CHAPTER 3

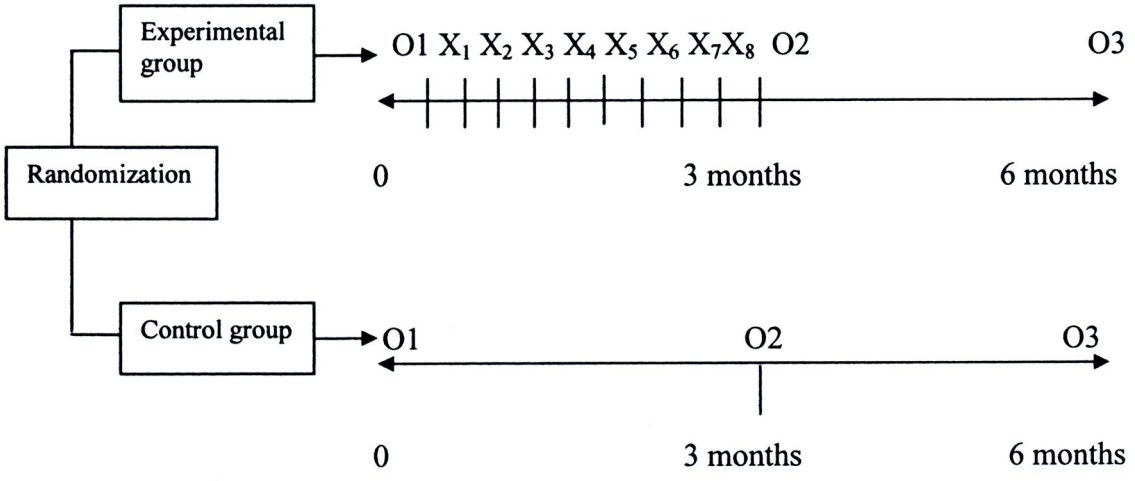
METHODOLOGY

This chapter presents a description of research design, population and sample, research setting, research instruments, human rights protection, data collection procedures, and data analysis.

Research Design

A pretest-posttest control group, experimental design was used to examine the effects of a 3- month nutritional education program in promoting healthy eating of the elderly in northeastern Thailand. It examined the difference between the effects on the elderly who participated in a 3- month nutritional education program and those who did not participate in the program (Figure 3-1).

Variables of this study. Independent variable was the 3 month-nutritional education program, and dependent variable was healthy eating.



O1 = Measurement of eating behavior before the experiment.

X_1- X_8 = A nutritional education program

O2 = Measurement of eating behavior after the experiment at 3 months.

O3 = Measurement of eating behavior after the experiment at 6 months.

Figure 3-1. A pretest-posttest control group, experimental design

Population and Sample

Population

The population for this study were the people aged 60 years or over residing in non- municipal areas of Amphoe Mueang Maha Sarakham, Maha Sarakham Province.

Sample

The sample for this study was selected using multistage sampling method. One sub-district of Amphoe Mueang Maha Sarakham was randomly selected. Then two villages that had similar characteristics in terms of socioeconomic, source of foods, location, transportation, health services, and cultural environment were randomly selected. They were randomly assigned into experimental and control groups. After that the prospective participants who met the inclusion criteria were invited to join the study.

The inclusion criteria for the elderly were as follows:

1) Being able to communicate verbally with the researcher

2) Living with at least one family member (or family caregiver) who was responsible for selecting and preparing meals for the elderly

3) Has never participated in another nutrition promoting program or health promotion program before beginning of this study for at least 6 months

4) Willing to participate in this study

The inclusion criteria for family members were as follows:

1) Age 20 years or over and being responsible for selecting and preparing meals for the elderly

2) Being able to communicate verbally with the researcher and to read and write Thai language

3) Has never participated in another nutrition promoting program or health promotion program before beginning of this study for at least 6 months

4) Willing to participate in this study.

The discontinuation criterion of the elderly and family members:

1) Not being able to attend at least one session of the program.

2) Having evidence of serious illness during the period of the study.

