



Barriers, Attitudes, and Dietary Behaviors Regarding Sodium Reduction in the Elderly Korean–Chinese Population in Yanbian, China

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Objectives: This research investigated the barriers, attitudes, and dietary behaviors related to sodium reduction among the elderly Korean–Chinese population in Yanbian, China.

Methods: We conducted this pilot study using both descriptive research and a focus group interview at the elderly community center in Yanbian.

Results: In total, 21 elderly Korean–Chinese (average age, 71 years) were examined. The findings showed that the top three barriers to sodium reduction were 1) the difficulties associated with having meals with others, 2) a preference for liquid based-dishes, and 3) the lack of taste in low-sodium dishes. Although the participants strongly believed that a reduced-sodium diet would improve their health, they were poorly aware of the amount of sodium in various foods and dishes. In particular, the focus group interviews with eight participants (mean age, 67 years) revealed that salt-preserved foods (e.g., Korean pickled cabbage called ‘*kimchi*’ and soybean paste) were frequently consumed as part of their food culture, and that very salty dishes were served at restaurants, both of which lead to a high sodium intake.

Conclusion: This study provides useful preliminary data to help design a nutrition intervention program for sodium reduction that targets the elderly Korean–Chinese population in China.

Key Words: diet, sodium reduction, Korean–Chinese

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INTRODUCTION

The Chinese diet is well known to be high in sodium. Laboratory analysis of sodium intake per person in studies conducted between 2009 and 2011, showed that 5.4 g of sodium was consumed per day (more than twice the tolerable upper intake level for sodium, which is 2 g/day), for 20 provinces in China [1,2]. A causal relationship between high sodium intake and increased blood pressure levels has also been well established [3,4]. The prevalence of hypertension increased from 10.4% in 1991 to 22.7% in 2009 [5], and particularly affects those ≥ 60 years (58.2%), followed by those aged 45–59 years (40.1%), and then 18–44 years old (17.5%) [6]. Patients with hypertension were most prevalent in the Northern region of China (29.5%), compared with patients in the Central (24.9%) and Southern (17.4%) regions [5]. Due to the high level of sodium intake and the high prevalence of hypertension among the elderly population in the Northern region, interventions aimed at reducing sodium intake among this particular age group have common in China.

To address the problem of high salt intake, it is critical to first identify the barriers, attitudes,



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and dietary behaviors related to sodium reduction. To conduct a survey of Knowledge, Attitudes, and Practices (KAPs), the Chinese Ministry of Health selected the Shandong province as the pilot area for a national sodium reduction project in 2011 [7]. The findings of this survey revealed that 80% of participants favored reduced-sodium diets, while approximately one in three participants entertained misconceptions, such as lowered sodium intake would lead to impaired physical health [7]. Designing an effective nutrition intervention program is dependent on understanding the misbeliefs and KAPs related to sodium reduction within a community.

The People's Republic of China consists of primarily Han Chinese, as well as people from 55 diverse minority nationalities [8]. Two million Korean–Chinese, the 13th largest minority population, officially live in China, and more than half of them live in Yanbian Korean Autonomous Prefecture in Northeastern China [8,9]. Several studies have revealed substantial health and nutrition inequalities between the Han and minority populations, suggesting that minorities generally have worse nutritional statuses and poorer health [10,11]. Additionally, ethnic minorities, especially the Korean–Chinese, often have limited access to health care information and community health centers.

Almost nothing is known about the personal and environmental factors that inhibit sodium reduction among the elderly Korean–Chinese population in Yanbian, China. In the present study, we conducted a needs assessment of nutrition education regarding sodium reduction. By realizing and understanding the individual and ecological challenges related to sodium reduction for this population, it is hoped that an effective sodium reduction program can be developed.

MATERIALS AND METHODS

1. Descriptive research

To implement this study, we obtained institutional review board approval at Kyonggi University. We conducted descriptive research for a pilot study aimed at reducing dietary sodium intake among the elderly Korean–Chinese people at the Danling Elderly Community Center in Yanbian in 2016. Because the specific aims of this research were to identify the factors affecting sodium reduction and the current status of KAPs related to sodium reduction, we focused on these factors and report the results herein as baseline information.

