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Research Article

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

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Abstract We conducted a randomized, controlled trial to examine the effects of a salt-reduction and efficacy-maintenance 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 or one of two intervention groups: salt-reduction training or salt-reduction and efficacy-maintenance. The salt-reduction and efficacy-maintenance group received educational training and a maintenance meeting; the participants' knowledge, attitudes, self-care practices, and self-efficacy significantly improved after training and were maintained after the maintenance meeting. Participants in the salt-reduction training group 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. The salt-reduction and efficacy-maintenance group participants reported positive effects of salt reduction and different practices based on who prepared their meals. The salt-reduction and efficacy-maintenance group program was effective in improving and maintaining knowledge, attitudes, and self-efficacy of salt-reduction practices and could be applied with community-dwelling older people with high blood pressure.

Key words hypertension, older people, salt, self-care, self-efficacy, patient education, primary health, randomized controlled trial.

INTRODUCTION

High blood pressure or uncontrolled hypertension is a global health problem. The Seventh Joint National Committee 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, induces psychosocial problems, increases overall healthcare costs, and is a main contributor to cardiovascular diseases (DeSimone & Crowe, 2009; Samranbua, 2011).

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 (The Seventh Joint National Committee Report, 2003). Most studies examining the efficiency of hypertension self-care activities have concentrated on medication adherence, physical exercise, and a generally-appropriate diet (Warren-Findlow & Seymour, 2011; Park *et al.*, 2012); few have focused on reducing salt intake. Medication use without diet change, including salt reduction, cannot control hypertension (DeSimone & Crowe, 2009). Prehypertensive 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 g of salt (WHO/ISH, 1999). Therefore, it is crucial for older people with hypertension/prehypertension 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 one-third of older hypertensive African American individuals had knowledge of high-salt content foods (Scisney-Matlock *et al.*, 2009). However, proper knowledge, attitudes, and skills alone fail to promote behavioral change. Self-efficacy, defined as individuals' confidence in their ability to perform a behavior, is a required driving force for self-care (Bandura, 1986). Good self-efficacy has been 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 and willingness to maintain a low-salt diet (Bandura, 1986). Four

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strategies to maintain self-efficacy include mastery experience, learning from role models, motivation, and physiological feedback (Bandura, 1986). In Korea, motivation was found to have the strongest effect on self-care in older patients with hypertension (Chang & Lee, 2014). Therefore, conducting maintenance meetings to share positive experiences, challenges, and motivation among older persons is important for maintaining good self-care practices and self-efficacy.

Hypertension is common among older people in Indonesia, and is a critical health concern (Mizutani *et al*., 2016). Hypertension is the seventh leading cause of mortality in older people in Indonesia, and half of older people visiting outpatient clinics do so for hypertension (Kementerian Kesehatan Republik Indonesia, 2013a). The second most prevalent disease among older people in the Rappokalling district, South Sulawesi, Indonesia, is hypertension. More than one-quarter of older people in the Tamua subdistrict have never limited their salt intake (Irwan *et al*., 2016). Significant relationships between salty food consumption, food flavoring, and hypertension incidence among Indonesians have been identified (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 fewer 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/prehypertension.

METHODS

Design

In this randomized, controlled trial (RCT), participants were assigned 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 a 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 subdistrict, located in the center of Makassar city, a metropolitan city in the eastern part of Indonesia. In 2014, 273 older people lived in Tammua. A flowchart of the participants in this RCT is provided in Fig. 1. Participants were selected using the following inclusion criteria: (i) age ≥60 years, based on the age criteria for older people in Indonesia (Kementerian Kesehatan Republik Indonesia, 2013a); (ii) SBP >120 mmHg and/or diastolic blood pressure > 80 mmHg during a recruitment meeting is prehypertension; or (iii) diagnosis of hypertension within the past 6 months and an MHC in the past year. MHC 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, which prevented them from participating in this study, were excluded. Absence during educational training and/or the maintenance meeting was considered the dropout criterion.

We chose two regions, and based on the inclusion and exclusion criteria, 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 three groups: the control ($n = 17$), SRT ($n = 17$), or SREM groups ($n = 17$).