Sample Size

An estimated sample size for testing two groups means - difference was calculated using power analysis formula. Firstly, effect size was calculated from the following formula (Polit & Beck, 2004).

$$\text{Effect size } (\Upsilon) = \frac{\mu_1 - \mu_2}{\delta}$$

$\mu_1 - \mu_2$ = mean difference between experimental group and control group

δ = standard deviation

The researcher used the result from a similar study of Sakulrang (2002) to calculate effect size ($\mu_1 = 22.71$, $\mu_2 = 21.20$, $\delta = 1.81$).

$$\Upsilon = \frac{22.71 - 21.20}{1.81} = 0.83 \ (\sim 0.80)$$

Secondly, according to the Estimated Effect Size and Power Table for a level of significance (α) = .05 (Polit & Beck, 2004, p. 497), the estimated sample size (n) to detect the effect size of 0.80 with power equals to 0.80 was 25 participants for each group. The previous similar studies in Thailand did not report the attrition rate of interventions, while several studies in other countries reported it ranging from 0% to 30%. In this study, the intervention was conducted for a longer period of time (6 months) compared to previous studies (approximately 4 months), so the researcher planned to compensate for losing subjects from dropping out by adding 30% of the

estimated sample size. Thus, the sample size in this study was 36 participants in each group.

Research Setting

This study was conducted in the northeastern region of Thailand at two villages of Wangnang sub-district in Amphoe Mueang, Maha Sarakham Province. The first village was used as the experimental group, and the second village was the control group. These villages were in non-municipal areas, and they were similar in terms of socioeconomic condition, sources of foods, number of the elderly, location, transportation, health services, and culture. One village is located three kilometers from Amphoe Mueang, while another village is four kilometers away from Amphoe Mueang. The elderly in the two villages normally receive health care services from the primary health care unit (PCU) of Wangnang sub-district and Mahasarakam Hospital. Health care services are normally provided to the elderly of the two villages which include health promotion, disease prevention, curative care, and home health care. Wangnang Market is an important source of foods for both villages with 2-3 kilometers distance from them. The participants of both villages could conveniently go to the market by public transportation or their own vehicle.

Instrumentation

The instruments used for data collection were as follows:

1. Demographic Data Collection Form developed by the researcher to collect general personal data including age, gender, religion, marital status, educational level, occupation, people living with the elderly, number of family members, family income, adequacy of income, sources of income, chronic illness, having signs and symptoms of chronic illness, medications taken, health care services needed, body mass index, present eating problems, food selector, and people preparing food.

2. The Elderly Healthy Eating Scale developed by the researcher to measure healthy eating of the elderly. The 144 items of this scale was related to food selection, food preparation and food consumption behaviors. A five-point Likert scale was used with the responses range from "never perform (1)" to "routinely perform (5)". This instrument was tested for clarity, the language appropriateness, and content validity by five experts. The Item – level Content Validity Index (I-CVI) values ranged from 0.60-1.00, and Scale-level Content Validity Index (S-CVI) value was 0.97 (Polit & Beck, 2006). The Proportion of Inter-rater Agreement (P_0) was calculated from which the value obtained 0.94 (Davis, 1992). The internal consistency was tested using Cronbach's alpha coefficient in 14 elders who met the inclusion criteria and the coefficient of 0.96 was obtained.

The overall healthy eating score was calculated by summing the scores of 114 items. The total score ranged from 114 to 570. This score was categorized into three levels, namely low (114-336 or $\leq$ 59%), moderate (337-450 or 60-79%), and

high (451-570 or ≥ 80%) (Bloom, 1975). The scores of healthy eating sub-dimensions consisting of food selection behavior, food preparation behavior, and food consumption behavior scores were also calculated. The possible scores of food selection, food preparation, and food consumption behaviors ranged from 36 to180, 26 to 130, and 52 to 260, respectively. The scores were also divided into three levels. The levels of food selection behavior score ranged from 36 to 106 (low), 107 to 142 (moderate), and 143 to 180 (high). The levels of food preparation score ranged from 26 to 77 (low), 78 to 103 (moderate), and 104 to 130 (high), and that of food consumption behavior scores ranged from 52 to 153 (low), 154 to 205 (moderate), and 206 to 260 (high) (Bloom, 1975).

Research Interventions

In this study, the research intervention was a nurse led nutritional education program that aimed to increase knowledge and skills pertaining healthy eating, to motivate the participants to adopt and maintain healthy eating. Multiple educational methods were used including nutritional education, individual counseling, motivating, maintaining and monitoring of behaviors. This program was 3-month long and was arranged as follows:

Nutritional Education

Nutritional education was provided to increase nutritional knowledge. The methods used four weekly group teaching and group discussions using the Elderly Healthy Eating Booklet and flip chart provided at the 1st, 2nd, 3rd and 5th week of the

program. Nutritional education plan, the Elderly Healthy Eating Booklet and flip chart were the teaching aids used.

