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Special Report: School Meal Program**The different between Japanese and Vietnamese school lunches
No.4 in a Series**

Nguyen Van Diep, Nguyen Huong Giang, Nguyen Mai Phuong

Jumonji University, Saitama, Japan

As the first generation of dietitians in Vietnam, studying in a graduate program in Japan, we are working hard to study every day in order to improve our country's nutrition situation, especially schools' nutrition. Through one year of working as a dietitian in a primary school in Vietnam, as well as one year of internship in Japanese school kitchens, I have seen the difference in school meals between two countries.

In Japan, lunch is often the most enjoyable time of the day for children. They eagerly await the lunch and eat with delight. Meals are meticulously planned by the dietitian and carefully prepared by the cooking staff. Hence school lunches are very attractive and delicious. Moreover, the menus are different every day in a school year, keeping children from getting bored. For those reasons, almost all the students eat all the food provided, and the amount of food leftover is very small.

In contrast, in Vietnam, children often do not like school meals. They often say that school meals are not tasty, the menu is repetitive. Many children do not eat at school but choose to eat at home. Currently, public schools in Vietnam do not have dietitians. Meals are prepared based on the experiences of the kitchen staff members – who are not fully trained in nutrition. They often make simple, quick-cooking menus. The dishes are very monotonous and not eye-catching. For that

reason, children who eat school lunch often leave a lot of food, mainly vegetables, and rice.

So why there is such a difference in the deliciousness and attractiveness of school meals between the two countries?

During my internship, I discovered that in Japan, they use a lot of materials, more than 10 kinds for each meal. On the first day of my internship, I was really surprised when I walked into the kitchen and saw many types of vegetables with a variety of colors. With such a variety of vegetables, they have created many different food combinations, in all dishes: main dishes, side dishes or even staple food (Photo 1). When combining vegetables together, vegetables with meats/fish/eggs or with rice, it will give children new sensations in both flavor and texture. In addition, when vegetables are part of a tasty mixture, even disliked vegetables might become acceptable. Also, because of these combinations, meals become colorful stimulating children's appetite. On the other hand, in Vietnam, a meal has only about 5-6 materials and is often cooked separately, without any combination (Photo 2). Therefore, the colors are also quite monotonous, not bringing excitement to children. Because of that cooking method, children who already do not like to eat vegetables will only eat meat and leave vegetables behind.



Photo 1: Japanese school meal



Photo 2: Vietnamese school meal

In addition to using a variety of food materials, the cutting method between the two countries is also different. In Japan, the Ministry of Education, Culture, Sports, Science and Technology has recommended to choose a cutting method that suits the nature of the ingredients and the cooking method, and decide the thickness and size according to the dish to standardize. They had made the guideline on how to cut the vegetable

for school lunch (photo 3) and also give examples of the characteristics of different cutting methods (Photo 4). Through my internship, I saw that the school really put it into practice. Each material has a different cutting method depending on the combination and is cut very carefully so that the thickness of all pieces is similar. With fish and meat, when delivered, the supplier has already cut it according to the requirements of the dietitian. With vegetables, every morning, the cooking staff cut them according to the instruction which was carefully noted by the dietitian.

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With the same vegetable but two different dishes, the cut is different. For example, carrots in a salad had thin strips cut, but in a soup, they were cut into quarter slices (Photo 1). With that cutting method, the ingredients will be mixed well together, and make the dish look better. In opposition, in Vietnam, the

materials are cut very rough, the size is uneven. As in stir-fried chicken (Photo 2), there were both very large pieces and very small pieces, so when cooking, small pieces might become very tender while large pieces still hard. Vegetables and eggs were also the same. This made the overall dish look less appealing.

