Development of the salt-reduction and efficacy-maintenance program in Indonesia

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Development of The Salt Reduction and Efficacy Maintenance Program in Indonesia

ABSTRACT

We conducted a randomized control trial to examine the effects of a Salt Reduction Efficacy Maintenance (SREM) program on the improvement and maintenance of self-care and self-efficacy in reducing the salt intake of older people with high blood pressure. A total of 51 participants with hypertension/prehypertension in Indonesia were randomly assigned to a control group (n=17) or to Salt Reduction Training (SRT) (n=17) or SREM as the intervention groups (n=17). The SREM group received educational training and a maintenance meeting. SREM participants' knowledge, attitudes, self-care practices, and self-efficacy significantly improved after training and were maintained after the maintenance meeting. SRT participants showed significant effects for the same variables; however, their food salt concentrations rebounded after the maintenance meeting. No significant improvement was found in the control group. SREM participants reported positive effects of salt reduction and different practices based on who prepared their meals. The SREM program was effective in improving and maintaining knowledge, attitude, and self-efficacy of salt reduction practices and could be applied with community-dwelling older people with high blood pressure.

Keywords: hypertension, older people, salt, self-care, self-efficacy

INTRODUCTION

High blood pressure or uncontrolled hypertension is a global health problem. The Seventh Joint National Committee (JNC 7) on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure revealed that two-thirds of older people have hypertension (2003). If left uncontrolled, hypertension threatens quality of life, limits activities of daily living (ADL), induces psychosocial problems, increases overall healthcare costs (Samranbua, 2011), and is a main contributor to cardiovascular diseases (DeSimone & Crowe, 2009).

Six self-care activities recommended for older people with hypertension include adhering to medications, maintaining or losing weight, adopting a low-salt diet, limiting alcohol consumption, exercising regularly, and eliminating tobacco use (JNC 7, 2003). Most studies examining the efficiency of hypertension self-care activities have concentrated on medication adherence, physical exercise, and a generally appropriate diet (Park et al, 2012; Warren-Findlow & Seymour, 2011); few have focused on reducing salt intake. Medication use without diet change, including salt reduction, cannot control hypertension (DeSimone & Crowe, 2009). Pre-hypertensive individuals as a high-risk population have not been sufficiently examined (Hu et al, 2013). To decrease systolic blood pressure (SBP) by 2–8 mmHg, hypertensive patients' daily intake of dietary sodium should not exceed 6 grams of salt (WHO, 1999). Therefore, it is crucial for older people with hypertension/pre-hypertension to understand and practice ideal salt intake and avoid foods with a high salt content.

LITERATURE REVIEW

Older people face challenges in achieving an ideal salt intake. In Orem's self-care deficit theory (Fawcett, 1995), those who lack sufficient knowledge, skills and proper attitudes about hypertension control have self-care deficits. Only a third of older hypertensive African American

individuals had knowledge of high salt content foods (Scisney-Matlock et al, 2009).However, proper knowledge, attitude and skills alone fail to promote behavioral change. Self-efficacy, defined as individuals' confidence in their ability to perform a behavior (Bandura, 1986), is a required driving force for self-care. Good self-efficacy was significantly associated with an increased prevalence of low-salt intake (Warren-Findlow et al, 2012). Therefore, older people need educational interventions to improve their knowledge, attitudes, skills, and self-efficacy to independently adhere to low-salt diets.

Without proper intervention, challenges and problems that arise during implementation can decrease self-efficacy (Bandura, 1986) and willingness to maintain a low-salt diet. Four strategies to maintain self-efficacy include mastery experience, learning from role models, motivation and physiological feedback (Bandura, 1986). In Korea, motivation had the strongest effect on self-care in older patients with hypertension (Chang & Lee, 2014). Therefore, conducting maintenance meeting to share positive experiences, challenges and motivation among older persons is very important to maintaining good self-care practices and self-efficacy.

Hypertension is quite common among older people in Indonesia and has been a critical health concern (Mizutani et al, 2016). Hypertension was the7th leading cause of mortality in older people in Indonesia, and half of older people visiting outpatient clinics do so for hypertension (Kementerian Kesehatan, 2013a). The second most prevalent disease among older people in the Rappokalling District, South Sulawesi, Indonesia, was hypertension. More than a quarter of older people in the Tamua sub-district have never limited their salt intake (Irwan et al, 2016).Significant relationships between salty food consumption, food flavoring and hypertension incidence were identified among Indonesians (Indrawati et al, 2009). In addition, sour mango mixed with salt and chili is frequently served with rice to increase one's appetite. However, there

are less intervention studies focusing on limited salt intake to control hypertension, including in Indonesia.

PURPOSE

This study examined the effects of a self-care and self-efficacy intervention in reducing and maintaining salt intake among older people with high blood pressure in Indonesia. We expected improvement and maintenance of hypertension knowledge, attitudes, self-care practices and self-efficacy after the intervention. Considering the high prevalence of hypertension related to the high salt intake culture, the following research objectives were addressed: (i) To examine whether an educational intervention improved self-care and self-efficacy and (ii) To determine whether maintenance meetings maintained self-care and self-efficacy among older people with hypertension/pre-hypertension.

METHODS

Design

A randomized controlled trial (RCT) assigned participants to one of three groups: a control group, a Salt Reduction Training (SRT) group and a Salt Reduction and Efficacy Maintenance (SREM) group. The SREM group included educational training and maintenance meeting to improve and maintain self-care and self-efficacy. The SRT group was provided educational training to improve self-care and self-efficacy. The control group received no intervention. Monthly Health Check-ups (MHC) were provided as usual care to all participants.

Participant recruitment

This study was conducted from October 2014 to January 2015 in the Tammua Sub-District, located in the center of Makassar city, a metropolitan city in the Eastern part of Indonesia. In 2014, 273 older people lived in Tammua. Figure 1 provides the participants' flow chart.

Participants were selected using the following inclusion criteria: (i) age ≥60 years based on the age criteria for older people in Indonesia (Kementerian Kesehatan, 2013a); (ii) SBP >120 mmHg and/or diastolic blood pressure>80 mmHg during a recruitment meeting is pre-hypertension; or (iii) diagnosis of hypertension within the last six months and a health visit (MHC) in the last year. MHCs represent a national health program for older people and are conducted within the community. This free-of-charge service consists of daily activity, nutritional and mental health status, blood pressure, blood glucose, and protein level monitoring. Health counseling and basic medication are provided as needed (Irwan et al, 2016). Older people with low cognition, hearing difficulties, sight problems, and other chronic illnesses in addition to hypertension that prevented them from participating in this study were excluded. Absence during educational training and/or maintenance meeting was our drop out criteria.

We conveniently chose 2 regions, and based on the inclusion and exclusion criteria, we identified 51 eligible participants. Each participant was assigned a number that was written on a piece of paper. After compiling the 51 pieces of paper in an envelope, a researcher randomly drew numbers and divided the participants into 3 groups: the control (n=17), SRT (n=17), or SREM group (n=17).