1. Nutritional education plan. This plan was developed by the researcher to guide the group teaching. The plan contained teaching objectives, contents, methods, teaching aids, and outcome evaluation. Six lessons were consecutively arranged including: (1) Thai Food Pyramid Guide, the Dietary Guidelines, and Nutrition Facts labels for Thai elderly (Nutrition Division, the Ministry of Public Health of Thailand, 2005); (2) major nutrients requirements consisting of carbohydrate, protein, fat, minerals, vitamins and water; (3) food choices and purchase; (4) food preparation, safety and storage; (5) the benefits and barriers of healthy eating; and (6) healthy food menu for Thai northeastern elderly.

2. The elderly healthy eating booklet. The booklet was provided to the participants at the first week of nutritional education for promoting healthy eating of the elderly. The contents of the booklet included: (1) Thai Food Pyramid Guide, the Dietary Guidelines, and Nutrition Facts labels for Thai elderly (Nutrition Division, Ministry of Public Health of Thailand, 2005); (2) essential nutrients consisting of carbohydrate, protein, fat, minerals, vitamins, water; (3) food choices and purchase; (4) food preparation (safety and storage); (5) the benefits of and barriers to healthy eating; and (6) healthy food menu for Thai northeastern elderly.

3. Flip chart. The flip chart was also used for group teaching. The contents included: (1) Thai Food Pyramid Guide, the Dietary Guidelines, and Nutrition Facts labels for Thai elderly (Nutrition Division, Ministry of Public Health of Thailand, 2005); (2) major nutrients requirements; (3) food choices and purchase; (4) food preparation consisting of safety and storage; (5) the benefits of and barriers to healthy

eating; and 6) healthy food menu for Thai northeastern elderly. The flip chart was presented with simple, short and concise contents, and with some attractive pictures.

Individual Counseling

Counseling was provided to help the participants solve the problems pertaining to healthy eating, minimize the barriers to adopting healthy eating, adjust the eating plan and set the realistic goals relating to healthy eating. The method used was individual counseling at the participant's home and telephone contacts. The participant was provided two individual counseling sessions during home visits at the 6^{th}-7^{th} week, and the 9^{th}-10^{th} week. Individual counseling using telephone contacts was also provided for the participant who needed some help in problem solving throughout the interventions.

Motivating

Motivating the participants to adopt healthy eating was done through increasing perceived self-efficacy, perceived benefits of healthy eating and perceived social support from family members, and decreasing perceived barriers to healthy eating. The researcher used educational strategies and other methods to motivate the participants.

1. Increasing perceived self-efficacy. The strategies for motivating perceived self-efficacy in this study included mastery experience, verbal persuasion, and emotional arousal. To enhance mastery experience, the researcher conducted the following activities: (1) demonstrating healthy food preparation and food choices,

(2) training and guidance of the participants on personal meal plan and personal goals setting. Verbal persuasion was done to encourage the participants to believe that they could perform healthy eating behaviors. Verbal reinforcement and advices were also done. Emotional arousal was the strategy used to reduce emotional problems relating to eating behavior changes, the activities consisted of providing information, sharing experiences and opinions using group discussions. Three motivated strategies were used altogether at the 2nd and 5th week of the program.

2. Increasing perceived benefits of and decreasing perceived barriers to healthy eating. The aims were increasing perceived benefits of and reducing perceived barriers to healthy eating of the elderly. The activities included: (1) group teaching to provide knowledge regarding the benefits of healthy eating of the elderly; (2) group discussions on action to take (how, where, when) and positive effects to be expected, and problems/ barriers regarding healthy eating behaviors; and (3) individual counseling through home visits and/or telephone contacts to help selecting action with the highest probability of success, and to assist the participants to eliminate obstacle factors influencing on healthy eating considering their needs, culture, and environment. The activities of motivating perceived benefits of and perceived barriers to healthy eating were performed, one time a week at the 3rd and 5th week.