Ethical considerations

This study was approved by the Kanazawa University Ethics Committee (Ishikawa, Japan). 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 their 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 a maintenance meeting. We utilized the self-care deficit and self-efficacy theories, and a geragogy learning model in the educational training (Glendenning & Cusack, 2000; Thomas, 2007; Taylor & Renpenning, 2011). In the maintenance meeting, we applied the self-efficacy theory. The conceptual framework of the program is shown in Fig. 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,

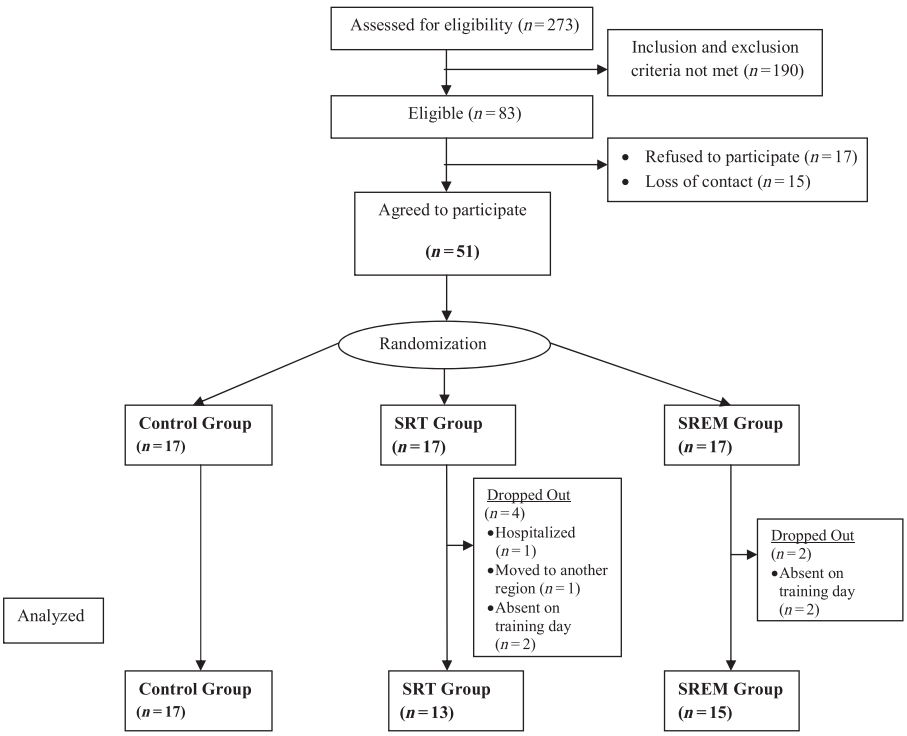

Figure 1. Flowchart of participants through the randomized, controlled trial. SREM, salt-reduction and efficacy-maintenance; SRT, salt-reduction training.

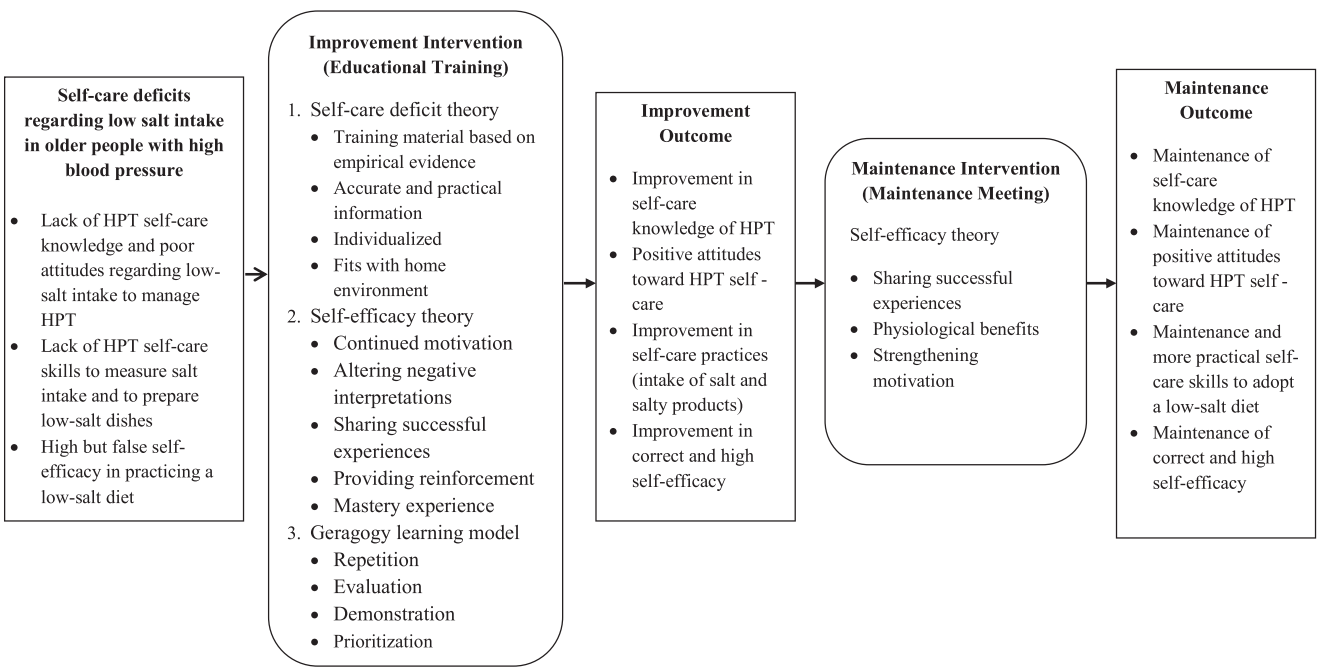

Figure 2. Conceptual framework of the salt-reduction and efficacy-maintenance program. HPT, hypertension.

