. It consisted of literature reviews and the qualitative study from the first phase. Developing the WHES and testing its psychometric properties in quantitative study was divided into six stages as follows: (1) develop an items pool, (2) determine a content validity index, (3) pilot tested the WHES, (4) first testing of field tested, (5) second testing of field tested, and (6) final testing of field tested.

First stage: Development of the WHES version 1. The objective of this stage was to develop the items for the WHES from the results of the qualitative phase and literature reviews. Following four themes from the results of the qualitative phase and

literature reviews, two steps were started by generating an initial items pool and determining the format for measurement as follows:

1. Generation of an items pool. Following each theme in the qualitative study and literature reviews, questions were generated as a large pool of items.

2. Determining the format for measurement. As Chamberlin (1997: 44) stated a quality of empowerment is: "having a range of options from which to make choices: not just yes or no." Furthermore, the study of cultural differences in responses to a Likert scale by Lee et al. (2002) found that both Chinese and Japanese respondents selected the mid-point more frequently than Americans.

The WHES version 1 was constructed and consisted of 96 items as follows: Theme 1: Increasing awareness of health, Theme 2: A reciprocal community support in solving health problems, Theme 3: A will-power to achieve visions and goals of health, and Theme 4: A sense of achievement to well-being. Each theme consists of 16 items for four dimensions of health: physical, psychological, spiritual, and social aspects. The items of WHES (version 1) were written in a structure of the five-point Likert scale format. The subjects were asked to indicate how they typically responded in a variety of situations. For each statement, the female factory workers selected the response, which applied best to them. The items were scored: 1 = Not at all, 2 = A little, 3 = Moderate, 4 = High, and 5 = Very high.

Second stage: Development of the WHES version 2. The objective of this stage was to determine a content validity index. The initial items pool (WHES version 1) was reviewed by seven experts, to determine if the questions were totally representative of the interview data. Experts reviewing the first version of the quantitative study of the WHES included: three experts in women's health, two

experts in development of instruments, one empowerment concept expert, and one expert in development of instruments and empowerment concept. These experts were asked to:

1. Link each theme with its respective item.

2. Assess the relevancy of the items to the content addressed by themes using a 4-point rating scale: 1 = not relevant, 2 = a little relevant, 3 = quite relevant, and 4 = very relevant. A Content Validity Index (CVI) was used to identify the extent of agreement between the experts. An acceptable level of CVI is at least 0.80 (Waltz et al., 1991). CVI from this phase was 0.94. The development of a committee-modified version (WHES version 2) that consists of 91 items was provided after determining the suggestions from experts.

3. Identify clarity and conciseness of items using “yes” and “no” responses.

In addition, the experts were asked to suggest alternatives for items that are “not relevant”, “a little relevant”, “not clear”, and “not concise” (Appendix B).

Third stage: Development of the WHES version 3. This stage examined the appropriateness of the language used in the items, determined clarity, adequacy for the research to be conducted, and administering the instruments and bias. The WHES version 2 was administered to 20 Thai female factory workers who were similar to those for whom the instrument was developed. The female factory workers were instructed to write comments on each item they had difficulty in understanding or items they considered irrelevant to the situation. Of this number, 18 surveys were completed and returned. Questionnaires were examined for appropriate items regarding language, clarity, and times. The results showed that there were many items in this study that were similar or redundant (72.22%). One of them said, “The content

is reasonable to understand and respond to but some items have similar meaning.” Most of the women (88.88%) were able to answer the content asked. One of them mentioned that the content had happened in real life. More than 70% agreed that the language was clear. The amount of time for completing this scale was moderate (50%), however, they said, “did not have enough time, would like to read for a longer time than available.” They were in a hurry to return to their jobs.

After the pilot tested version 2 of the WHES, modification of this scale resulted in the WHES version 3 with 91 items, which was used for the next stage; the first testing was used for differentiating item selection and reliability of the scale.

Fourth stage: Development of the WHES version 4. This stage was to determine if a given item contained differentiators between subjects who obtained high scores and low scores of performance on the overall measure by using t-test (Edwards, 1957; Srisaard, 1989). In addition, the fourth stage was tested to determine the reliability of the scale by using alpha coefficient. The WHES version 3 consisted of 91 items and was tested with 100 randomly recruited Thai female workers from one factory, who were similar to those for whom the instrument was developed. Of the 100 surveys, 83 surveys were completed and returned. The results showed that five items were not significantly different and then removed from the WHES. These five items were as follows:

Item one: “If my boyfriend is not faithful to me and has another girlfriend, I will consider a blood test to check for the HIV virus.”