(5) 野菜の切り方

素材の性質や調理方法に合った切り方を選択し、料理に応じて厚さや大きさを決めて標準化しましょう。



Photo 3: Guideline on how to cut the vegetable for school lunch

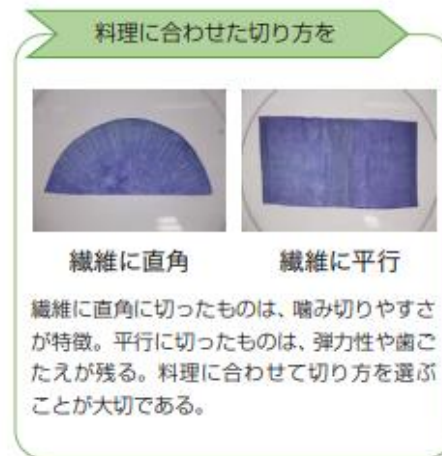


Photo 4: Characteristics of different cutting methods.
*[Those cut at right angles to the fibers (left) are characterized by their ease of chewing.
 Those cut in parallel (right) retain elasticity and chewy texture]*

While these findings may sound small, simply increasing the number of food materials to make more food combinations and more colorful meals and changing the way of cutting can have a huge impact on the palatability and appeal of a meal. In my opinion, if Vietnamese school meals can improve those points, it

will make children able to eat with interest and the leftover will be reduced. In addition, I think that it might work not only at school meals but also at home meals. And not only Vietnam, but all countries can also try the above points to improve children's meals.

Original**Study of Energy Intake of Children with or without School Lunch in Hanoi, Vietnam**

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Abstract: Background: In the urban areas of Vietnam, the obesity rate of children is increasing rapidly. Over the past few years, Vietnam has implemented a school meals program to address this problem. However, students are free to decide whether to get school lunch or not. Students who do not eat lunch at school tend to consume sweet drinks, sweet confections, greasy snacks etc. that are energy rich, more often than other students do. The objective of this study was to confirm the hypothesis that students without school lunch consume higher energy, especially from snacks, when compare with students with school lunch. **Methods:** We asked approximately 200 fifth grade students (10 years old) with or without school lunch for more than 3 years at a public elementary school to cooperate in our research. From over 100 children who agreed, we randomly selected 50 children who ate school lunch and 50 who didn't eat school lunch. We rented smartphones for the students and asked them to send photos of all the food and beverages that they consumed for three days (two weekdays, one weekend day or holiday). From those photos, we estimated the weight of the food and then calculated the energy intake. **Results:** The average energy intakes (kcal) of children who ate school lunch and those who did not eat it were respectively 1902 and 2075 on weekday one, 1907 and 2108 on weekday two, 2107 and 2120 on the weekend day ($p < 0.05$), and 1972 and 2101 on average for three days ($p < 0.01$). The average energy intake (kcal) of three days from snacks was 235 for student with school lunch and 401 for student without school lunch ($p < 0.01$). The reason for the higher energy intake among children who did not eat school lunch was the large influence of snacks during the day. The average BMI of children with school lunch was 17.1, and of children without school lunch was 18.5 ($p < 0.05$). **Conclusion:** In comparison with children with school lunch, children without school lunch had higher energy intake from their snacks, resulting in higher total energy intake.

Key Words: School lunch, energy intake, snack.

INTRODUCTION

Since the Vietnam War ended in 1975, the Vietnamese economy has entered a period of peaceful development. Along with the country's socio-economic growth, Vietnam has achieved remarkable results in improving nutritional status and child health. However, in this period, eating habits have also changed. In particular, children's diet and lifestyle are affected in various ways, such as the trend toward consuming a lot of fast food and processed foods that are less healthy, the trend toward drinking carbonated soft drinks and energy drinks, and the trend toward eating snacks and street food which do not guarantee food safety. Consequently, childhood obesity has been rapidly increasing. In 1995, the prevalence of obesity among primary school children in Ho Chi Minh City was 1.4% (1) and rose to 52.7% in 2016 (2). In Hanoi, the prevalence also increased rapidly from 3.3% in 1995 to 40.6% in 2013 (3, 4).