we trained older people 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 people to initiate the same behavior. To provide a mastery experience, participants and researchers cooked low-salt recipes that were agreed upon together. By personally cooking low-salt recipes, 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 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 (John, 1988).

Self-efficacy strategies utilized during the 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

An overview of the intervention given to the SREM group is provided in Table 1. A 2-day educational training was conducted in 1 week. Each 90-min session with eight-to-10 participants was followed by a 15-min 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 for strengthening the message and can be more effective than words (Rigdon, 2010).

One month after training, participants in the SREM group attended a 90-min 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 sociodemographic and hypertension history. To measure self-care knowledge, the 12-item knowledge of hypertension index (KHI) was used. Three of the 12 items are reverse coded (4, 5, and 11). "Neutral", "agree", and "strongly agree" are scored 0, 3, and 4, respectively. Total scores ranged from zero to 48 (Eugene & Bourne, 2013). The English version of the KHI was translated into Bahasa with the help of a gerontologist. We assessed attitudes 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 (LAQUAtwin; Horiba Scientific, Kyoto, Japan), and the concentration of salt in participants' urine was measured using an aKME-03 salinity checker (Kawano Me Lab, Yokohama, 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 Muranaka Medical Instrument, Osaka, Japan sphygmomanometer and a Littmann Classic Stethoscope (3M Science, St.Paul, Minnesota, USA). Body mass index was calculated from weight and height (kg/m^2) during MHC. 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 to 40, with a Cronbach's alpha of 0.80.

All data were collected at baseline, 1 week after educational training, and 1 week after the maintenance meeting by one researcher and two research assistants. One month elapsed between training and the maintenance meeting. With previous

Table 1. Overview of the salt-reduction and efficacy-maintenance 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	Discussion and sharing of experiences, sharing by role models
	•Substitutes for salt to maintain appetite	
	•List of foods to avoid/reduce	
Training 2	•Challenges and solutions of a low-salt diet	Discussion, sharing of experiences, description of family/caregiver involvement
	•Cooking and testing low-salt recipes	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	Motivation, sharing by role models and other successful respondents
	•Resetting targets	Motivation

[†]After each subtopic in educational sessions 1 and 2, an evaluation is always conducted using the repetition method to ensure that knowledge is retained.

agreement from the participants, the maintenance meeting conversation was recorded and transcribed.

One-quarter 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 into the three groups.

Data analysis

Quantitative data were analyzed by χ^2-test, Fisher's exact test, one-way between-groups ANOVA, one-way repeated ANOVA, and Tukey's tests, with a significance level of $P < 0.05$. SPSS 23.0 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 Republik Indonesia, 2013a).

Qualitative data were analyzed by text mining using KH Coder, a free and open source software program created by Koichi Higuchi at Ritsumeikan University, Kyoto 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: (i) a word frequency list was applied to determine the frequency of words mentioned in the conversation; (ii) to identify groups of words, a co-occurrence network of words was performed; large bubbles represented words frequently used in the meeting; and (iii) to explore co-occurrence networks in detail, key words in context 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 participant, 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 arrangements.

As shown in Table 3, after the training and maintenance meeting, the habit of adding salt significantly differed between the 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 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

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*-value
	N (%)	N (%)	N (%)	N (%)	
Sex					
Male	5 (29.4)	7 (53.8)	5 (33.3)	17 (37.8)	0.360†
Female	12 (70.6)	6 (46.2)	10 (66.7)	28 (62.2)	
Age (years)					0.617§
Mean (SD)	66.1 (5.7)	67.9 (6.9)	65.8 (5.9)	66.5 (6.1)	
Living arrangement					0.027‡
Spouse	0 (0.0)	6 (46.2)	3 (20.0)	9 (20.0)	
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					1.000‡
Lower	12 (70.6)	9 (69.2)	11 (73.3)	32 (71.1)	
Higher	5 (29.4)	4 (30.8)	4 (26.7)	13 (28.9)	
Who cooks at home					0.740‡
Respondents	8 (47.1)	5 (38.5)	7 (46.7)	20 (44.4)	
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					0.672†
No	8 (47.1)	8 (61.5)	7 (46.7)	23 (51.1)	
Yes	9 (52.9)	5 (38.5)	8 (53.3)	22 (48.9)	

†Probability using Pearson's χ^2-test; ‡probability using Fisher's exact test; §differences within groups using one-way between-groups ANOVA. SD, standard deviation; SRT, salt-reduction training.