Item two: “I have ways to eliminate problems that make me unhappy.”

Item three: “When I stay with my family, I often say things that will make them happy.”

Item four: “If I encounter problems with my advisors I have someone close to me to consult.”

Item five: “I am confident that I can observe any personal health abnormalities.”

Furthermore, six items were not significantly different at level .01, but significantly different at level .05 and these items were modified for reasons of precision, objective wordings and to increase the sequences of words in each item. Regarding these six items, (1) three items were modified for precision, such as from “If I know that my boyfriend has a sexual relationship with another girlfriend, I may make him use a condom when having sexual intercourse with me.” to “If my husband has sexual relationships with another woman, I must make him use a condom when having sexual intercourse with me,” (2) two items were modified for using objective words, such as from “I try to think of ways to make myself healthy” to “I have ways to make myself healthy,” and one item was modified to improve the word sequence in the item, from “I visit the doctor if I find my body is abnormal” to “When my body is abnormal, I visit the doctor.”

The results of the fourth stage showed that the WHES version 4 consisted of 86 items, which can be used to differentiate between those who obtained high scores and low scores on the significant scale ($p < .01$ of 80 items and $p < .05$ of 6 items). In addition, alpha coefficient of WHES version 4 was 0.967.

Fifth stage: Development of the WHES version 5. This stage was used to confirm for differentiating item selection if a given item contained differentiators between subjects who obtained high scores and low scores of performance on the overall measure by using t-test (Edwards, 1957; Srisaard, 1989). In addition, this stage

was also tested to determine the reliability of the scale by using alpha coefficient. The scale (WHES version 4) with 86 items was tested with 130 Thai female factory workers, a new group of workers from a different factory from the fourth stage, was used. The subjects, who were similar to those for whom the instrument was developed, were randomly recruited from one factory with 130 female factory workers. Of the 130 surveys, 120 surveys were completed and returned. The results of WHES version 5 were presented as follows: (1) all items can be used to differentiate between those who obtained high scores and low scores on the significant scale ($p < .01$ of 80 items and $p < .05$ of 6 items), and (2) the WHES version 5 consisted of 86 items, (Appendix C), with high alpha coefficient (0.958).

Sixth stage: Development of the WHES version 6. This stage was to determine the components of the WHES and its psychometric properties. The new instrument (WHES version 6) was presented after finishing the sixth stage of the quantitative study (Figure 4). The final stage consisted of:

1. Determining the construct validity using exploratory factor analysis (EFA). EFA was a useful approach in this study. It provided a way of assessing construct validity and to help determine how many constructs underline a set of items (DeVellis, 1991; Waltz et al., 1991). To assure construct validity, EFA was performed on the WHES to provide factors of the scale by two groups, a whole group ($n = 1,384$), and splitting the whole group into two samples ($n = 692$).

2. Testing the hypothesis using Pearson product-moment correlations, analysis of variance, and correlation ratio (η). These techniques were used to test the conceptual framework of this study. The hypotheses were the relationships between

demographic variables (including age, personal income, family income, number of family member, educational level, type of family, and caregivers) with the WHES.

3. Establishing the internal consistency using alpha coefficient. The results showed a satisfactory reliability of 0.968.

4. Testing the stability using test-retest technique. This was used as a method of testing confirmation of the WHES's reliability on two separate occasions. With a 2-week interval between tests (Shiu et al., 2003; Ven et al., 2003), a sample of 33 Thai female factory workers who were working in a manufacturing factory were retested for the WHES for the second time.

Protection of Human Subjects' Rights

Upon approval from the Institutional Review Board of the Faculty of Nursing, Prince of Songkla University, female workers in the specified factories were contacted for permission to take part in the study. Protection of subjects' rights was obtained by full oral explanation: (1) the title of the study, (2) the purpose of the study, (3) assurance of the subjects' anonymity, (4) voluntary participation with and withdrawal from the study at any time, (5) the usefulness of the results of the study to female workers in factories particularly health promotion and maintenance, wellness and illness prevention (6) the name and address of the investigator (Appendix D).