Over the past few years, Vietnam has implemented a school meals program to address this problem. The school lunch implementation rate in Vietnam is high,

up to 93% (5), but it is not required by law and children can decide to eat lunch at school or return home to eat. Many children prefer to go home because they don't like the taste of school meals. When they go home for lunch, on the way, they can easily buy junk food from the vendors – who are waiting for the hungry children – around the school. The children who have school lunch are not able to go outside to buy snacks. So, we thought that children without school lunch may have higher energy intake, especially from snacks, when compared with children with school lunch. Therefore, we conducted this study to confirm this hypothesis in order to show directly the effect of school lunch on dietary behavior and obesity of children

METHODS

Study design. This was a cross-sectional study conducted between January 2018 and March 2018 at a public elementary school in Hanoi where all the children came from middle-income families. We divided students into two groups: students who took school lunch and students who did not for more than 3 years, then asked them and their parents to cooperate in the research. 63 out of 94 students who took school

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lunch and 89 out of 106 students who did not take school lunch agreed to participate. In each group, we randomly selected 50 children (25 boys and 25 girls).

The protocol had been approved by the ethics committee of primary school in January 2018. The study complied with the ethical principles provided by Declaration of Helsinki. Before we conducted the research, all the parents and children were introduced to the nature of the project, signed a consent form and were instructed on how to record dietary items and send them to the researchers.

Anthropometric measurement. Weight and height were measured at baseline, in light clothing and without shoes. Body mass index (BMI) was computed as the ratio of weight (kg) per height squared (m^2). The nutritional status was determined based on BMI reported in WHO 2007 (6): obesity $>+2SD$; overweight $>+1SD$; normal $-2SD \leq Z\text{-score} \leq +1SD$; thinness $<-2SD$; severe thinness $<-3SD$.

Nutrition survey. Three-consecutive-day nutrition surveys which included two weekdays and one weekend day were conducted by the photograph method. We rented smartphones, gave one to each child before the survey and took it back after the survey. We asked the children to take pictures of all the foods and drinks they consumed, before and after

eating, then send the photos to the researchers every day. The size of dishes and energy intake were estimated and calculated using Calorie Smile Vietnam version software.

Calorie Smile Vietnam version (7) is a nutrition support software which was made for Vietnamese people. The basic method is that subjects take photos of their food, send them to the Calorie Smile software with/without some notes, and then the dietitians evaluate their dietary pattern. Calorie Smile Vietnam Version software has been integrated with the Vietnam food composition table (8), the nutrition value of 500 popular dishes from Hanoi area (9) and the nutrition value of 400 popular street foods from the Ho Chi Minh City area (10). When subjects' meals are different or they eat items other than those in the data base, adjustments can be made according to the "Photo book to estimate the weight of food" (11), so the dietitians can analyze users' meals easily and quickly. It has been reported that the Calorie Smile Vietnam version software was able to accurately estimate the weights of food portions and to give results comparable to the actually consumed amounts (12, 13).

Statistical analysis. Microsoft Excel was used to analyze the data. The variables were compared by unpaired Student *t*-test. P-values of less than 0.05 were considered statistically significant for all the analyses.

RESULTS

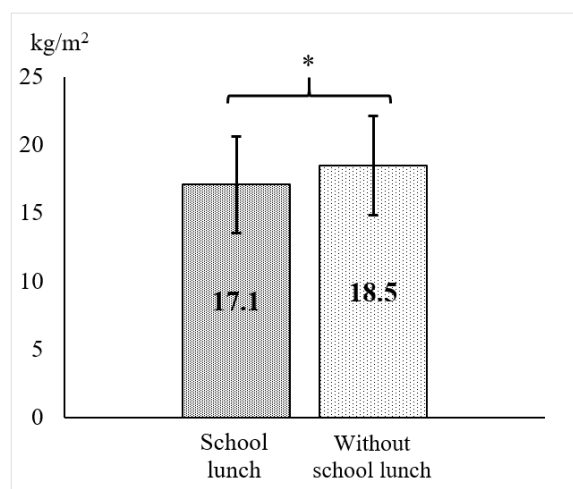


Fig. 1. The average BMI of students with or without school lunch for more than 3 years (25 boys and 25 girls in each group) (* $p < 0.05$, unpaired student *t*-test)