Table 3. Differences between control, salt-reduction training (SRT), and salt-reduction and efficacy-maintenance (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*-value	Control ($n = 17$)	SRT ($n = 13$)	SREM ($n = 15$)	*P*-value	Control ($n = 17$)	SRT ($n = 13$)	SREM ($n = 15$)	*P*-value
Add salt												
Yes	9 (52.9)	6 (46.2)	4 (26.7)	0.354‡	8 (47.1)	0 (0.0)	0 (0.0)	0.000‡	7 (41.2)	0 (0.0)	0 (0.0)	0.001‡
No	8 (47.1)	7 (53.8)	11 (73.3)		9 (24.3)	13 (100)	15 (100)		10 (58.8)	13 (100)	15 (100)	
Hypertension diagnosis												
Yes	5 (29.4)	5 (38.5)	5 (33.3)	0.873†	5 (29.4)	6 (46.2)	4 (26.7)	0.527‡	4 (23.5)	6 (46.2)	4 (26.7)	0.433‡
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)	
Medication intake												
Yes	2 (11.8)	1 (7.7)	3 (20.0)	0.749‡	3 (17.6)	1 (7.7)	2 (13.3)	0.863‡	2 (11.8)	0 (0.0)	4 (26.7)	0.158‡
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												
Yes	2 (11.8)	1 (7.7)	3 (20.0)	0.749‡	1 (5.9)	0 (0.0)	2 (13.3)	0.863‡	1 (5.9)	0 (0.0)	1 (6.7)	0.158‡
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)	

†Probability using Pearson's χ^2-test; ‡probability using Fisher's exact test.

both $P > 0.05$. The attitude 3 scale and self-efficacy were significantly improved after training and were maintained after the maintenance meeting. Food salt concentration increased significantly after the maintenance meeting. Although not statistically significant, the 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 training and the maintenance meeting, whereas SBP and the attitude 6 scale significantly improved after training.

The word frequency list of the maintenance meeting is displayed in Fig. 3. "Salt" was the most frequently used word in the three groups: 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 (Fig. 4), and four each to those whose food was cooked by their spouses, children, and relatives.

The various low-salt diet experiences of the SREM participants are shown in Table 6. We chose the verb "cook" to describe the low-salt diet experiences of the four 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 stated: "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 three 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, were effective and applicable into 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.

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, and helping older people obtain appropriate knowledge narrows the information gap (Rigdon, 2010; Sadeghi *et al.*, 2013). 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