3. Increasing perceived social support from family members. The objectives were to motivate family members to assist the elderly to perform healthy eating. Four types of assisting needed for promoting healthy eating of the elderly included: (1) emotional support to the elderly for expression of empathy, love, trust and caring when having problems such as negative emotion (depression, frustration

and anger), difficulties in chewing and swallowing, and anorexia, (2) instrumental support for nutritious food preparation, nutritious food selection and purchase that have seasonal variation, (3) informational support for the provision of providing advice and information addressing problems relating to healthy eating, and (4) appraisal support for performing behaviors by affirmation, or acknowledgement about healthy eating. To increase perceived social support from family members to the elderly, the researcher performed two activities including: (1) providing information on significance of family support on the elderly's eating behaviors, roles and responsibilities of family members in supporting healthy eating, types of supports needed and strategies for providing supports. This was done while conducting group teaching and group discussions, and (2) encouraging family members to regularly assist and facilitate the elderly to perform and maintain healthy eating through individual advice during home visits and/or telephone contacts. The activities were also performed, one time a week at the 1st and 5th week.

Maintaining Healthy Eating

To maintain the participants' healthy eating, the researcher used mailed handouts to help recall how to keep eating well.

Four handouts including: (1) Easy Steps for Healthy Eating, (2) Sample Menu for Your Meals (Part 1), (3) Sample Menu for Your Meals (Part 2), and (4)To Keep Healthy Eating in Your Daily Life, were sent to the participants at 8th week and 11th week respectively.

Monitoring Healthy Eating of the Elderly

The researcher monitored healthy eating of the elderly using Self- Dietary Assessment Form developed by the researcher.

This form consisted of 23 items asking about the participant's eating habits (Appendix D). The participants had to complete the form once a week for 12 weeks of the intervention. At the end of each session, the researcher investigated the participant's answers in each items. Whether the participant's answered showed that they could not perform appropriate eating habits, the researcher would provide knowledge and advices repeatedly. In addition, verbal reinforcement was also provided for adopting healthy eating.

The nutritional education plan, the Elderly Healthy Eating Booklet, flip chart, mailed handouts and the Self- Dietary Assessment Form were verified for their contents validity by five experts in the area of nutrition care of the elderly.

Table 3-1

Research Interventions

Objectives	Methods
1. To increase nutritional knowledge pertaining to healthy eating of the elderly in northeastern Thailand	- Four weekly group teaching, 12-14 elderly and family members /group, 45 minutes – 1 hour, using the booklet and flip chart, and group discussions.
2. To increase perceived self-efficacy relating to healthy eating of the elderly in northeastern Thailand:	- Two groups demonstrations and return demonstrations, two groups training and guiding in performing personal meal plan, and two groups discussions about personal goals setting for achieving healthy eating behaviors and emotional problems relating to eating behaviors - Two individual counseling about adjusting realistic goals and the dietary plan relating to healthy eating at home - Verbal reinforcement and advice that the participants could perform healthy eating behaviors in each session of the intervention
3. To increase perceived benefits of and decrease perceived barriers to healthy eating of the elderly in northeastern Thailand	- Two groups teaching using the booklet and flip chart on benefits of healthy eating, and two groups discussions about the action to take (how, where, when) and positive effects to be expected and problems/ barriers regarding healthy eating - Two individual counseling at home and/or telephone contacts to help selecting action with the highest probability of success and to assist the participants to eliminate obstacle factors influencing on healthy eating considering their needs, culture, and environment

Table 3-1 (continued)

Objectives	Methods
4. To increase perceived social support from family members	- Two groups teaching and discussions among family members on providing information on significance of family support on the elderly's eating behaviors, roles and responsibilities of family members in supporting healthy eating, types of supports needed, and strategies for providing supports - Two individual counseling with the family members through home visits and/or telephone contacts to regularly assist and facilitate the elderly to perform and maintain healthy eating
5. To maintain healthy eating of the elderly	- Providing four mailed handouts, the two handouts were sent to the participant's home at the 8th week, and the others at the 11th week
6. To monitor healthy eating of the elderly	- Having got the participants' self-evaluated on healthy food eating in daily life, once a week for 12 weeks

Protection of Human Subjects

Prior to the collection of data, the proposal and the instruments were approved by the Research Ethical Committee at the Faculty of Nursing, Chiang Mai University, Thailand. The researcher asked for permission to conduct a study from the head of villages and primary health care units (PCU units), Maha Sarakam Province.

The researcher provided complete explanation, and written descriptions of the study to the involved authorities. Research purposes, the research processes, the protection of confidentiality and anonymity were elaborated to the participants who met the inclusion criteria for this study. The participants in the experimental group were assured about confidentiality and anonymity before signing the consent form. They had an opportunity to ask questions about the study before signing, and could refuse to participate or withdraw from the program at anytime.