The average BMI of subjects is shown in Fig.1. Most children had normal nutrition status; however, students without school lunch had higher BMI than students with school lunch ($p < 0.05$).

Fig.2 shows the average energy consumption of subjects by days and group. The average energy

consumption of the group without school lunch when compared with the group with school lunch was higher on weekdays ($p < 0.05$) but was similar on the weekend. On average for the 3 days, students without school lunch consumed 2101 kcal, higher than students with school lunch, who consumed 1972 kcal ($p < 0.01$)

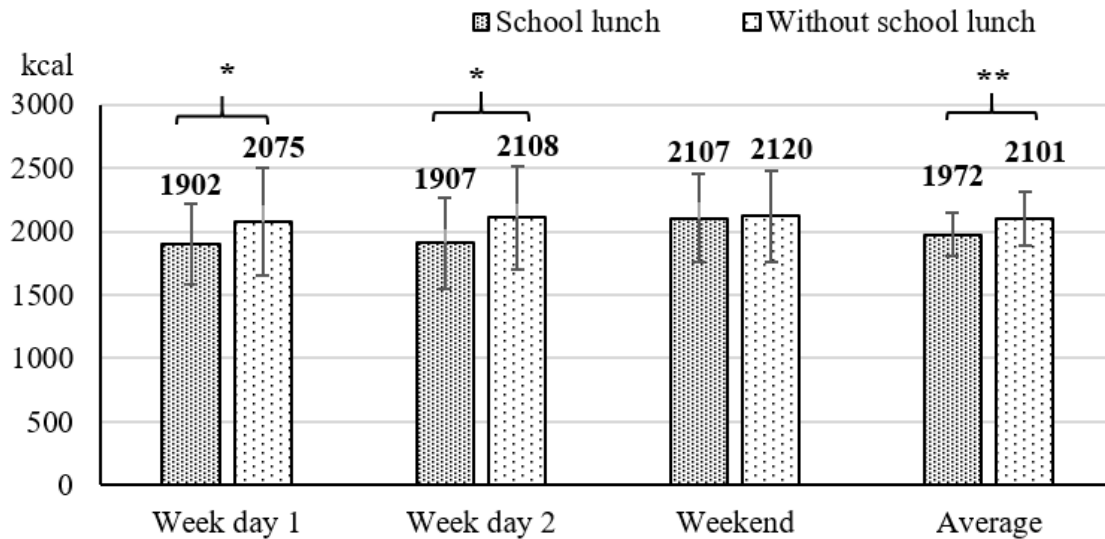


Fig. 2. Average energy consumption of subjects by days and group
(Significantly different by unpaired Student *t*-test, * $p < 0.05$, ** $p < 0.01$)