Table 4. Differences between control, salt-reduction training (SRT), and salt-reduction and efficacy-maintenance (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 ($n = 17$)	SRT group ($n = 13$)	SREM group ($n = 15$)	P-value‡		Control group ($n = 17$)	SRT group ($n = 13$)	SREM group ($n = 15$)	P-value‡		Control group ($n = 17$)	SRT group ($n = 13$)	SREM group ($n = 15$)	P-value‡	
Systolic blood pressure (mmHg)	144.8 (21.1)	147.5 (17.3)	145.5 (30.5)	0.952		143.5 (16.9)	142.3 (16.2)	136.2 (23.3)	0.535		138.5 (19.3)	138.1 (15.6)	137.8 (21.5)	0.995	
Diastolic blood pressure (mmHg)	85.2 (10.2)	88.0 (12.8)	87.5 (15.5)	0.808		87.3 (7.5)	85.6 (8.9)	85.1 (9.1)	0.750		85.7 (10.6)	85.2 (5.3)	83.1 (9.8)	0.699	
BMI (kg/m^2)	21.6 (3.9)	22.6 (3.3)	23.5 (3.3)	0.357		21.4 (4.1)	22.4 (3.5)	23.5 (3.1)	0.288		21.6 (4.2)	22.4 (3.3)	23.6 (3.3)	0.319	
Knowledge, total score	34.2 (6.1)	31.8 (6.4)	31.3 (5.4)	0.350		34.3 (8.6)	36.3 (6.1)	39.5 (5.8)	0.124		37.9 (4.8)	36.4 (5.5)	40.7 (4.8)	0.083	
Attitude 1 scale	6.3 (3.6)	5.6 (3.4)	6.2 (3.7)	0.851		8.2 (2.2)	6.1 (4.2)	7.2 (3.5)	0.223		7.0 (3.4)	8.4 (2.2)	5.6 (3.6)	0.086	
Attitude 2 scale	6.6 (3.5)	5.4 (4.0)	6.3 (3.6)	0.673		7.4 (3.2)	6.0 (4.1)	7.5 (3.3)	0.454		7.0 (3.7)	6.7 (3.6)	5.3 (4.0)	0.415	
Attitude 3 scale	8.1 (1.8)	6.4 (3.3)	7.7 (2.9)	0.223		7.5 (3.2)	9.0 (0.7)	8.1 (2.4)	0.279		8.4 (2.1)	9.0 (0.4)	8.8 (0.4)	0.505	
Attitude 4 scale	5.3 (3.3)	3.8 (3.4)	5.8 (3.7)	0.313		6.1 (3.4)	4.0 (4.1)	3.4 (3.7)	0.120		3.6 (3.7)	5.6 (4.0)	3.5 (3.6)	0.264	
Attitude 5 scale	8.0 (2.1)	7.7 (2.2)	7.6 (1.7)	0.822		8.2 (1.5)	8.5 (2.4)	9.1 (0.5)	0.282		8.6 (2.1)	9.1 (0.5)	8.9 (0.5)	0.696	
Attitude 6 scale	8.3 (1.3)	7.6 (1.6)	8.2 (1.5)	0.396		7.9 (2.3)	8.4 (2.3)	9.1 (0.4)	0.229		8.6 (2.2)	8.5 (2.2)	8.8 (0.5)	0.870	
Attitude 7 scale	7.2 (2.7)	8.3 (0.9)	8.7 (0.9)	0.069		8.2 (2.3)	7.6 (3.1)	9.1 (0.4)	0.222		8.7 (2.1)	9.1 (0.4)	9.1 (0.3)	0.687	
Urine salt (g)	5.9 (2.8)	8.6 (3.2)	7.5 (2.6)	0.043	Control group < SRT group*§	6.9 (2.9)	7.2 (3.2)	6.4 (2.4)	0.714		7.4 (2.2)	7.7 (2.0)	6.9 (2.4)	0.633	
Food salt (%)	3.2 (4.1)	3.2 (3.3)	2.9 (4.8)	0.979		2.4 (3.7)	1.1 (1.5)	1.8 (2.3)	0.444		2.6 (3.1)	3.8 (2.7)	2.1 (3.2)	0.345	
Self-efficacy, total score	30.2 (5.9)	28.9 (5.1)	29.1 (4.7)	0.779		30.0 (6.3)	36.9 (3.9)	34.5 (4.1)	0.002	Control group < SRT group**§ Control group < SREM group**§	29.6 (6.6)	35.5 (3.4)	35.4 (3.6)	0.002	Control group < SRT group**§ Control group < SREM group**§

*$P < 0.05$, **$P < 0.01$. BMI, body mass index. ‡Differences between groups using a one-way between ANOVA test, §Multiple comparisons using Tukey's test.

Table 5. Differences in control, salt-reduction training (SRT), and salt-reduction and efficacy-maintenance (SREM) groups at baseline, 1 week after training, and 1 week after maintenance meeting