We first collected demographic and health information from the participants, including age, sex, education, household composition, and subjective health status. For sodium-related information, we obtained data from the participants regarding

the barriers, attitudes, awareness, willingness, dietary behaviors, and knowledge regarding sodium reduction. We then assessed the barriers to reduction of sodium intake, namely: 1) difficulty when eating with others, 2) preference for soup, 3) lack of taste, 4) preference for salt-preserved dishes, 5) limited choices when eating at restaurants, 6) complicated cooking process, and 7) lack of knowledge about specific information or methods of sodium reduction. Subsequently, the participants' attitudes toward sodium reduction were tested in part using the following two items: 1) "Dishes should be well seasoned with salt," and 2) "A reduced-sodium diet will improve my health." Awareness of sodium reduction was examined using one item: 1) "I am aware of the amount of sodium in foods and dishes." Finally, willingness to reduce sodium intake was explored in part using the following four items: 1) "I am willing to buy fresh and natural foods," 2) "I request reduced-sodium dishes at restaurants," 3) "I choose dishes according to my native taste and smell of food," and 4) "I am willing to cook reduced-sodium food." The participants answered each item on a 5-point Likert scale that ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).

To determine the participants' dietary behaviors related to sodium reduction, we asked how frequently they consumed salty foods (e.g., processed foods, soup, and salt-preserved dishes), to which they responded "never," "seldom," "sometimes," "often," or "almost always." Finally, to test the participants' nutrition knowledge about sodium reduction, a 9-item questionnaire (which included questions about salt intake and disease, the relationship between sodium and salt, the tolerable upper intake level of sodium, requirement of salt, learning to prefer less salty food, sodium excretion, nutrition labeling of sodium, and amount of sodium in soybean paste and instant noodle) was distributed; the participants responded with "yes," "no," or "I don't know." This descriptive research was useful for identifying the current status of barriers, attitudes, and dietary behaviors among elderly Korean–Chinese population.

2. Focus group interview

We included subjects who agreed to participate in this focus group interview. One focus group interview was conducted with the elderly Korean–Chinese population at the Danling Elderly Community Center in August 2016 [12]. A facilitator guided the interview, which included four main inquiries: 1) awareness of sodium consumption; 2) barriers to decreasing sodium intake; 3) factors affecting sodium consumption; and 4) suggestions for education about salt reduction (Table 1). The interview was recorded for transcription per the approval of the participants. Overall, the focus group discussion lasted for approximately 1 hour. Subsequently, we reviewed the transcripts and assigned

Table 1. Interview guide for the focus group interview

No.	Question
1	Are you aware of sodium consumption?
2	What are the barriers to decreasing sodium intake?
3	What factors affect your sodium consumption?
4	Do you have any suggestions for improving education about salt reduction?

codes to each piece of information obtained through the key questions and classified similar answers into themes [13].

RESULTS

1. Findings from the descriptive research

This pilot study included 21 participants (3 males and 18 females), who were an average age of 71 years (Table 2). Half of the participants had graduated from middle school, and almost two in three (65%) indicated that they almost never eat away from home. Additionally, about half of the participants (47.4%) had been diagnosed with hypertension and almost one in two lived alone (52.4%).

Our review of the questionnaire revealed that the participants ranked the barriers to sodium reduction in the following order: 1) difficulty having a meal with others (4.05 points), 2) preference for liquid-based dishes (e.g., soup and stew) (3.86 points), 3) lack of taste (3.85 points), 4) preference for salt-preserved dishes (3.67 points), 5) limited options when eating at restaurants (3.50 points), 6) complicated cooking process (2.95 points), and 7) lack of knowledge about specific information or methods of sodium reduction (2.86 points) (Table 3).

The score for attitude was very high for the item “A reduced-sodium diet will improve my health” (4.50 points), while the score regarding awareness of sodium in foods and dishes was comparatively low (3.45 points) (Table 4). Regarding the participants’ willingness to reduce their sodium intake, three out of the four items on this questionnaire scored over 4 points: 1) “I am willing to buy fresh and natural foods” (4.20 points), 2) “I choose dishes according to my native taste and smell of foods” (4.10 points), and 3) “I am willing to cook reduced-sodium food” (4.10 points). The last item on this questionnaire, “I request reduced-sodium dishes at restaurants,” had a relatively low score by comparison (3.76 points).