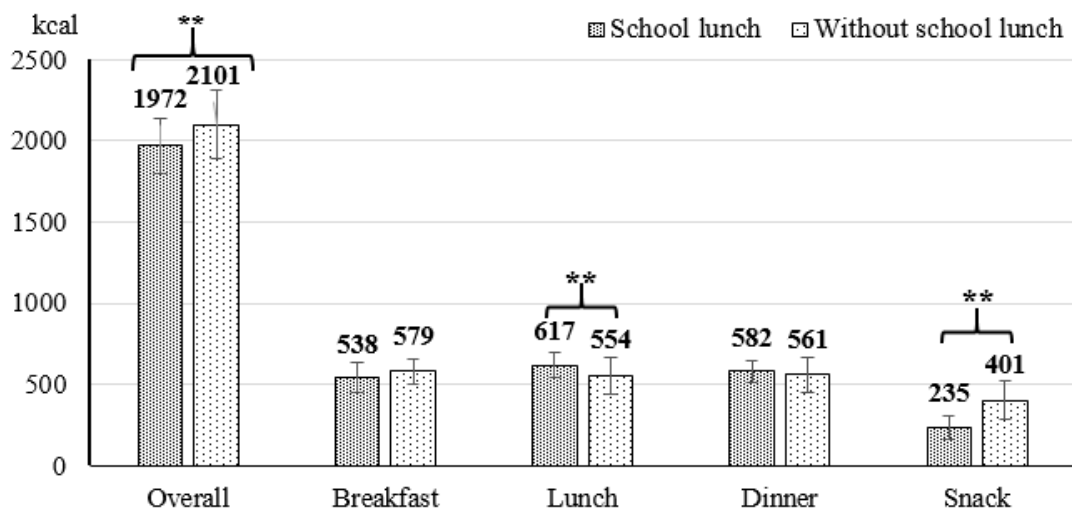


Fig. 3. Average energy intake of subjects by meals and group for 3 days.
(Significantly different by unpaired Student *t*-test, ** $p < 0.01$)

Fig.3 presents the average energy intake of subjects by meals and group. The energy intake of both groups was similar at breakfast and dinner but was different at lunch and snack. Children with school lunch had higher energy intake at lunch and lower energy intake at snack, when compared with children without school lunch ($p < 0.01$)

Fig.4 shows the average energy intake from snacks by time and group. On weekdays, children tended to eat more snacks from 11am-1pm and 5-7pm and on weekends, children ate more snacks in the afternoon, especially from 5-7pm. Children with school lunch ate fewer snacks than children without school lunch on weekdays.

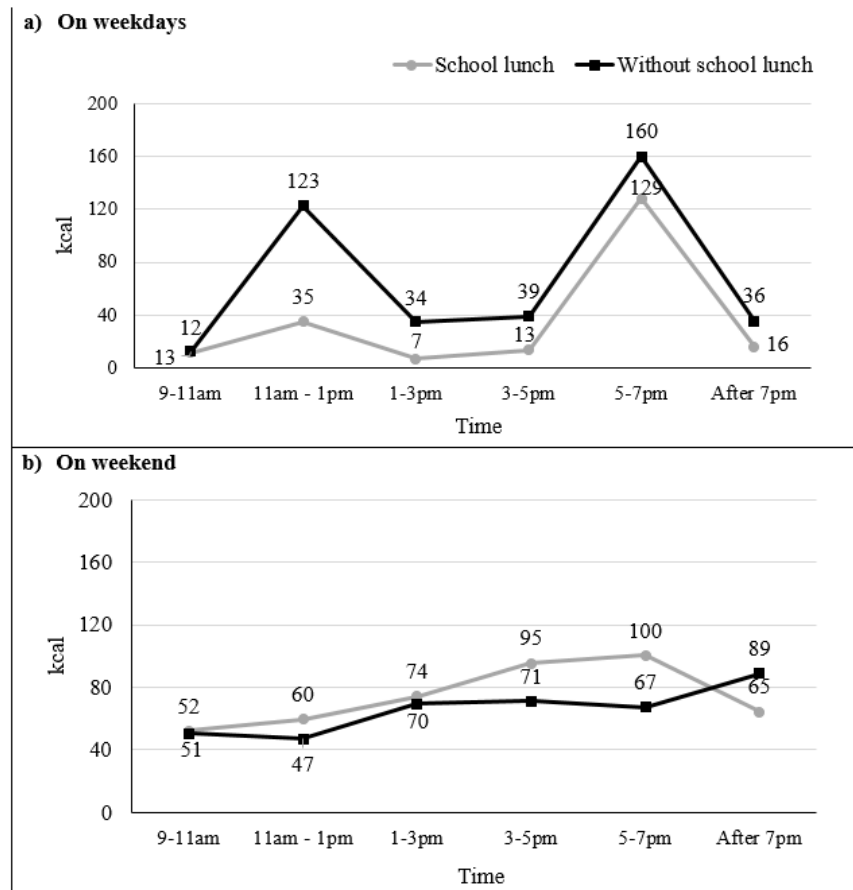


Fig. 4. Average energy intake from snacks by time and group.