The participants in the control group also received a complete explanation and written descriptions about the purposes and processes of the study, and the protection of confidentiality and anonymity. The researcher informed the control group that they received the usual care given by nurses. They had an opportunity to ask questions about the study before signing, and could also refuse to participate or withdraw from the program at anytime. At the end of the program, the researcher provided four nutritional handouts and a booklet to the participants.

Data Collection Procedures

Data was collected over a 6-month period with the following steps:

1. After getting the approval from the Research Ethical Committee of the Faculty of Nursing, Chiang Mai University, the researcher contacted the heads of village and primary health care units (PCU units) in the study areas. The purpose and procedure of the study were explained to them to get their cooperation.

2. The researcher recruited the prospective participants (the elderly and family members) who met the inclusion criteria and invited them to join the study.

3. The researcher explained the purpose and procedure of the study to the participants who agreed to participate in this study and asked for initial consent.

4. A complete verbal explanation about the study was given to the participants who met the inclusion criteria and those who agreed to participate in both groups were asked to sign the consent form (see Appendix C).

5. The participants who agreed to participate in the experimental and the control groups were appointed for collecting the demographic data and the Elderly Healthy Eating Scale during the first week after recruitment at PCU in their communities before beginning of the intervention.

Procedure in the Experimental Group

1. The researcher set the appointment dates with the experimental participants to participate in the program. Six groups of the participants, 12-14 elderly and family members in each group, were set up for group sessions that were 45 minutes – 1 hour lasting at the 1st, 2nd, 3rd, and 5th week. Also, the researcher set the appointment dates for individual sessions.

2. The interventions were provided to the experimental group for promoting healthy eating of the elderly (Table 3-2).

The 1st Week (1st group sessions). The researcher built a trusting relationship with the participants and gave them the information about the intervention. Two lessons of nutritional education were provided using group teaching with flip chart and a healthy eating booklet, and group discussions. The contents included (1) food choices from Thai Food Pyramid guide, the Dietary Guidelines, and Food Facts labels for Thai elderly (Nutrition Division, the Ministry of Public Health

of Thailand, 2005), and (2) major nutrients requirements consisting of carbohydrate, protein, fat, minerals, vitamins and water. Then, the researcher prepared family members to provide nutritional support for the elderly. Group teaching and discussions were done to provide knowledge/advice about roles and responsibilities of family members to support or assist their elderly for performing healthy eating (emotional, instrumental, information, and appraisal supports), and to encourage family members to assist or support the elderly to perform and maintain healthy eating.

The 2nd Week (2nd group session). Through group teaching using flip chart and a healthy eating booklet, the researcher discussed with the participants about food choices and purchase and food preparation consisting of safety and storage. Also, the activities to enhance perceived self-efficacy were done including training and guidance in performing individual meal planning, demonstrating healthy food choices, encouraging the participants to set personal goals for achieving healthy eating behaviors, giving verbal reinforcement to the participants for healthy eating practices, and encouraging the participants to share experiences/ opinions relating to healthy eating using group discussions.

The 3rd Week (3rd group session). The researcher continued group teaching to provide knowledge of the benefits of and barriers to healthy eating, and healthy food menu for Thai northeastern elderly to increase perceived benefits of healthy eating and decrease barriers to healthy eating. The activities included in this session were encourage the participants in each group to share their information/ opinions/ experiences regarding the benefits and positive effects of healthy eating, and to define their problems/ barriers regarding healthy eating using group discussions.

The researcher also discussed with the family members on assisting and supporting the elderly to properly reduce or eliminate obstacles relating to healthy eating.

The 5th Week (4th group session). The researcher encouraged the participants in each group to share information/ opinions/experiences through group discussions regarding known nutritional knowledge, social support from family members, the benefits of and barriers to perform healthy eating, and their ability to perform healthy eating. Then, the researcher provided verbal reinforcement to perform and maintain healthy eating. The family members were also encouraged to assist, support or facilitate the elderly to practice and maintain healthy eating.

The 6th -7th Week (Individual session, 1st home visit). The researcher provided an individual session with whom at the participant's home. The activities included verbal persuasion and advising the individuals to perform and maintain healthy eating, and encourage the family members to support or assist the elderly for performing and maintaining healthy eating. Furthermore, individual counseling were also done to solve problems that might be found during dietary change, and to adjust individual menu plan and realistic goals setting relating to healthy eating.