Of the dietary behaviors related to a higher intake of sodium, the most common were frequent consumption of *kimchi* (Korean pickled cabbage) (often/almost always, 47.6%) and addition of

Table 2. Characteristics of the participants

Characteristic	Participant (n = 21)
Age (y)	70.67 ± 7.00
Sex	
Male	3 (14.3)
Female	18 (85.7)
Education (n = 20) ^a	
No education	3 (15.0)
Completed elementary school	1 (5.0)
Completed middle school	10 (50.0)
Completed high school	6 (30.0)
Frequency of eating at restaurants (n = 20) ^a	
Almost never	13 (65.0)
1–2 times per week	7 (35.0)
Hypertension diagnosed by a doctor (n = 19) ^a	
No	10 (52.6)
Yes	9 (47.4)
Subjective health status	
Very good	2 (9.5)
Good	5 (23.8)
Average	10 (47.6)
Bad	4 (19.0)
Household composition	
Living alone	11 (52.4)
Living with spouse	6 (28.6)
Living with spouse and children	2 (9.5)
Living with children	2 (9.5)

Values are presented as mean ± standard deviation or number (%).

^aThe number of participants was indicated due to missing data, if it was different from the total number of participants.

salt or soy sauce to a dish or soup that is not salty enough (often/almost always, 42.9%) (Table 5). Among the healthy eating behaviors related to a lower intake of sodium, the most common was consumption of vegetables and fruits (often/almost always, 57.1%). On the other hand, eating out at restaurants or consuming processed foods (e.g., cookies, crackers, and instant noodles) were less common dietary behaviors (often/almost always, 9.5% and 4.8%, respectively).

The average score of nutrition knowledge was 53.3 points (standard deviation, 18.8; range, 0–90). Of the nine questions, the relationship between sodium and salt had the lowest proportion (23.8%) of participants who answered correctly (Table 6). In addition, only one in three participants knew about the sodium

Table 3. Barriers to sodium reduction (n = 21)

No.	Question	Data
1	When I have a meal with my family or friends, it is difficult to eat a reduced-sodium meal alone.	4.05 ± 1.02
2	Because I like liquid-based dishes, such as soup and stew, it is hard to reduce my sodium intake.	3.86 ± 1.11
3	Sodium reduction is hard because reduced-sodium food has a lack of taste.	3.85 ± 1.09
4	Because I like to eat kimchi, salted seafood, and pastes (e.g., pepper paste, soybean paste), it is difficult to decrease my sodium intake.	3.67 ± 1.32
5	Because there are not many types of reduced-sodium foods and restaurants, I do not have many options to eat less sodium.	3.50 ± 1.43
6	Because of the longer cooking times and more complex cooking processes, it is difficult to make low-sodium food.	2.95 ± 1.53
7	I am unaware of specific information or methods regarding reduced-sodium meals.	2.86 ± 1.77

Values are presented as mean ± standard deviation.

These data were obtained from a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree).

Table 4. Attitudes toward, awareness of, and willingness for sodium reduction (n = 21)

No.	Question	Data
Attitudes		
1	I think that dishes should be well-seasoned with salt.	4.19 ± 1.25
2	If I eat a reduced-sodium diet, I think it will improve my health.	4.50 ± 1.00
Awareness		
3	I am aware of the amount of sodium in foods and dishes.	3.45 ± 1.50
Willingness		
4	I am willing to buy fresh and natural foods more often than the processed and instant foods.	4.20 ± 1.36
5	When I eat at restaurants, I am willing to request reduced-sodium options.	3.76 ± 1.61
6	I am willing to select dishes, including those that appeal to my native taste and smell, over spicy and salty dishes.	4.10 ± 1.14
7	I am willing to cook reduced-sodium food.	4.10 ± 1.34

Values are presented as mean ± standard deviation.