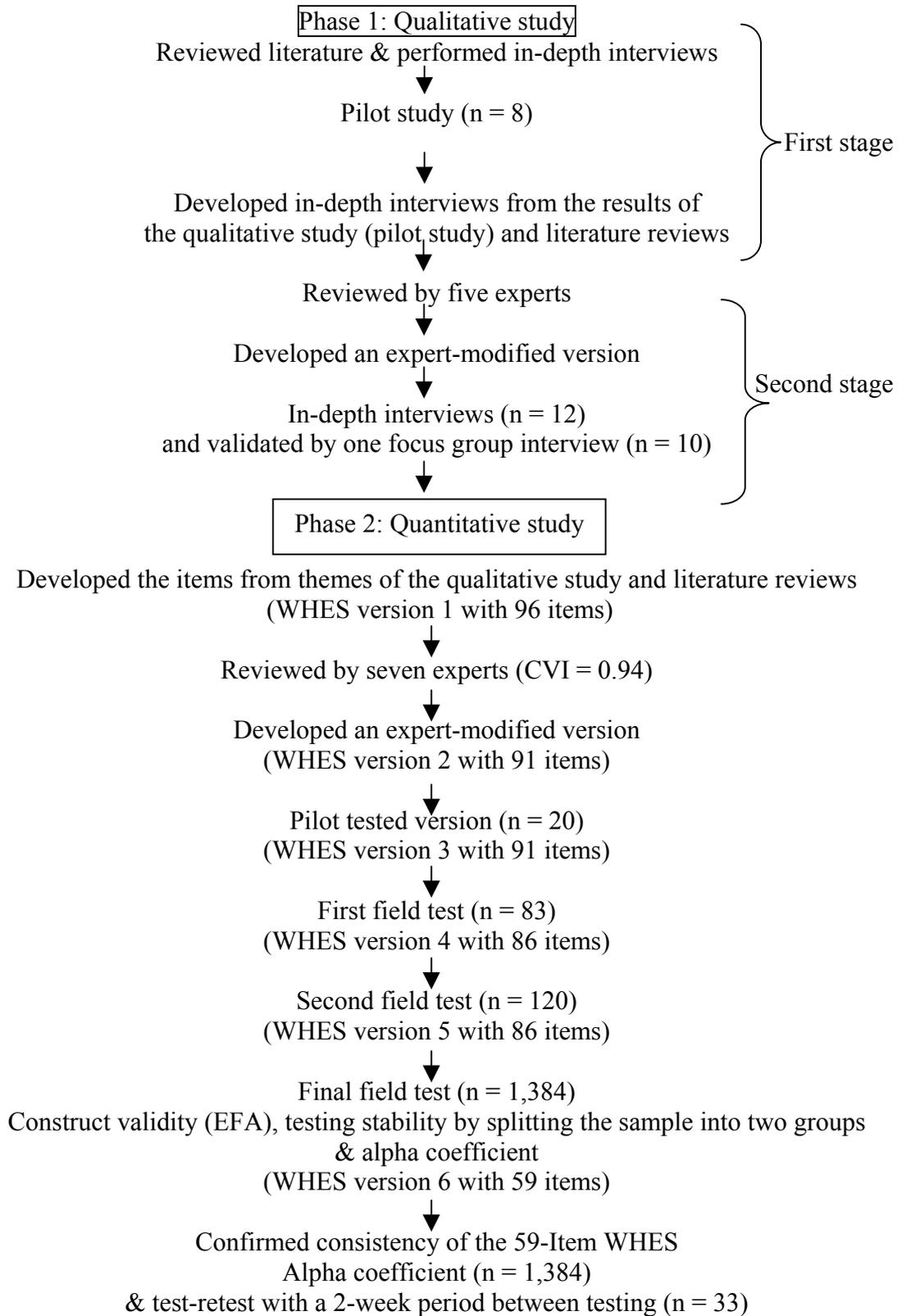


Figure 4. The Development and Testing Psychometric Properties of the WHES

Data Collection

Prior to data collection, a letter was sent to the general manager of all target factories (Appendix E) to carry out data collection from their workers. After permission was granted, the data was collected between May 2004 and January 2005. The details of the data collection from each phase were as follows: (1) phase 1: The qualitative study; first stage was conducted during May to June 2004 and the second stage was conducted between August and October 2004, and (2) phase 2: The quantitative study was conducted from November 2004 to January 2005.