The 8th Week (Individual session, 1st mailed-handouts). The researcher sent mailed-handouts to participants at home to motivate nutritional knowledge, and to remind known nutritional knowledge for maintaining healthy eating. The mailed handouts included "Easy Steps for Healthy eating", and "Sample Menu for Your Meals (Part 1)".

The 9th -10th Week (Individual session, 2nd home visit). The researcher provided during the 2nd home visit to provide verbal persuasion and advice about performing and maintaining healthy eating, and to encourage the family members on

supporting or assisting the elderly about performing and maintaining healthy eating. Furthermore, individual counseling were also done to solve problems that might be found during dietary change, and to adjust individual menu plan and realistic goals setting relating to their healthy eating.

The 11th Week (Individual session, 2nd mailed-handouts). The researcher sent the 2nd mailed handouts to the participants at home to motivate and reinforce nutritional knowledge, and to remind known nutritional knowledge for regularly performing and maintaining healthy eating. The mailed-handouts included "Sample Menu for Your Meals (Part 2)", and "To Keep Healthy Eating in Your Daily Life".

Telephone contact. The participants could call the researcher for individual counseling throughout the interventions, if they needed some help for solving their problems during performing and maintaining of healthy eating.

3. The participants' eating behaviors were measured using "The Elderly Healthy Eating Scale" at the 13th week.

4. The participants' eating behaviors were measured again using "The Elderly Healthy Eating Scale" at the 24th week.

Table 3-2

The Protocol of the Intervention

Time	Activities
The 1st Week:	- Self introduction by the researcher, and explaining objectives,
The 1st group session	schedule, procedures and activities of the intervention to the participants (the elderly and family members)
	- Forming six groups of 10-14 elderly and their family members / group
	- The 1st group teaching and discussions using the booklet and flip charts on the following topics:
	- food choices from Thai Food Pyramid guide, the Dietary Guidelines, and Food Facts labels for Thai elderly
	- major nutrients requirements of the elderly; carbohydrate, protein, fat, minerals, vitamins and water
	- family support on the elderly's eating behaviors
	- roles and responsibilities of family members in supporting healthy eating
	- types of supports needed
	- strategies for providing supports: nutritious food preparation, selection and purchasing
	- Group evaluation and feedback on those topics
	- Self-evaluation *(The activities took 45 minutes – 1 hour)*
The 2nd Week:	- Reviewing the participants' retained knowledge, perception
The 2nd group session	and practices in the last week
	- The 2nd Group teaching and discussions using the booklet and flip chart on the following topics:
	- food choices and purchase
	- food preparation (safety and storage)
	- personal goals setting for achieving healthy eating
	- eating behaviors and emotional problems relating to eating behaviors

Table 3-2 (continued)

Time	Activities
	- Group demonstration of healthy food choices and food preparation, and group training and guiding of the participants on meal planning - Verbally reinforced the participants for healthy eating practices - Group evaluation and feedback - Self-evaluation
The 3rd Week: the 3rd group session	- Reviewing the participants' retained knowledge, perception and practices in the last week - The 3rd group teaching and discussions through the booklet and flip chart on the following topics: - healthy food menu for Thai northeastern elderly - benefits of and problems/barriers to healthy eating - action to take (how, where, when) for assisting the elderly to properly reduce or eliminate obstacles relating to healthy eating, and positive effects of healthy eating to be expected - Verbally reinforced the participants for healthy eating practices - Group evaluation and feedback - Self-evaluation
The 5th Week: the 4th group session	- Reviewing the participants' retained knowledge, perceptions and practices in the last sessions - The 4th group teaching and discussions through the booklet and flip chart on the following known topics: - nutritional knowledge - social support from family members - benefits of and barriers to perform healthy eating - realistic goals setting, and the dietary planning - the participants' ability to perform healthy eating

Table 3-2 (continued)