Ethical considerations

This study was approved by the Kanazawa University Ethics Committee. All participants were given informed consent forms that described the purpose, procedures, estimated risks and benefits, confidentiality measures, right to refuse participation in some parts of the study including urine salt measurement, and right to freely withdraw before or at any time during the study period.

Intervention

Conceptual framework of the SREM Program

The SREM Program consisted of two interventions: an improvement intervention through educational training and a maintenance intervention through maintenance meeting. We utilized the self-care deficit (Taylor & Renpenning, 2011) and self-efficacy theories and a geragogy learning model (Glendenning & Cusack, 2000; Thomas, 2007) in the educational training. In maintenance meeting, we applied the self-care deficit theory. The conceptual framework of the program is shown in Figure 2.

We applied the self-care deficit theory by providing materials on the definition, signs, and consequences of hypertension, hypertension self-care, benefits of salt reduction, and salt substitutes and by allocating time to set individual targets.

We implemented self-efficacy concepts by providing motivation that a low-salt diet is easy to adopt, changing negative perceptions of salt usage and hypertension, and reinforcing positive comments and attitudes during discussion. In addition, we trained older persons to follow a low salt diet. They became role models and shared their experiences regarding the benefits and ease of practicing a low-salt diet. Listening to role models' successful experiences with implementing a low salt diet and its benefits motivated older persons to initiate the same behavior. To provide mastery experience, participants and researchers together cooked an agreed upon low salt menu. By personally cooking a low-salt menu, they mastered the skill of preparing meals with the appropriate amount of salt, promoting the future maintenance of this practice.

We applied a geragogy learning model for older people (John, 1988) by frequently repeating key points on hypertension self-care, conducting an evaluation after each key concept and at the end of the session, demonstrating how to measure daily salt intake and prioritizing important skills.

Self-efficacy strategies utilized during maintenance meeting included urging participants to share their perceived benefits, successful experiences and challenges with their low-salt diet practice. We appraised successful experiences and stimulated discussion to jointly solve any challenges faced by the participants.

Implementation of the SREM Program

Table 1 provides an overview of the intervention given to the SREM group. A two-day educational training was conducted in a week. Each 90-minute session with 8–10 participants was followed by a 15-minute break. The majority of training information and leaflets was in pictures, including the leaflet "You Can Address High Blood Pressure by Reducing Salt Intake." Simple and clear pictures in older adult education are essential to strengthening the message and can be more effective than words (Rigdon, 2010).

One month after training, participants in the SREM group attended a 90-minute maintenance meeting.

Pretest

Before data collection, two older people underwent an intervention with the same measurements as those applied to respondents. No problems were reported during the pretest period. These two participants were appointed role models.

Data collection

We used the Isaac Walkey mental impairment measurement, consisting of eight questions, to screen eligible participants' cognitive levels (Prescott et al, 1982). For baseline data, the participants answered a questionnaire on their socio demographic and hypertension history. To measure self-care knowledge, the 12-item knowledge of hypertension index (KHI) was used. Three of 12 items are reverse coded (4,5, and 11). *Neutral, agree,* and *strongly agree* are scored

zero, three, and four, respectively. Total scores ranged from 0–48 (Eugene & Bourne, 2013). The English version of the KHI was translated into Bahasa with the help of a gerontologist. We assessed attitude toward self-care by seven statements with a 0–10 cm Visual Analog Scale. To determine self-care practices, the percentage of salt in food was measured with a Compact Salt Meter [Horiba Scientific, Inc., LAQUA twin, Japan], and the concentration of salt in participants' urine was measured using an aKME-03 salinity checker [Kawano Me Lab, Inc., Japan], which has been validated and recommended by the Japanese Society of Hypertension for decreasing salt intake (Yasutake et al, 2013). Blood pressure was measured with a portable MMI sphygmomanometer and a Littmann Classic stethoscope. Body mass index (BMI) was calculated from weight and height (kg/m^2) during MHCs. To determine self-efficacy, we utilized a Bahasa version of the General Self-Efficacy Scale(Schwarzer & Jerusalem, 1995), consisting of 10 statements with five response options from 1 (not at all true) to 5 (exactly true)and a total score ranging from 10–40, with a Cronbach's alpha of .80.

All data were collected at baseline, one week after educational training, and one week after the maintenance meeting by one researcher and two research assistants. One month elapsed between training and the maintenance meeting. With previous agreement from the participants, the maintenance meeting conversation was recorded and transcribed.

One-fourth of older people in Tammua cannot read well (Irwan et al, 2016).Therefore, the researcher read all questionnaires, and participants responded orally. To prevent a Hawthorne effect, the importance of providing true and real information regarding hypertension self-care practices was explained before data collection. To prevent bias and contamination, participants and research assistants were unaware of the division of participants in the three groups.

Data analysis

Quantitative data were analyzed by Chi-square, Fisher's exact, one-way between groups ANOVA, one-way repeated ANOVA, and Tukey's tests, with a significance level of $p < 0.05$. SPSS 23.0 with Advanced Statistics was used (SPSS, Armonk, NY, USA). Parametric tests were used because the participants represented the population. In Indonesia, 51.7% of community-dwelling older people with hypertension visited outpatient clinics in 2011 (Kementerian Kesehatan, 2013a).

Qualitative data were analyzed by text mining using KH Coder, a free and open source software program created by K. Higuchi at Ritsumeikan University, Japan (Higuchi, 2012).Text mining is a computerized process of extracting information from collected discussions and has been widely used in health science research to improve the consistency of qualitative data analysis (Goto et al, 2014).We conducted three analysis steps. First, a word frequency list was applied to determine the frequency of words mentioned in the conversation. Second, to identify groups of words, a co-occurrence network of words was performed; large bubbles represented words frequently used in the meeting. Finally, to explore co-occurrence networks in detail, Key Words in Context (KWIC) concordance was used. We focused on analyzing participants' various experiences with a low salt diet by different family constructions. Therefore, maintenance meeting conversations were grouped based on who prepared meals at home —the participants, their spouse, children, or other relatives, and we chose one common verb used by the four groups.

RESULTS

Participant characteristics

Data from 45 (88.2%) participants were analyzed. The participants' demographic characteristics are summarized in Table 2. There were no significant differences in participant characteristics except for living arrangement.

As shown in Table 3, after the training and maintenance meeting, the habit of adding salt significantly differed between groups. The effects of the intervention by group are summarized in Table 4. Self-efficacy was significantly improved in the SRT and SREM groups after training and was maintained after the maintenance meeting compared to the control group.

In Table 5, the knowledge of the SRT group was significantly improved, but the effect could not be observed because the p values of Tukey's tests comparing baseline values to after training and baseline to after the maintenance meeting were both > 0.05. The attitude 3 scale and self-efficacy were significantly improved after training and maintained after the maintenance meeting. Food salt concentration increased significantly after the maintenance meeting. Although not statistically significant, urine salt concentration in the control group continued to increase over time. For the SREM group, knowledge, attitude 5 scale, and self-efficacy significantly changed after the training and the maintenance meeting, whereas SBP and the attitude 6 scale significantly improved after training.