To collect the qualitative data, tape recordings, photographs, and written text formats were used in in-depth individual and focus group interviews. When no new information was identified, the interviews were concluded. Tape recordings were transcribed fully. Written and transcribed data were typed on a word processor. Furthermore, to collect the quantitative data, a questionnaire including the Demographic Data Form and the WHES was sent to workers to request that they complete and return the questionnaires. There were two masters' degree graduate research assistants who were available for data collection during the qualitative study between May to October 2004 and two bachelor degree research assistants who were available for data collection in the quantitative study from November 2004 to January 2005.

The investigator and research assistants distributed the surveys during the times stated by the manager's of the factories. The most appropriate time to respond to the survey was after lunch.

Data Analysis

Only those questionnaires with complete data were included in the analysis. Demographic data was computed using descriptive statistics. Data analysis of the empowerment scale was divided into two phases; qualitative and quantitative data analysis.

Phase 1: Qualitative data analysis. In establishing the trustworthiness of the results, first, triangulation techniques were used. From the initial interviews, themes for the scale were developed step by step using content analysis which consisted of coding, sorting and transforming the data into themes (Berg, 2001). The interviews took place in a focus group interview to determine the trustworthiness of the individual in-depth interview data. Participants were asked to confirm, reflect, clarify, and access the substantive content of verbally expressed views, opinions, experiences, and attitudes. Finally, the investigator and the seven experts independently analyzed and determined relevant themes and representative statements.

Phase 2: Quantitative data analysis. To assure the quality of the WHES, differentiating item selection and reliability testing were conducted in the first and second testing using t-test and Cronbach's coefficient alpha respectively. This was followed by data analysis and interpretation of results, carried out by answering the following two research questions:

Research question 1: What are the components of an empowerment scale related to the health of female factory workers in Thailand?

Research question 2: How valid and reliable is this newly developed empowerment scale related to the health of female factory workers in Thailand?

To answer these two questions. First; analysis of construct validity and test stability factors structure by splitting the sample into two samples, exploratory factor analysis was performed on the empowerment scale to provide the components of WHES. Four criteria were set for analyzing and interpreting the factor analysis including: (1) the factors with Eigenvalues greater than 1, (2) the Scree Plot, (3) an item loading cutoff point of at least .40, and (4) theoretical congruence in each factor (Davis & Grant, 1993; DeVellis, 1991; Munro, 2001; Nunnally & Bernstein, 1994; Waltz et al., 1991). The resulting factors structure that best conformed to the concept of empowerment of the construct were selected from the various rotations. The EFA was conducted to confirm the factor structure of the scale by splitting the sample into two-sub samples. Hypothesis testing was conducted to test the correlations among the demographic variables and the resulting factors of the WHES by using Pearson product-moment correlations and correlation ratio (η).

To analyze reliability, Cronbach's coefficient alpha was used to determine the internal consistency of the individual subscales and the total scale. Then, test-retest was used to establish the stability of the WHES.

Summary

The objective of this study was to develop an instrument that explored the components of the WHES for Thai female factory workers and determined its psychometric properties. Initially, the scale was developed from literature reviews and in-depth individual interviews of 8 Thai female factory workers. The objectives of this stage were: (1) to check the time and the place for in-depth interviews, (2) to develop a guideline for in-depth interviews for the second stage, (3) to determine if

empowerment is a process or an outcome, and (4) to overview the components or the themes of the WHES and to report the information regarding female factory workers in a Thai context. Then, in-depth individual interviews of 12 Thai female factory workers and one focus group interview of 10 from the 12 individual in-depth interviewees took place. The objective of this stage was to develop themes for the quantitative study. Finally, using the development guidelines of DeVellis (1991) the instrument (WHES) was conducted for assessing the extent of empowerment with regards to health for Thai female workers in factories. Testing psychometric properties of the scale consisted of: (1) construct validity by using exploratory factor analysis, (2) hypothesis testing by using Pearson product-moment correlations, analysis of variance, and correlation ratio (η), and (3) reliability by using alpha coefficient and test-retest technique.