DISCUSSION

The present study found that children without school lunch had higher BMI, higher total energy intake, and higher energy intake from snacks when compared with children with school lunch.

Subjects' conditions in our two research groups were quite similar: They are the fifth-grade students at the same primary school, have similar economic conditions, which helped reduce confounding factors. In addition, the student ate or did not ate school lunch for more than 3 years and the BMI data is the result of several years, hence, we could point out that the school lunch is a factor that influences the nutrition status of children.

All subjects were fifth graders, so they were able to do the nutrition survey on their own. Self-reported food records are common methods of obtaining dietary intake data however, those methods are riddled with limitations including the time-consuming, and errors in estimates of portion size (14-16). Our study used the photography method which was reported could improve accuracy over standard self-report methods and reduce the burden on children (17). Children only took pictures of their food, send it to the researchers and researchers estimated and analyzed those portions. Therefore, the nutrition survey results in this study were accurate.

According to the nutrition survey results, we found that while children with school lunch had energy consumption on weekdays lower than on the weekend day, children without school lunch had almost the

same energy consumption every day. In Vietnam, people usually like their children to be chubby; they think a chubby child is healthy and beautiful (18), so when their children are at home, they give them a lot of food. This explains why the energy intake on weekdays and on the weekend was different. In addition, children without school lunch had an average energy intake throughout the week higher than those with school lunch. It seems that school meals can help control children's total energy consumption and keep it in moderation.

In terms of snacks, in this study, we considered a snack as everything children ate or drank between the main meals. Snacks, which are rich in fat and added sugar, such as potato chips, fast food, candy, ice cream, and sweetened beverages, were often consumed. Student tended to eat snack at the times that school ends for the morning and afternoon. Therefore, the reason for snacking may be that after a long time in school, children feel hungry and want to eat something tasty and rich in calories. Along with that, there are many shops and local vendors outside school selling many unhealthy snacks that look very attractive and are also very cheap, so children have ample opportunity to purchase them with their pocket money or to ask a family member to purchase them. For children with school lunch, at lunch (11am-1pm) they cannot leave the school to buy snacks, which is why energy from snacks was low. But for children without school lunch, they ate a lot of snacks during this break and as a result, they could not eat much at lunch, so the

energy intake at lunch for them was lower than for the children with school lunch. Thus, we could say that school meals and school environment also helped prevent snacking in children.

From those results, we considered whether it is preferable for children to have school lunch. School lunch has been considered as a factor in controlling obesity rates in children in Japan; however there has been no evidence yet. This study may be the first study to show the effect of school lunch on the energy intake of children. School lunch not only provides lunch for children but also conveys an understanding of portion size, meal balance and gratitude for the food and for the people who make it (19–21). Therefore, school lunch may be important in controlling overweight. Especially important is the role of the dietitian in the school, not only to develop menus for children, but also to develop educational programs to teach children (21). Coordination with the education from the family is also necessary. Parents can restrict junk food or absolutely not allow children buy it when they go to school.

However, the number of dietitians in Vietnam is still very limited, so menus are drawn up by the cooks, who often lack knowledge about nutrition (5). Therefore, the school lunch menu is repeated, and the price is considered more than the nutritional aspect. This means that students do not really like the school lunch. That is the main reason why many children do not eat at school, not because of other factors such as price or family environment.