In Figure 3, the word frequency list of the maintenance meeting is displayed. *Salt* was the most frequently used word in the three groups, namely, food prepared by participants themselves (45 times), by children (10 times), and by relatives (7 times); *eat* was most frequently mentioned by those whose food was cooked by a spouse (10 times). Regarding the co-occurrence network of words, 13 categories pertained to participants who cooked for themselves (Figure 4) and 4each to those whose food was cooked by their spouses, children, and relatives.

Table 6 shows the various low-salt diet experiences of the SREM participants. We chose the verb *cook* to describe the low-salt diet experiences of the 4 groups because it illustrated the various participant practices with different cooks. A participant who cooked by herself said "…I used Royco [food flavor with high sodium], but I cooked separately for my husband [her

husband is also hypertensive]…Now, we eat the same food." Similarly, one participant whose child prepared his meals reported that "When my daughter cooks, I tell her to reduce the salt or I ask her to separate my portion before [adding salt] ..." To explore commonality among groups, we chose the verb *eat* because it was the most frequently used verb in 3 groups (food cooked by themselves, spouses, and children), and it was also mentioned in the relatives group. Participants whose food was cooked by a spouse shared the benefits of reducing their salt intake: "…since I started avoiding high amounts of salt, my neck is less rigid." Whereas for challenges, a participant who cooked for herself shared her difficulty in resisting her favorite food: "I can't resist eating mango; it's very delicious… Yesterday, I really forgot it was salty when consuming it because it's so delicious."

DISCUSSION

This study showed that an SREM program comprising educational training that applied self-care and self-efficacy theories and a maintenance meeting that applied self-efficacy principles was effective and applicable to improving and maintaining salt reduction among older people with high blood pressure in Indonesia. Significant improvement and maintenance of self-care knowledge, attitudes, practices, and self-efficacy were observed in the SREM group. These findings are explored below.

Improvement in Self-care and Self-efficacy

Knowledge of self-care in the SREM group significantly increased after training; however, in the SRT group, improved knowledge did not occur at any specific point, and no significant improvement was detected in the control group. Sufficient knowledge is a crucial component of adequate self-care. In Orem's self-care deficit theory, education is the basis of self-care (Sadeghi et al, 2013), and helping older people obtain appropriate knowledge narrows the information gap

(Rigdon, 2010). This finding indicates that knowledge can be improved through educational training and by participants assuming active roles (Rujiwatthanakorn et al, 2011).

Positive attitudes support self-care. After training, SREM group members showed significant improvement in the belief that salt reduction can help control blood pressure (attitude 5). The SRT group also showed a significant effect on the belief that salt reduction can affect blood pressure (attitude 3), whereas no attitude improvement was observed in the control group. According to geragogy, educational interventions for older people can improve positive attitudes (John, 1988). Patients with diabetes mellitus in Taiwan who attended education sessions also exhibited better attitudes (Ouyang et al, 2015).

Systolic blood pressure in the SREM group continued decreasing with subsequent measurements and showed statistical significance after training, whereas no significant improvement was found in the SRT or control group. Modifying eating habits, including reducing salt intake, can decrease systolic blood pressure by 8–14 mmHg (US Department of Health and Human Services, 2006).We did not expect a significant effect on blood pressure because our main outcome was salt reduction and because blood pressure is very tenuous and affected by external and internal factors other than the study intervention.

SREM and SRT significantly improved self-efficacy, whereas no improvement in self-efficacy was detected in the control group. Mastery experience, the modeling of successful experiences by others and being motivated are the most effective ways of creating a strong sense of efficacy (Bandura, 1986). During educational training, we utilized these strategies to improve self-efficacy.

Maintenance of Self-care and Self-efficacy

After the maintenance meeting, knowledge of self-care was significantly maintained. Repeating the same discussion topics in maintenance meeting significantly sustains knowledge (Park et al, 2011). However, educational training without allowing older people to meet and share their experiences with low-salt diets seemed insufficiently powerful to maintain knowledge improvement, as shown in the SRT group.

The SREM participants maintained their food salt concentrations over time. In contrast, the SRT group showed significant rebound values. No significant differences were observed in the urine salt concentration of the SREM and SRT groups, although it increased over time in the control group. Adopting and maintaining self-care practices for chronic diseases are lifelong endeavors requiring continuous support and motivation (Lee et al, 2010). Providing educational training without supporting and motivating participants when applying the desired behaviors is insufficient to maintain self-care adherence, as evidenced by the rebounding food salt concentrations of the SRT group. Therefore, maintenance meeting, as in the SREM group, is crucial for helping older people overcome challenges and encouraging them to adhere to self-care practices.

Both SREM and SRT showed sustained improvements in self-efficacy after the maintenance meeting. Park et al. (2011) reported similar findings; one month after participating in integrated health education, participant self-efficacy improved. Although SRT showed similar trends in self-efficacy, SREM participants had a greater advantage because they met role models twice; during educational training and in the maintenance meeting, participants and role models discussed and exchanged tips to resolve challenges with low-salt diets. By doing so, older people maintained motivation to care for themselves and improved their self-care practices based on suggestions from the meeting. The findings revealed that combining self-care and self-efficacy

theories is critically important to helping older people maintain adherence to self-care. When participants believed that they could practice self-care activities (with higher self-efficacy), they made the most of their abilities and succeeded with ease (Wu et al, 2011).Another important consideration in implementing SREM is cultural eating habits. Other participants can maintain their self-care and self-efficacy by hearing about and copying the successful experiences of individuals from the same cultural eating background.

The qualitative data, as shown in the text mining analysis, supported the quantitative findings. Salt reduction is an eating habit that closely depends on who cooks at home. Accordingly, we discussed low-salt experiences in the maintenance meeting. The maintenance meeting discussion illustrated how SREM participants applied their maintained knowledge, attitude, skills and self-efficacy by confidently implementing a low-salt diet. Furthermore, regardless of who cooks at home, participants with high self-efficacy and a willingness to adopt a low-salt diet as part of hypertension self-care will actively create different ways to consume low salt dishes. Respondents who cooked for themselves could easily reduce the salt content of their food. As for respondents whose children cooked for them, they asked to separate their portions before adding salt. Most SREM participants reported positive experiences with a low-salt diet. However, as described by the self-efficacy concept, some participants also shared challenges of trying to reduce their salt intake. One participant who cooked for herself reported difficulty in resisting her favorite food, sour mango with salt and chili. Another participant, whose food was prepared by relatives, admitted that he did not tell his family to reduce the amount of salt when cooking. Deciding not to tell his family about salt reduction might reflect his continuing disbelief in his abilities and a tendency to avoid the task (Gallagher et al, 2008). Each person has a different pace in improving and maintaining their self-efficacy. In addition, a high percentage of

Indonesian people consume salty foods; 26.2% consume salty foods and 77.3% consume food flavor (Kementerian Kesehatan, 2013b), which is known to have high concentrations of sodium. The challenges reported by SREM participants and the high salt intake habits of Indonesian people reflect a need to continue regular maintenance meetings to support self-efficacy and improve self-care skills in consuming a low-salt diet. Nurses could help participants interpret their progress by highlighting their abilities, supporting their self-efficacy and continuing the behavior (Lee et al, 2007). Participants were continually motivated to succeed in adopting a low salt diet in the maintenance meeting.