Time	Activities
	- Verbally reinforced and advised: the family members for assisting and facilitating the elderly to practice and maintain healthy eating; and the elderly for performing and maintaining healthy eating - Group evaluation and feedback - Self-evaluation
The 6th – 7th Week: Individual session (the 1st home visit)	- The 1st individual counseling at home relating to: - The elderly's problem solving during dietary change, and adjusting the dietary plan and realistic goals setting relating to healthy eating - The family members' assisting and facilitating to the elderly in performing and maintaining healthy eating - Allowing the participants called the researcher when they needed help in problem solving - Verbally reinforced and advised: the family members for assisting and facilitating to the elderly in performing and maintaining healthy eating; and the elderly for regularly performing and maintaining healthy eating - Self-evaluation
The 8th Week: Individual session (the 1st mailed handouts)	- Sending the 1st two handouts to the participant's home including "Easy Steps for Healthy Eating" ,and "Sample Menu for Your Meals (Part 1)" - The researcher called the participants for encouraging self-evaluation - Individual counseling by using telephone was available for the participant who needed some help in problem solving

Table 3-2 (continued)

Time	Activities
The 9th -10th Week: Individual session (the 2nd home visit)	- The 2nd individual counseling at home relating to: - The elderly's problem solving during dietary change, and adjusting the dietary plan and realistic goals setting relating to healthy eating - The family members' assisting and facilitating to the elderly in performing and maintaining healthy eating - Telephone contacts was also available for the participant who needed some help in problem solving - Verbally reinforced and advised: the family members for assisting and facilitating the elderly in performing and maintaining healthy eating; and the elderly for regularly performing and maintaining healthy eating - Self-evaluation
The 11th Week: Individual session (the 2nd mailed handouts)	- Sending the 2nd two handouts to the participant's homes including "Sample Menu for Your Meals (Part 2)", and "To Keep Healthy Eating in Your Daily Life" - Calling the participants for motivating self-evaluation - Arranging individual counseling through telephone for those who needed help in problem solving

Procedure in the Control Group

The control group did not receive the program on promoting healthy eating behaviors. They received usual health education or suggestions at health care providers at Primary Care Unit, hospitals, or homes during 24 weeks.

1. The researcher measured eating behaviors using "The Elderly Healthy Eating Scale" at the 13th week, and the 24th week after entering the program.

2. The researcher provided the booklets and four handouts to the control group at the 25th week.

Table 3-3

The Protocol of the Intervention and Data Collection Procedures of the Study

Week	B	1st	2nd	3rd	5th	6th-7th	8th	9th-10th	11th	13th	24th	25th
Experimental group												
- measurements	O1	-	-	-	-	-	-	-	-	O2	O3	-
- interventions	-	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	-	-	-
		← Group sessions →				← Individual sessions →						
Control group												
- measurements	O1	-	-	-	-	-	-	-	-	O2	O3	-
- interventions	-	← X_0 →								-	-	N

Note. B = Before beginning of the intervention

O1 = Pretest; measurement of healthy eating before the experiment

O2 = Post-test 1; measurement of healthy eating after the experiment at 3 months

O3 = Post-test 2; measurement of healthy eating after the experiment at 6 months

X_0 = Usual health education or suggestions

X_1 - X_4 = Group session 1-4: Group teaching and group discussions

X_5 - X_8 = Individual session 1-4: 2 home visits and 4 mailed-nutritional handouts