Variables	Baseline	1 week after training	1 week after maintenance meeting	*P*-value‡	
	Mean (SD)	Mean (SD)	Mean (SD)		
Control group ($n = 17$)					
Systolic blood pressure (mmHg)	144.8 (21.1)	143.5 (16.9)	138.5 (19.3)	0.496	
Diastolic blood pressure (mmHg)	85.2 (10.2)	87.3 (7.5)	85.7 (10.6)	0.579	
BMI (kg/m^2)	21.6 (3.9)	21.4 (4.1)	21.6 (4.2)	0.523	
Knowledge, total score	34.2 (6.1)	34.3 (8.6)	37.9 (4.8)	0.095	
Attitude 1 scale	6.3 (3.6)	8.2 (2.2)	7.0 (3.4)	0.144	
Attitude 2 scale	6.6 (3.5)	7.4 (3.2)	7.0 (3.7)	0.686	
Attitude 3 scale	8.1 (1.8)	7.5 (3.2)	8.4 (2.1)	0.554	
Attitude 4 scale	5.3 (3.3)	6.1 (3.4)	3.6 (3.7)	0.105	
Attitude 5 scale	8.0 (2.1)	8.2 (1.5)	8.6 (2.1)	0.568	
Attitude 6 scale	8.3 (1.3)	7.9 (2.3)	8.6 (2.2)	0.549	
Attitude 7 scale	7.2 (2.7)	8.2 (2.3)	8.7 (2.1)	0.172	
Urine salt (g)	5.9 (2.8)	6.9 (2.9)	7.4 (2.2)	0.171	
Food salt (%)	3.2 (4.1)	2.4 (3.7)	2.6 (3.1)	0.737	
Self-efficacy, total score	30.2 (5.9)	30.0 (6.3)	29.6 (6.6)	0.679	
SRT group ($n = 13$)					
Systolic blood pressure (mmHg)	147.5 (17.3)	142.3 (16.2)	138.1 (15.6)	0.224	
Diastolic blood pressure (mmHg)	88.0 (12.8)	85.6 (8.9)	85.2 (5.3)	0.608	
BMI (kg/m^2)	22.6 (3.3)	22.4 (3.5)	22.4 (3.3)	0.487	
Knowledge, total score	31.8 (6.4)	36.3 (6.1)	36.4 (5.5)	0.033	
Attitude 1 scale	5.6 (3.4)	6.1 (4.2)	8.4 (2.2)	0.062	
Attitude 2 scale	5.4 (4.0)	6.0 (4.1)	6.7 (3.6)	0.681	
Attitude 3 scale	6.4 (3.3)	9.0 (0.7)	9.0 (0.4)	0.003	Baseline $<$ 1 week after training**§ Baseline $<$ 1 week after maintenance meeting**§
Attitude 4 scale	3.8 (3.4)	4.0 (4.1)	5.6 (4.0)	0.466	
Attitude 5 scale	7.7 (2.2)	8.5 (2.4)	9.1 (0.5)	0.233	
Attitude 6 scale	7.6 (1.6)	8.4 (2.3)	8.5 (2.2)	0.463	
Attitude 7 scale	8.3 (0.9)	7.6 (3.1)	9.1 (0.4)	0.223	
Urine salt (g)	8.6 (3.2)	7.2 (3.2)	7.7 (2.0)	0.129	
Food salt (%)	3.2 (3.3)	1.1 (1.5)	3.8 (2.7)	0.039	1 week after training $<$ 1 week after maintenance meeting*§
Self-efficacy, total score	28.9 (5.1)	36.9 (3.9)	35.5 (3.4)	0.000	Baseline $<$ 1 week after training**§ Baseline $<$ 1 week after maintenance meeting**§
SREM group ($n = 15$)					
Systolic blood pressure (mmHg)	145.5 (30.5)	136.2 (23.3)	137.8 (21.5)	0.037	Baseline $>$ 1 week after training*§
Diastolic blood pressure (mmHg)	87.5 (15.5)	85.1 (9.1)	83.1 (9.8)	0.196	
BMI (kg/m^2)	23.5 (3.3)	23.5 (3.1)	23.6 (3.3)	0.810	
Knowledge, total score	31.3 (5.4)	39.5 (5.8)	40.7 (4.8)	0.000	Baseline $<$ 1 week after training**§ Baseline $<$ 1 week after maintenance meeting**§
Attitude 1 scale	6.2 (3.7)	7.2 (3.5)	5.6 (3.6)	0.250	
Attitude 2 scale	6.3 (3.6)	7.5 (3.3)	5.3 (4.0)	0.149	
Attitude 3 scale	7.7 (2.9)	8.1 (2.4)	8.8 (0.4)	0.439	

(*Continues*)

Table 5. (Continued)

Variables	Baseline	1 week after training	1 week after maintenance meeting	*P*-value‡	
	Mean (SD)	Mean (SD)	Mean (SD)		
Attitude 4 scale	5.8 (3.7)	3.4 (3.7)	3.5 (3.6)	0.077	
Attitude 5 scale	7.6 (1.7)	9.1 (0.5)	8.9 (0.5)	0.001	Baseline < 1 week after training**§ Baseline < 1 week after maintenance meeting**§
Attitude 6 scale	8.2 (1.5)	9.1 (0.4)	8.8 (0.5)	0.038	Baseline < 1 week after training*§
Attitude 7 scale	8.7 (0.9)	9.1 (0.4)	9.1 (0.3)	0.159	
Urine salt (g)	7.5 (2.6)	6.4 (2.4)	6.9 (2.4)	0.101	
Food salt (%)	2.9 (4.8)	1.8 (2.3)	2.1 (3.2)	0.680	
Self-efficacy, total score	29.1 (4.7)	34.5 (4.1)	35.4 (3.6)	0.000	Baseline < 1 week after training**§ Baseline < 1 week after maintenance meeting**§

*$P < 0.05$, **$P < 0.01$. ‡Differences between groups using one-way repeated ANOVA, §Multiple comparisons using Tukey's test. BMI, body mass index; SD, standard deviation.

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).

SBP in the SREM group continued to decrease 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, is the most effective way of creating a strong sense of efficacy (Bandura, 1986). During educational training, we utilized this 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 a 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, a 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; 1 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), and participants and role models discussed and exchanged tips to resolve challenges with low-salt diets. By doing so, older people maintained the 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 culture.