Almost half of older Indonesian people choose to live with family (Adib, 2008). An important consideration when interacting with older people is their diversity (Rigdon, 2010). Therefore, each participant should be managed as an individual, and SREM programs should be applied based on individual circumstances.

Limitations

Although the participants were randomly divided into3 groups, the small sample size might affect the results. The qualitative data were only drawn from one maintenance meeting, and the analysis aimed to describe experiences with low salt-diets visually and with word frequencies without generating any themes. In addition, the results in rural areas may differ from those of this study, which was administered in an urban setting.

CONCLUSION

Educational training in the SRT and SREM groups showed improvements in knowledge, attitudes, self-care practices and self-efficacy regarding salt reduction. The SREM maintenance meetings showed maintenance of the same variables. The self-care and self-efficacy intervention was effective. Experiences and challenges with a low-salt diet vary based on who cooks at home.

These results indicate that SREM could be recommended for older people with high blood pressure in the community. However, when applying SREM programs, we need to consider who cooks at home to approach older people individually.

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CONTRIBUTIONS

Study design:

Data collection and analysis:

Manuscript writing:

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Tables

Table 1. Overview of the SREM Program

Intervention	Content Outline	Learning Methods
Training 1	• Definition, signs, symptoms, and consequences of hypertension	Discussion and sharing of experiences
	• Hypertension treatable by self-care	Motivation, alteration of negative interpretations
	• Forms of self-care, focusing on a low-salt diet	Discussion and sharing of experiences, prioritization
	• Effects of high salt intake on blood pressure	Discussion
	• Benefits of reducing salt intake	Sharing by role models
	• Ideal daily salt intake • Substitutes for salt to maintain appetite • List of foods to avoid/reduce	Discussion and sharing of experiences, sharing by role models
Training 2	• Challenges and solutions of a low-salt diet	Discussion, sharing of experiences, description of family/caregiver involvement
	• Cooking and testing low-salt menus	Demonstration and practicum, mastery experiences
	• Determining samples of daily low-salt menus and setting individual targets	Motivation
Maintenance meeting	• Sharing benefits of salt reduction	Discussion
	• Overcoming challenges of low salt intake	Discussion
	• Tips for overcoming challenges	Sharing by role models and other successful respondents Motivation
	• Resetting targets	Motivation

[†]After each sub-topic in educational sessions1 and 2, an evaluation is always conducted using the repetition method to ensure that knowledge is retained.

Table 2. Demographics and characteristics of participants in the intervention study testing the Salt Reduction and Efficacy Maintenance (SREM) Program

Characteristics	Control group (n=17)		SRT group† (n=13)		SREM group (n=15)		Total (n=45)		p
	n	(%)	n	(%)	n	(%)	n	(%)	
Sex									
Male	5	(29.4)	7	(53.8)	5	(33.3)	17	(37.8)	.360[1]
Female	12	(70.6)	6	(46.2)	10	(66.7)	28	(62.2)	
Age									
Mean (SD)	66.1 (5.7)		67.9 (6.9)		65.8 (5.9)		66.5 (6.1)		.617[3]
Living Arrangement									
Spouse	0	(0.0)	6	(46.2)	3	(20.0)	9	(20.0)	.027[2]
Spouse + children	10	(58.8)	3	(23.1)	5	(33.3)	18	(40.0)	
Children	7	(41.2)	4	(30.8)	7	(46.7)	18	(40.0)	
Education Level									
Lower	12	(70.6)	9	(69.2)	11	(73.3)	32	(71.1)	1[2]
Higher	5	(29.4)	4	(30.8)	4	(26.7)	13	(28.9)	
Who Cooks at Home									
Respondents	8	(47.1)	5	(38.5)	7	(46.7)	20	(44.4)	.740[2]
Spouse	1	(5.9)	3	(23.1)	3	(20.0)	7	(15.6)	
Children	7	(41.2)	4	(30.8)	3	(20.0)	14	(31.1)	
Relatives	1	(5.9)	1	(7.7)	2	(13.3)	4	(8.9)	
Other Diseases									
No	8	(47.1)	8	(61.5)	7	(46.7)	23	(51.1)	.672[1]
Yes	9	(52.9)	5	(38.5)	8	(53.3)	22	(48.9)	

†Salt Reduction Training (SRT)

[1]Probability using Pearson's chi-square test

[2]Probability using Fisher's exact test

[3]Differences within groups using one-way between ANOVA

Table 3. Differences between control, SRT, and SREM groups after the self-care practice program

Variables	Baseline				1 week after training				1 week after maintenance meeting			
	Control (n=17)	SRT (n=13)	SREM (n=15)	P	Control (n=17)	SRT (n=13)	SREM (n=15)	p	Control (n=17)	SRT (n=13)	SREM (n=15)	p
Add Salt												
Yes	9 (52.9)	6 (46.2)	4 (26.7)	.354[2]	8 (47.1)	0 (0.0)	0 (0.0)	.000[2]	7 (41.2)	0 (0.0)	0 (0.0)	.001[2].
No	8 (47.1)	7 (53.8)	11 (73.3)		9 (24.3)	13 (100)	15 (100)		10 (58.8)	13 (100)	15 (100)	
HPT[†] Diagnosis												.433[2]
Yes	5 (29.4)	5 (38.5)	5 (33.3)	.873[1]	5 (29.4)	6 (46.2)	4 (26.7)	.527[2]	4 (23.5)	6 (46.2)	4 (26.7)	
No	12 (70.6)	8 (61.5)	10 (66.7)		12 (70.6)	7 (53.8)	11 (73.3)		13 (76.5)	7 (53.8)	11 (73.3)	
Med Consumption								.863[2]				.158[2].
Yes	2 (11.8)	1 (7.7)	3 (20.0)	.749[2]	3 (17.6)	1 (7.7)	2 (13.3)		2 (11.8)	0 (0.0)	4 (26.7)	
No	15 (88.2)	12 (92.3)	12 (80.0)		14 (82.4)	12 (92.3)	13 (86.7)		15 (88.2)	13 (100)	11 (73.3)	
Herb Consumption				.749[2]				.863[2]				.158[2]
Yes	2 (11.8)	1 (7.7)	3 (20.0)		1 (5.9)	0 (0.0)	2 (13.3)		1 (5.9)	0 (0.0)	1 (6.7)	
No	15 (88.2)	12 (92.3)	12 (80.0)		16 (94.1)	13 (100)	13 (86.7)		16 (94.1)	13 (100)	14 (93.3)	