N = Providing a healthy eating booklet and 4 handouts, at the 25th week

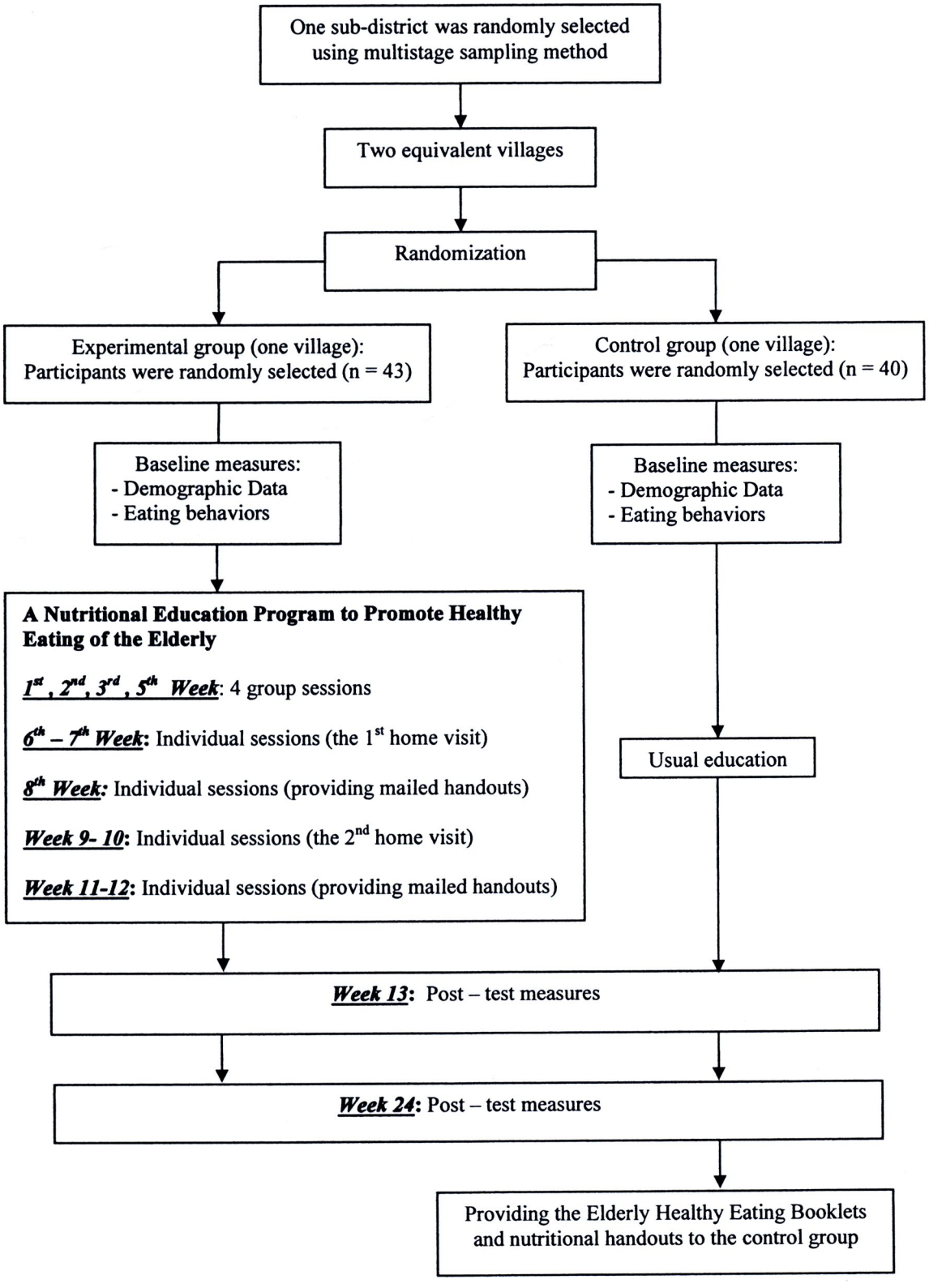


Figure 3-2. Data collection plan for the study

Data Analysis

Data were analyzed using the statistical package as follows:

1. Demographic data were analyzed in terms of percentage, mean and standard deviation. Chi-square or Fisher's exact test was used to examine the differences between the experimental group and control group on categorical variables. The difference in the means of age between both groups was tested using independent t-test.

2. Normality of the scores of overall healthy eating, food selection, food consumption behaviors at baseline, 3 months and 6 months were tested using histogram, skewness, kurtosis, and Kolmogorov - Sminove tests. A visual check of the histogram was compared with a normal distribution curve. The skewness value was checked using two guidelines to determine the normally distributed data. The skewness value between -1.0 and +1.0, and the $z_{skewness}$ beyond $\pm$ 3.3, were considered as normal distribution. The $z_{skewness}$ was calculated by dividing the skewness value with its standard error (Morgan, Leech, Gloeckner, & Barrette, 2004). The $z_{kurtosis}$ was obtained by dividing the kurtosis value with its standard error. However, if the skewness and kurtosis coefficient did not show normally distributed data, the Komogorove – Smirnove test was used to test normality.

In this study, from statistical test the scores of overall healthy eating, food selection, food consumption behaviors at baseline, 3 months and 6 months were normally distributed, while the scores of food preparation behavior at 6 months were not included (see Appendix B).

3. The two-way repeated measures ANOVA was used to test the difference between groups and change over time in each group of overall healthy eating, food selection, food preparation and food consumption behaviors scores (see Appendix B).

4. The one-way repeated measures ANOVA was used to test the change over time of the overall healthy eating, food selection, and food consumption behaviors in each group. Multiple pairwise comparisons for these variables between each point of measurement were done using Bonferroni test. However, the Friedman test was used to test the change over time for food preparation behavior since its scores were not normally distributed.