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

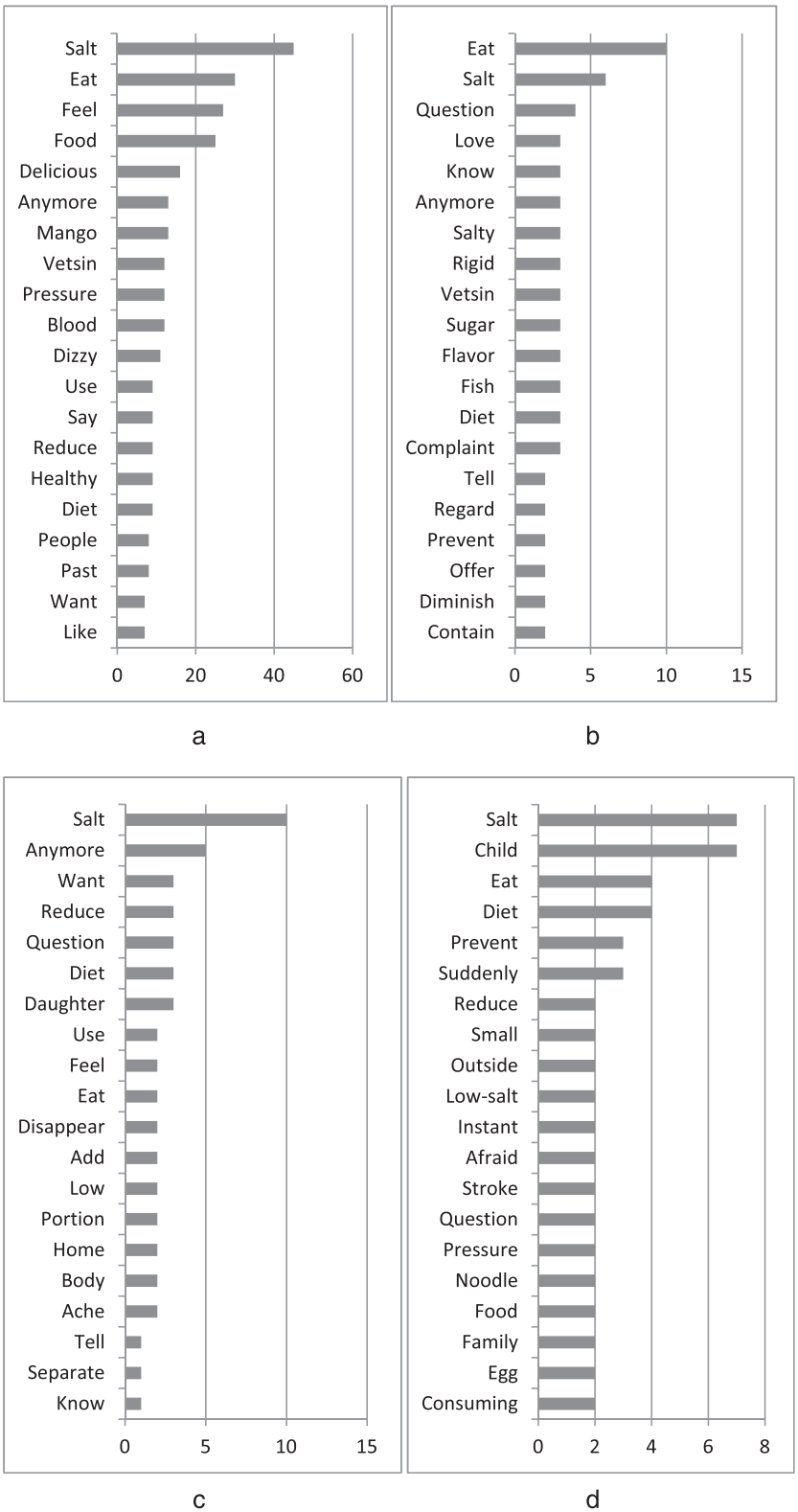

Figure 3. Frequency lists of words used by respondents whose food was cooked by themselves (a), their spouse (b), their children (c), or relatives (d).

participants applied their maintained knowledge, attitudes, 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