[†]Hypertension (HPT)

[1]Probability using Pearson's chi-square test

[2]Probability using Fisher's exact test

Table 4. Differences between control, SRT, and SREM groups after the self-care practice program

Variables	Baseline					1 week after training					1 week after maintenance meeting				
	Mean (SD)					Mean (SD)					Mean (SD)				
	Control group[a] (n=17)	SRT group[b] (n=13)	SREM group[c] (n=15)	p[1]	P[2]	Control group[a] (n=17)	SRT group[b] (n=13)	SREM group[c] (n=15)	p[1]	P[2]	Control group[a] (n=17)	SRT group[b] (n=13)	SREM group[c] (n=15)	p[1]	p[2]
Systolic (mmHg)	144.8 (21.1)	147.5 (17.3)	145.5(30.5)	.952		143.5(16.9)	142.3(16.2)	136.2(23.3)	.535		138.5(19.3)	138.1(15.6)	137.8(21.5)	.995	
Diastolic (mmHg)	85.2 (10.2)	88.0 (12.8)	87.5(15.5)	.808		87.3 (7.5)	85.6 (8.9)	85.1 (9.1)	.750		85.7(10.6)	85.2 (5.3)	83.1 (9.8)	.699	
BMI (kg/m^2)	21.6 (3.9)	22.6 (3.3)	23.5 (3.3)	.357		21.4 (4.1)	22.4 (3.5)	23.5 (3.1)	.288		21.6 (4.2)	22.4 (3.3)	23.6 (3.3)	.319	
Knowledge, total score	34.2 (6.1)	31.8 (6.4)	31.3 (5.4)	.350		34.3 (8.6)	36.3 (6.1)	39.5 (5.8)	.124		37.9 (4.8)	36.4 (5.5)	40.7 (4.8)	.083	
Attitude 1 scale	6.3 (3.6)	5.6 (3.4)	6.2 (3.7)	.851		8.2 (2.2)	6.1 (4.2)	7.2 (3.5)	.223		7.0 (3.4)	8.4 (2.2)	5.6 (3.6)	.086	
Attitude 2 scale	6.6 (3.5)	5.4 (4.0)	6.3 (3.6)	.673		7.4 (3.2)	6.0 (4.1)	7.5 (3.3)	.454		7.0 (3.7)	6.7 (3.6)	5.3 (4.0)	.415	
Attitude 3 scale	8.1 (1.8)	6.4 (3.3)	7.7 (2.9)	.223		7.5 (3.2)	9.0 (0.7)	8.1 (2.4)	.279		8.4 (2.1)	9.0 (0.4)	8.8 (0.4)	.505	
Attitude 4 scale	5.3 (3.3)	3.8 (3.4)	5.8 (3.7)	.313		6.1 (3.4)	4.0 (4.1)	3.4 (3.7)	.120		3.6 (3.7)	5.6 (4.0)	3.5 (3.6)	.264	
Attitude 5 scale	8.0 (2.1)	7.7 (2.2)	7.6 (1.7)	.822		8.2 (1.5)	8.5 (2.4)	9.1 (0.5)	.282		8.6 (2.1)	9.1 (0.5)	8.9 (0.5)	.696	
Attitude 6 scale	8.3 (1.3)	7.6 (1.6)	8.2 (1.5)	.396		7.9 (2.3)	8.4 (2.3)	9.1 (0.4)	.229		8.6 (2.2)	8.5 (2.2)	8.8 (0.5)	.870	
Attitude 7 scale	7.2 (2.7)	8.3 (0.9)	8.7 (0.9)	.069		8.2 (2.3)	7.6 (3.1)	9.1 (0.4)	.222		8.7 (2.1)	9.1 (0.4)	9.1 (0.3)	.687	
Urine salt (g)	5.9 (2.8)	8.6 (3.2)	7.5 (2.6)	.043	a < b*	6.9 (2.9)	7.2 (3.2)	6.4 (2.4)	.714		7.4 (2.2)	7.7 (2.0)	6.9 (2.4)	.633	
Food salt (%)	3.2 (4.1)	3.2 (3.3)	2.9 (4.8)	.979		2.4 (3.7)	1.1 (1.5)	1.8 (2.3)	.444		2.6 (3.1)	3.8 (2.7)	2.1 (3.2)	.345	
Self-efficacy, total score	30.2 (5.9)	28.9 (5.1)	29.1 (4.7)	.779		30.0 (6.3)	36.9 (3.9)	34.5 (4.1)	.002	a < b** a < c**	29.6 (6.6)	35.5 (3.4)	35.4 (3.6)	.002	a < b** a < c**

Note. [1]Differences between groups using a one-way between ANOVA test; [2] multiple comparisons using Tukey's test

*: p<.05, **: p<.01

[a] Control group

[b] Salt Reduction Training (SRT) group

[c] Salt Reduction Efficacy Maintenance (SREM) group <>

Table 5. Differences in control, SRT, and SREM groups at baseline, 1 week after training, and 1 week after maintenance meeting

Variables	Baseline[a]	1 week after training[b]	1 week after maintenance meeting[c]	p^1	p^2
Control Group (n=17)	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**		
Systolic (mmHg)	144.8 (21.1)	143.5(16.9)	138.5(19.3)	.496	
Diastolic (mmHg)	85.2 (10.2)	87.3 (7.5)	85.7(10.6)	.579	
BMI (kg/m^2)	21.6 (3.9)	21.4 (4.1)	21.6 (4.2)	.523	
Knowledge, total score	34.2 (6.1)	34.3 (8.6)	37.9 (4.8)	.095	
Attitude 1 scale	6.3 (3.6)	8.2 (2.2)	7.0 (3.4)	.144	
Attitude 2 scale	6.6 (3.5)	7.4 (3.2)	7.0 (3.7)	.686	
Attitude 3 scale	8.1 (1.8)	7.5 (3.2)	8.4 (2.1)	.554	
Attitude 4 scale	5.3 (3.3)	6.1 (3.4)	3.6 (3.7)	.105	
Attitude 5 scale	8.0 (2.1)	8.2 (1.5)	8.6 (2.1)	.568	
Attitude 6 scale	8.3 (1.3)	7.9 (2.3)	8.6 (2.2)	.549	
Attitude 7 scale	7.2 (2.7)	8.2 (2.3)	8.7 (2.1)	.172	
Urine salt (g)	5.9 (2.8)	6.9 (2.9)	7.4 (2.2)	.171	
Food salt (%)	3.2 (4.1)	2.4 (3.7)	2.6 (3.1)	.737	
Self-efficacy, total score	30.2 (5.9)	30.0 (6.3)	29.6 (6.6)	.679	
SRT Group (n=13)					
Systolic (mmHg)	147.5 (17.3)	142.3(16.2)	138.1(15.6)	.224	
Diastolic (mmHg)	88.0 (12.8)	85.6 (8.9)	85.2 (5.3)	.608	
BMI (kg/m^2)	22.6 (3.3)	22.4 (3.5)	22.4 (3.3)	.487	
Knowledge, total score	31.8 (6.4)	36.3 (6.1)	36.4 (5.5)	.033	
Attitude 1 scale	5.6 (3.4)	6.1 (4.2)	8.4 (2.2)	.062	
Attitude 2 scale	5.4 (4.0)	6.0 (4.1)	6.7 (3.6)	.681	
Attitude 3 scale	6.4 (3.3)	9.0 (0.7)	9.0 (0.4)	.003	$a_{<}b^{**}$, $a_{<}c^{**}$
Attitude 4 scale	3.8 (3.4)	4.0 (4.1)	5.6 (4.0)	.466	
Attitude 5 scale	7.7 (2.2)	8.5 (2.4)	9.1 (0.5)	.233	
Attitude 6 scale	7.6 (1.6)	8.4 (2.3)	8.5 (2.2)	.463	
Attitude 7 scale	8.3 (0.9)	7.6 (3.1)	9.1 (0.4)	.223	