These data were obtained from a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree).

Table 5. Dietary behavior related to sodium intake (n = 21)

No.	Question	Never/seldom	Sometimes	Often/almost always
1	I frequently eat salted dry fish and pickled fish.	13 (61.9)	2 (9.5)	5 (23.8)
2	I frequently eat processed foods such as instant noodles, canned foods, and ham.	15 (71.4)	2 (9.5)	3 (14.3)
3	If the dishes or soup is not salty enough, I add salt or soy sauce.	9 (42.9)	3 (14.3)	9 (42.9)
4	I tend to consume the liquid, when I have soup or noodles.	13 (61.9)	1 (4.8)	5 (23.8)
5	I eat out at restaurants or have food delivered more than twice per week.	17 (81.0)	0 (0.0)	2 (9.5)
6	I tend to eat kimchi.	7 (33.3)	2 (9.5)	10 (47.6)
7	I generously dip fried foods, Korean style pancakes, and sliced raw fish into soy sauce or pepper paste.	11 (52.4)	4 (19.0)	3 (14.3)
8	I select seasoned roasted fish or simmered fish instead of grilled fish.	10 (47.6)	5 (23.8)	4 (19.0)
9	I eat enough vegetables and fruits.	0 (0.0)	9 (42.9)	12 (57.1)
10	When I buy food, I tend to read the amount of sodium on the nutrition label.	10 (47.6)	6 (28.6)	3 (14.3)
11	I frequently eat cookies or crackers as snack food.	8 (38.1)	12 (57.1)	1 (4.8)

Values are presented as number (%).

Table 6. Nutrition knowledge regarding sodium reduction

Nutrition knowledge survey questions	Option	Participant (n = 21)
1. Too much salt intake can increase the risk of osteoporosis.	Yes ^a	15 (71.4)
	No	0 (0)
	Don't know	6 (28.6)
2. In the same food, the amount of sodium is equal to the amount of salt.	Yes	5 (23.8)
	No ^a	2 (9.5)
	Don't know	14 (66.7)
3. The tolerable upper intake level of salt is two teaspoons of salt.	Yes	4 (19.0)
	No ^a	16 (76.2)
	Don't know	1 (4.8)
4. We can meet the requirements of salt by eating natural foods.	Yes ^a	11 (52.4)
	No	4 (19.0)
	Don't know	6 (28.6)
5. Although we are addicted to salty food, we can learn to prefer less salty food by gradually decreasing sodium consumption.	Yes ^a	16 (76.2)
	No	3 (14.3)
	Don't know	2 (9.5)
6. The intake of fresh vegetables and fruit can increase sodium excretion from our bodies.	Yes ^a	18 (85.7)
	No	1 (4.8)
	Don't know	2 (9.5)
7. The amount of sodium is shown on the nutrition label of processed foods.	Yes ^a	7 (33.3)
	No	3 (14.3)
	Don't know	11 (52.4)
8. One tablespoon of salt and one tablespoon of soybean paste has the same amount of sodium.	Yes	5 (23.8)
	No ^a	13 (61.9)
	Don't know	3 (14.3)
9. Instant noodle soup has a large amount of salt.	Yes ^a	14 (66.7)
	No	2 (9.5)
	Don't know	5 (23.8)

Values are presented as number (%).

Total score of nutrition knowledge (0–90) = 53.3 ± 18.8 (mean ± standard deviation).

^aThe option cell of the correct answer to each question.

information displayed on the nutrition labels of processed foods.

2. Findings from the focus group interview

Eight participants (1 males and 7 females) were included in the focus group interview (Table 7). The average age of the participants was 67 years, half of them had graduated high school, and almost two in three (62.5%) lived alone.