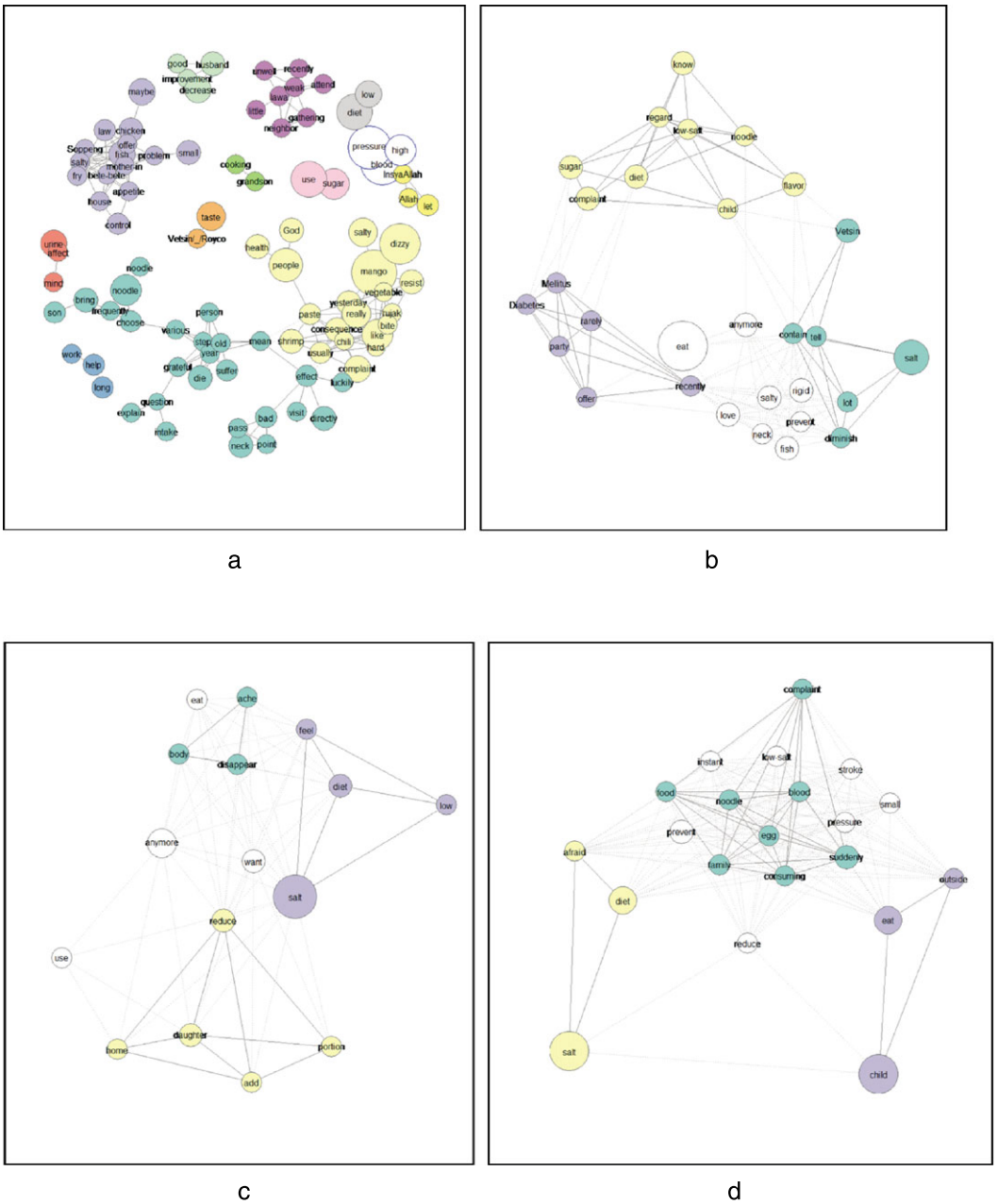

Figure 4. Co-occurrence network of words of respondents whose food was cooked by themselves (a), their spouse (b), their children (c), or relatives (d).

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 Indonesians consume salty foods; 26.2% consume salty foods and 77.3% consume food flavor, which is known to have high concentrations of sodium (Kementerian Kesehatan Republik Indonesia, 2013b). The challenges reported by SREM participants and the high-salt intake habits of Indonesians reflect a need to continue regular maintenance meetings to support self-efficacy and improve self-care skills

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	Although I am 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 do not	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 have stopped eating lots of salt, my neck is less rigid.
Children	Yes, there are a lot of changes. I do not want to	eat	much salt anymore; I have 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	Although people	eat	a lot of salt, I do not. No. My blood pressure is not high, but I prevent it (from increasing). I am afraid of my blood pressure suddenly rising. From what I see, strokes occur suddenly.
Unique verbs among family types			
Themselves	I cannot	resist	eating mango; it is 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, "Do not 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.

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 Indonesians 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 into three groups, the small sample size might have affected 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 might 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 varied based on who cooks at home. These results indicated that SREM could be recommended for older people with high blood pressure in the community. However, we need to consider who cooks at home when applying SREM programs to older people.

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CONTRIBUTIONS

Study Design: AMI, MK, KK, MS
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