Urine salt (g)	8.6 (3.2)	7.2 (3.2)	7.7 (2.0)	.129	
Food salt (%)	3.2 (3.3)	1.1 (1.5)	3.8 (2.7)	.039	$b<c^{*}$
Self-efficacy, total score	28.9 (5.1)	36.9 (3.9)	35.5 (3.4)	.000	$a<b^{**}$, $a<c^{**}$
SREM Group (n=15)					
Systolic (mmHg)	145.5 (30.5)	136.2(23.3)	137.8(21.5)	.037	$a>b^{*}$
Diastolic (mmHg)	87.5 (15.5)	85.1 (9.1)	83.1 (9.8)	.196	
BMI (kg/m^2)	23.5 (3.3)	23.5 (3.1)	23.6 (3.3)	.810	
Knowledge, total score	31.3 (5.4)	39.5 (5.8)	40.7 (4.8)	.000	$a<b^{**}$, $a<c^{**}$
Attitude 1 scale	6.2 (3.7)	7.2 (3.5)	5.6 (3.6)	.250	
Attitude 2 scale	6.3 (3.6)	7.5 (3.3)	5.3 (4.0)	.149	
Attitude 3 scale	7.7 (2.9)	8.1 (2.4)	8.8 (0.4)	.439	
Attitude 4 scale	5.8 (3.7)	3.4 (3.7)	3.5 (3.6)	.077	
Attitude 5 scale	7.6 (1.7)	9.1 (0.5)	8.9 (0.5)	.001	$a<b^{**}$, $a<c^{**}$
Attitude 6 scale	8.2 (1.5)	9.1 (0.4)	8.8 (0.5)	.038	$a<b^{*}$
Attitude 7 scale	8.7 (0.9)	9.1 (0.4)	9.1 (0.3)	.159	
Urine salt (g)	7.5 (2.6)	6.4 (2.4)	6.9 (2.4)	.101	
Food salt (%)	2.9 (4.8)	1.8 (2.3)	2.1 (3.2)	.680	
Self-efficacy, total score	29.1 (4.7)	34.5 (4.1)	35.4 (3.6)	.000	$a<b^{**}$, $a<c^{**}$

[1]Differences between groups using one-way repeated ANOVA

[2]Multiple comparisons using Tukey's test

*: p<.05, **: p<.01

[a]Baseline, [b]1 week after training, [c]1 week after maintenance meeting

Table 6. Description of low-salt diet experience

Who cooks	Before	Word	After
Various low-salt diet experiences			
Themselves	In the past, when I	cooked	and felt that my food was not delicious, I used Royco,† but I cooked separately for my husband. No delicious food for you, delicious food for me. Now, we eat the same food. My husband's complaint of back pain has decreased.
Spouse	Though I'm not the one who	cooks	at home, my wife has known about my low-salt diet.
Children	When my daughter	cooks	I tell her to reduce the amount of salt or I ask her to separate my portion beforehand; she adds salt for herself, if she wants. I only take one portion of a meal.
Relatives	I sometimes go to my children's home to have a meal. If they don't	cook	I eat outside.
Common verbs among family types			
Themselves	I never use Vetsin†, now I only use a little amount of salt. Moreover, I am the only one who	eats	my cooking; no one else does.
Spouse	But in the past, I did love to	eat	a lot of salt. I love most salty fish. Now, I avoid salty fish because we are told that it contains a lot of salt. Since I've stopped eating lots of salt, my neck is less rigid.
Children	Yes, there are a lot of changes. I don't want to	eat	much salt anymore; I've reduced my salt intake. My health complaints are disappearing gradually. In the past, my whole body ached, but not so much anymore. We feel it when our health problems are back.
Relatives	Though people	eat	a lot of salt, I don't. No. My blood pressure is not high, but I prevent it [from happening]. I'm afraid of my blood pressure suddenly rising. From what I see, strokes occur suddenly.
Unique verbs among family types			
Themselves	I can't	resist	eating mango; it's very delicious. Very delicious. Yesterday I really forgot mangos were salty when I was consuming one because they are so delicious.
Spouse	No difficulties. I even	remind	all of my family, "Don't eat too much salt; don't eat Vetsin,† mainly Vetsin."†
Children	Frequently the food is too salty, but I	add	hot water.
Relatives	No, I did not	tell	my child to reduce the amount of salt.

†Brand of MSG (salty food flavoring) frequently used in Indonesia

Figure Legends

Figure 1. Flow chart of participants through the randomized controlled trial.

Figure 2. Conceptual framework of the SREM program. Legend: HPT: Hypertension.

Figure 3. Word frequency lists of words used by respondents whose food was cooked by themselves, a spouse, their children, or relatives.

Figure 4. Co-occurrence network of words of respondents whose food was cooked by themselves, their spouse, their children, or relatives.