A few participants admitted to habitually consuming salted dishes (Table 8). Although they acknowledged that they could modify their dietary habits and adopt new ones through will-

power, they generally never thought of abandoning their current habits. Other participants indicated that taste was a barrier to reducing their sodium intake, although some admitted that they automatically assume unsalted foods are not tasty. The participants also considered consumption of salt-preserved dishes as part of their food culture, which has been passed down over centuries up to the present settlement of the Korean–Chinese population. Notably, a few participants admitted that restaurant dishes were very salty and complained about the unhealthy food environment at restaurants; nevertheless, they seemed unwilling to

Table 7. Characteristics of participants in focus group interview

Characteristic	Data (n = 8)
Age (y)	67.38 ± 7.21
Sex	
Male	1 (12.5)
Female	7 (87.5)
Education	
Completed elementary school	1 (12.5)
Completed middle school	3 (37.5)
Completed high school	4 (50.0)
Frequency of alcohol consumption	
Never	4 (50.0)
Almost never (≤ 1 time/mo)	1 (12.5)
Sometimes (2–4 times/mo)	2 (25.0)
Frequently (≥ 2 times/wk)	1 (12.5)
Frequency of exercise	
Never	2 (25.0)
1–2 times/wk	2 (25.0)
3–4 times/wk	2 (25.0)
≥ 5 times/wk	2 (25.0)
Disease	
No	2 (25.0)
Yes ^a	6 (75.0)
Subjective health status	
Good	2 (25.0)
Average	3 (37.5)
Bad	3 (37.5)
Family history	
Yes	2 (25.0)
No	6 (75.0)
Household composition	
Living alone	5 (62.5)
Living with spouse	1 (12.5)
Living with grandchild	2 (25.0)
Average monthly living expenses (Chinese Yuan Renminbi)	1,625.00 ± 744.02

Values are presented as mean ± standard deviation or number (%).

^aHypertension, heart disease, cholecystitis, diabetes, spinal stenosis.

actively change this environment. Moreover, the participants expressed certain misbeliefs about salt, stating that eating healthy salts, such as bay-salt and bamboo salt, was healthy. Finally, the participants indicated that checking the amount of sodium on

nutrition labels of food products or by using a salimeter would be a burden.

Some factors were identified as heavily associated with salt consumption (Table 9). For example, the participants who strongly believed in the health benefits of sodium reduction were generally more willing to reduce their salt intake. Overall, the popular, salt-preserved Korean dishes were the main factor contributing to high salt consumption. Most Korean–Chinese frequently consume kimchi, as well as pickled meat or vegetables in the summer, and soybean soup in winter. However, eating with children or grandchildren was noted as a critical contributor to the use of less salt in the elderly participants; because of their strong familial ties, the participants indicated that their family's health was more important than their taste preferences.

Finally, the participants also offered suggestions on salt reduction education (Table 10). First, they suggested the use of visual materials, such as video clips, in demonstrating certain severe symptoms or clinical outcomes of disease due to high salt intake. Second, they suggested incorporating practical food education and cooking classes consisting low-sodium recipes. Third, they emphasized that continuous education would be crucial in ensuring that sodium reduction practices were maintained.

DISCUSSION

Our findings showed that the top three barriers to sodium reduction among the elderly Korean–Chinese population were: 1) the difficulties associated with having meals with others, 2) a preference for liquid-based dishes, and 3) the lack of taste in low-sodium dishes. Some of the participants also appeared unable to make sodium-reduction choices due to peer pressure and an unhealthy atmosphere. To overcome these barriers, a sodium reduction campaign at the community level is necessary for all age groups, to increase awareness about sodium reduction. Moreover, we need to develop reduced-sodium recipes for liquid-based dishes and offer cooking classes that teach low-sodium recipes. Girgis et al. [14] found that most consumers did not notice any difference in flavor in white bread when the amount of sodium was gradually reduced by 25% over a period of 6 weeks. We suggest applying this gradual sodium reduction strategy to elderly Korean–Chinese who consume high-sodium diets.

In this study, we also observed that the most common dietary behaviors related to sodium intake were the consumption of pickled dishes (e.g., kimchi) and sauce (e.g., soy sauce and soybean paste). Therefore, technically and financially supporting the development of tasty, low-sodium recipes, particularly those that modify the most frequently consumed high-sodium dishes,

Table 8. Barriers to decreasing sodium intake

No.	Quote
Food habits	
1	“I do consider reducing salt, but I have the ‘salty diet habit.’ If my food is not salty, it has no taste. We cannot eat three meals without soybean paste.”
2	“Human should eat soybean paste. I consume lettuce-wrapped rice with soybean paste sauce in summer. We consider that we eat well every time we eat soybean paste soup.”
3	“I consume salty dishes habitually, habitually.”
Taste	
4	“Every dish should be a little salty. If it is not salty enough, we consider it to have no taste.”
5	“Due to the sodium reduction messages, I am aware that I need to reduce my sodium consumption. However, if I use less salt, the dish does not have any taste. If the dish is not salty enough, I add soy sauce to the dish. If I eat a reduced-sodium meal, I might live 1 or 2 years longer, but not 10 years (laughing).”
6	“It is so strange. If I eat dishes that are too salty, I know it is bad for my health. However, I add soybean paste or hot pepper paste to lettuce-wrapped rice consistently for the better taste. When I visit my children’s house on the weekends, I cannot eat the dishes they served because it is not salty enough. Therefore, I add soy sauce to the food on my own plate as necessary.”
Food culture	
7	“In the past, the Korean–Chinese would eat salty dishes, because they were poor. Moreover, if it was not salty enough, people would eat larger dishes. However, many people can share pickled dishes, because each individual cannot eat much of that type of food. These preservation techniques have been inherited by this area for a long time.”
8	“In our minds, we enjoy pickled dishes. Pickled dishes.”
Eating foods away from home	
9	“Whenever I have dishes at a restaurant, I feel that the dishes are too salty. Because I eat meals out restaurant about 10 times per month, I know it is ruining my health for later.”
10	“Although I like salty dishes, I cannot eat vegetable dishes at restaurants because they are too salty.”
11	“I rarely eat meals at restaurant these days due to stomach problems. I used to say that restaurant dishes are salty, but I also kept eating them anyway.”
12	“I think restaurant dishes are salty, but I cannot request sodium reduction at restaurants.”
Misbelief	
13	“I have heard that sodium reduction is good for health from the mass media. However, the more important thing is the type of salt. For example, although bay-salt and bamboo salt are salty, they are healthy”
Burden	
14	“I do not read the nutrition labels on processed foods, because it is tiresome.”
15	“Even if there were a salimeter in my home, I would never use it to measure sodium. It is a difficult activity for me.”

is crucial. For example, more savory soybean paste sauce can be achieved by adding nuts or mashed tofu as a salt substitute. According to the focus group participants, a habitual salty diet is the biggest barrier to sodium reduction. Gardner et al. [15] argued that new habit formation takes approximately 10 weeks, and noted that repeating a single specific behavior over this period is essential to successfully form the new habit. It is clear that a multidimensional approach is crucial to eliminate the barriers to sodium reduction.

Environmental factors could also strongly affect one’s dietary intake [16]. Thus, monitoring the sodium content of restaurant foods would be a useful intervention to address problems with

high sodium content. The 2009 China Health and Nutrition Survey ranked the main sources of sodium intake in the following order: 1) added salt, 2) soy sauce, and 3) processed foods [5]. Unlike western countries, where the primary source of sodium is processed foods, over 70% of sodium intake in China is a result of adding salt during/after cooking (both at restaurants and at home) [17,18]. The participants in the present study similarly complained that restaurant meals were very salty. Nevertheless, they rarely requested a reduced-sodium dish when eating out. To curb this, we suggest information regarding the sodium content of restaurant foods be shared with the community, and to recommend low-sodium menus to the public after conduct-