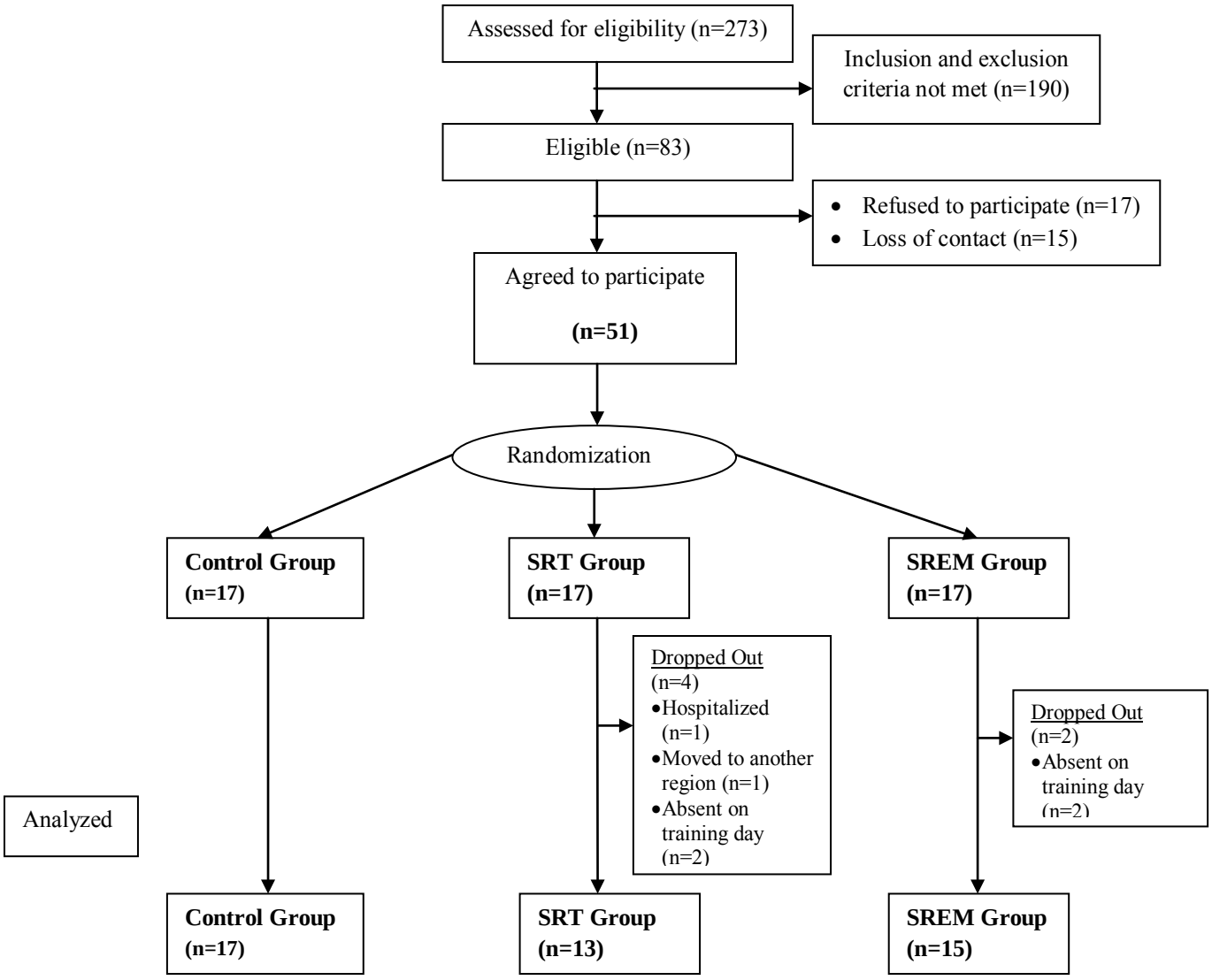


Figure 1. Flow chart of participants through the randomized controlled trial.

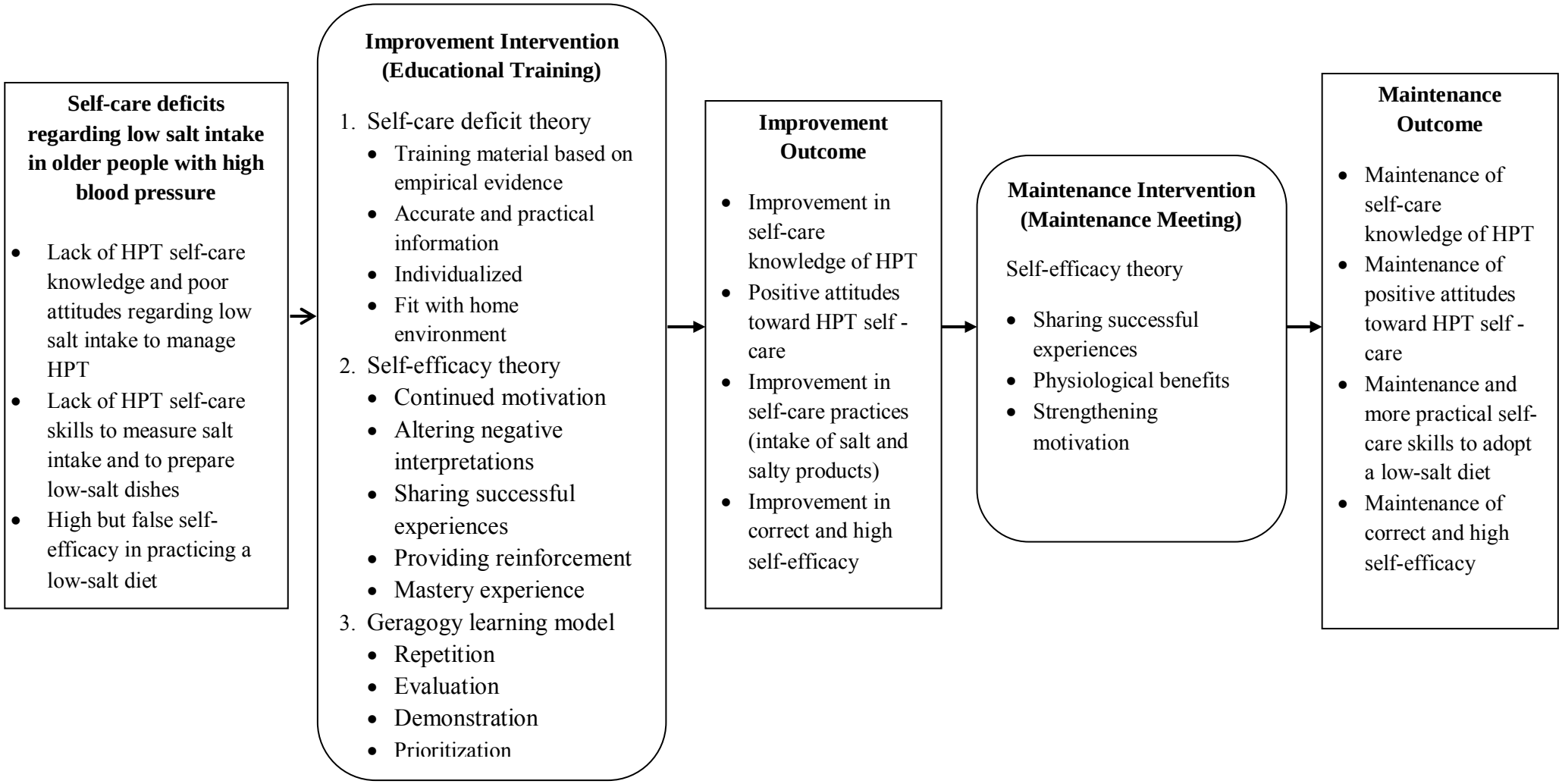


Figure 2. Conceptual framework of the SREM program
Legend: HPT: Hypertension.