Table 9. Factors associated with salt consumption

No.	Quote
Health benefits	
1	“I thought I am going to consume salt as much as I want, and I will naturally die after 60 years of age. However, I do not believe this anymore. If I am sick in my old age, I will have to spend a lot of money on medical care and my family will have to take care of me. It is not an easy thing. Therefore, I am trying to reduce salt consumption, because I would like to improve my health status. I am making an effort to reduce my salt consumption today a little, and I am going to continue to reduce my sodium consumption in the future... If I do so, I expect I will be healthier.”
2	“I am trying to eat salt less now than before for my health.”
Salt-preserved dishes	
3	“We do consume a lot of salt in the summer, such as beef boiled down in soy sauce, pickled garlic, and pickled perilla leaf. We eat many kinds of salt-preserved dishes in this season. Additionally, we eat soybean paste soup a lot in the winter, such as soybean paste soup with dried radish leaves. And we eat kimchi a lot in the winter too.”
4	“Most Korean–Chinese prepare a lot of kimchi on their own to eat.”
Family	
5	“As I become older, my taste buds have become dull. However, because I often cook dishes that are too salty, my children complain about it. They tell me I should not eat salty dishes. If I cook salty dishes and serve it, my grandchildren also eat the salty dishes. So usually my children cook meals for themselves.”
6	“Personally, I like to eat salty dishes for myself. However, if I am with my children or grandchildren, I always think that I should not eat salty dishes. On the other hand, I do not think that salt reduction is important, and I feel that I can eat as much salt as I want. I think education about salt reduction should be targeted to solitary senior citizens.”
7	“If the elderly live alone, they consume salt as much as they want. However, if the elderly live with their children, they pay more attention to salt reduction for their children.”
8	“Most of the elderly live alone in this region, and they follow their own taste.”
9	“We consider our health, because we do not want to burden to our children. That’s why we think we should eat a salt-reduced diet.”
10	“My husband keeps telling me that I need to eat low-salt dishes, again and again. So I am aware that I need to reduce my salt consumption.”

Table 10. Suggestions for education about salt-reduction

No.	Quote
Visual education materials about salt and disease	
1	“It will be helpful to show video clips about too much salt intake that lead to certain diseases, such as obesity. I am afraid of these messages when I see them on television. I feel that I will have this kind of disease someday.”
2	“We have watched on television as a health professional showed how too much salt intake can increase high blood pressure and lead to cerebral hemorrhage. After we saw the clinical outcomes or symptoms of disease on video clips, we knew that too much salt intake is fatal and dangerous.”
Food education and cooking classes	
3	“It will be useful to teach people how to cook dishes that prevent diseases related to too much salt intake. Additionally, it will be good to know which food or dishes are good for certain parts of our bodies.”
4	“I would like to know more about dishes to reduce salt intake...”
Continuous education	
5	“I think it is helpful to have continuous education, no matter what the topic is.”
6	“If I receive a nutrition education message about nutrition labeling like today, I will read it.”

ing future research regarding the monitoring of sodium content in restaurant foods. One study indicated that providing sodium information on restaurant menus, similar to the nutrition labels

provided on processed foods, could lead consumers to make reduced-sodium menu choices [19]. The elderly Korean–Chinese participants in our focus group discussion suggested a nutrition

education program that includes visual education materials (i.e., video clips) about salt and disease, and a step-by-step education process.

The health belief model argues that one's health behavior is determined by their own perceived susceptibility to a problem, and the perceived severity of the problem [20]. Thus, education regarding the high prevalence of hypertension, such as the complications, symptoms, and treatment costs of the disease, could play a key role in encouraging people to reduce their sodium intake by increasing their perceived susceptibility to and the perceived severity of the problem. In the United Kingdom, a national salt reduction campaign successfully in reduced the proportion of adults who added table salt to their food by 10% in 5 years [21]. Developing visual educational aids and implementing sodium reduction campaigns are thus effective strategies of a successful nutrition education program.

To date, there has been scarce information on factors related to sodium reduction among the elderly Korean–Chinese population. However, this study successfully revealed several reasons why many continue to consume substantial amounts of sodium. As far as we know, this is the first study to assess the barriers

against, awareness of, and willingness toward sodium reduction for this group of nutritionally vulnerable people by employing both quantitative and qualitative data analyses. Limitation of this study is that we could not test any hypotheses nor generalize the findings due to the small sample size [22]. Nevertheless, this study provides essential preliminary information that could help develop a large-scale nutrition intervention program to reduce sodium intake among the elderly Korean–Chinese population in Yanbian. The health belief model describes that one's health behavior is determined by perceived susceptibility and perceived severity [20]. In particular, we suggest that education regarding the high prevalence of hypertension, including the complications, symptoms, and treatment costs of the disease, be encouraged, to help people reduce their sodium intake.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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