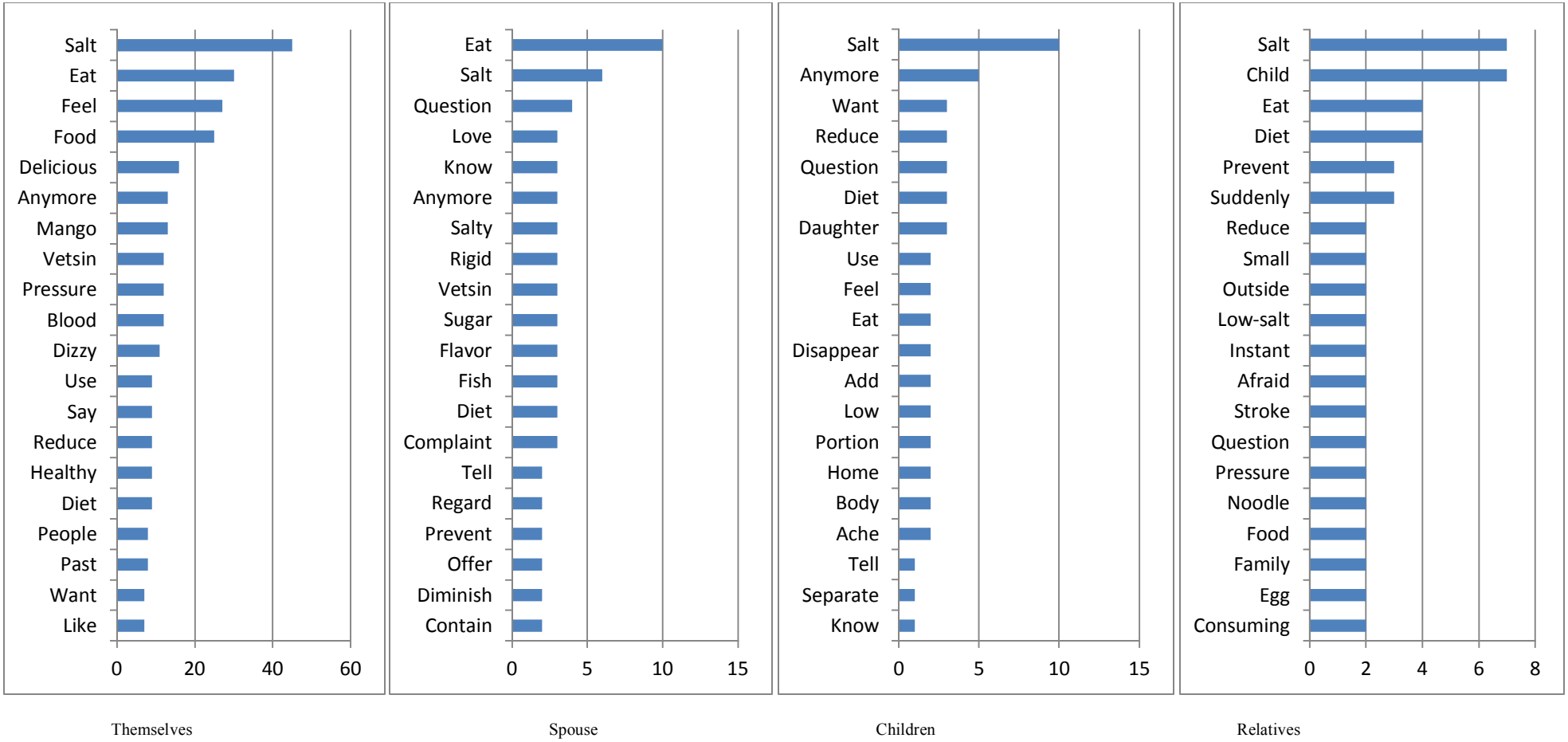
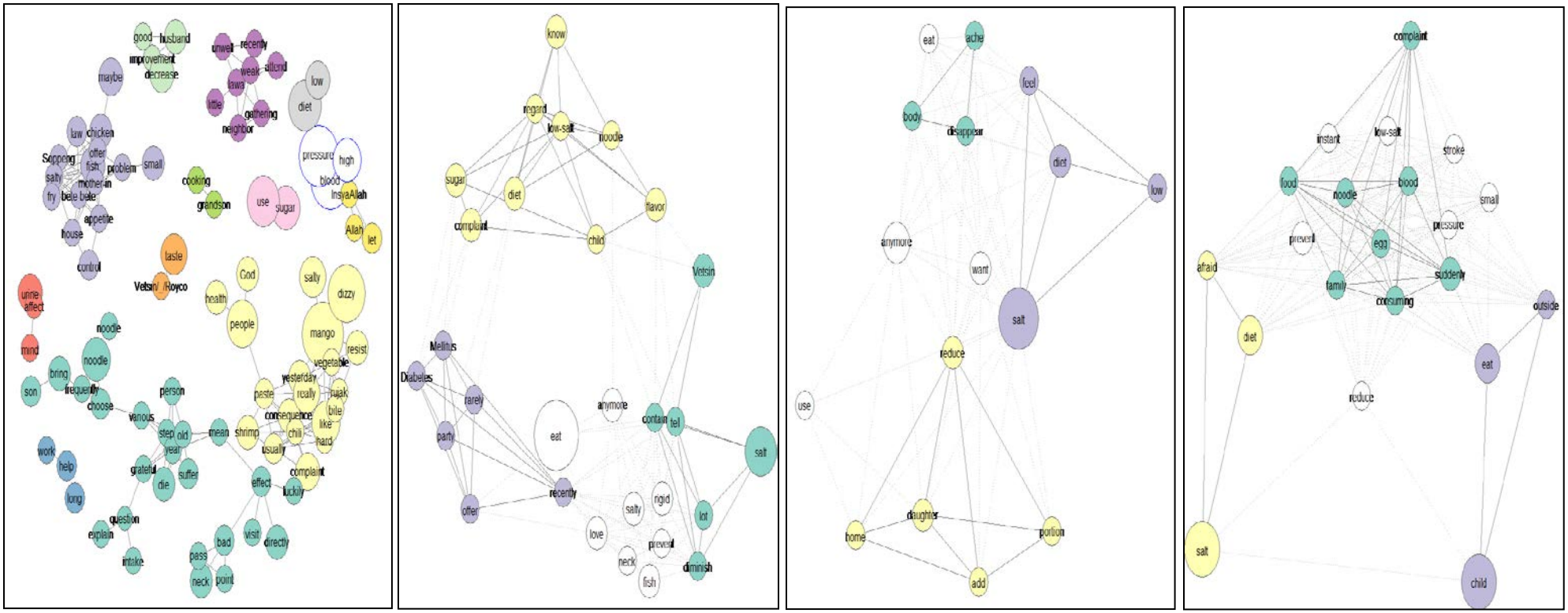


Figure 3. Word frequency lists of words used by respondents whose food was cooked by themselves, a spouse, their children, or relatives.



Themselves Spouse Children Relatives

Figure 4. Co-occurrence network of words of respondents whose food was cooked by themselves, their spouse, their children, or relatives.