As a limitation of this study, any difference in physical activity between children who ate school lunch and those who do not, which is thought to affect meal intake, could not be assessed in this study, so it was not possible to examine this. The other limitation of this study was that the results are from only one school, and it will be necessary to analyze how accurately this school represents Vietnam as a whole. It is desirable to spread school lunches and establish a school dietitian system in Vietnam so that children can enjoy a nutritious school lunch.

In conclusion, this study showed that in comparison with children with school lunch, children without school lunch had higher energy intake from their snacks, resulting in higher total energy intake.

ACKNOWLEDGMENTS

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Original**The Stability of Vitamin K in The Diet of Patients Using Oral Anticoagulant Vitamin K Antagonist (VKA) Drugs in Hanoi Medical University Hospital in 2021**

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ABSTRACT: The amount of vitamin K in the daily diet plays a pivotal role in the therapeutic effects of oral anticoagulant vitamin K antagonist (VKA) medicines. The study aims to describe the dietary and the stability of vitamin K in daily meals of patients who use oral anticoagulant VKA medicines. A longitudinal study was carried out on 26 patients, which shows that the average amount of vitamin K in the participant's diet was 237.8 µg, and 58.6% of the patient's diet did not meet the recommendation for vitamin K. The surveys had been conducted among two groups: patients who knew and patients who did not know about the nutritional knowledge when using oral anticoagulant VKA drugs. The results showed that the average amounts of vitamin K of the two groups were 183.4 µg and 292.2 µg, respectively. The variation in the amount of vitamin K in knowledgeable patients' groups was less than the figure for the non-knowledgeable patients' groups with the coefficient of variation (CV) being 1.01 and 1.19, respectively.

Key words: Vitamin K, oral anticoagulant vitamin K antagonist (VKA) drugs, Hanoi Medical University Hospital.

INTRODUCTION

Vitamin K antagonists (VKA) are a group of substances that reduce blood clotting by reducing the action of vitamin K. However, the risks of complications related to the usage of these substances are significant. According to some studies, the rate of hemorrhage is approximately 1% to 3% each year (1,2). World-wide, "Vitamin K antagonist medicines related to about 6.000 deaths in which about 4.000 cases can be avoided as well as 17.300 hospitalization cases can be avoided each year" (3). Recently, many pieces of evidence showed that uncontrolled-vitamin K diets are one of the most prevalence factors which have direct influences on these treatments (4,5). If the amount of vitamin K intake is too much, this can increase clotting factors and decrease the effect of these drugs. Whereas, if the amount of vitamin K intake is not enough, it will lead to clotting factor deficiency and the risks of hemorrhage. According to previous opinions, patients who use oral anticoagulant VKA medicines need to limit food containing a high amount of vitamin K. However, recent researches show that it is not necessary to constrain these food and more important thing is that patients have to maintain their daily diets with a stable amount of vitamin K (6,7).

In Vietnam, there are many common food, which are used in everyday meals that containing a high amount of vitamin K such as cruciferous vegetables, seasoning vegetables, amaranths, and morning glory water (8). In fact, vitamin K dietary intake is unstable because of seasonal vegetables and therefore making

it difficult to control the INR. In many Western and North American countries, patients are instructed to practice nutrition under the supervision of doctors, the proportion of patients who achieved the INR target was from 60% to 75% (9,10). In Vietnam, it is only 30% to 45% of patients using oral anticoagulant VKA drugs meet the INR target (11,12).

In the world, there are researches about the effect of diets relating to the result of INR (6,7). By contrast, in Vietnam, researches about nutrition for patients who used oral anticoagulant VKA drugs are extremely rare. Therefore, we conducted this study to describe the dietary vitamin K intake and the stability of vitamin K intake in diets of patients who used these medicines.

METHODS**Study setting and subjects**

This longitudinal study involved 26 inpatients in the Cardiovascular Center at Hanoi Medical University Hospital from January to May 2021. We used a non-probabilistic and purposive sampling method in this study and collected all inpatients who had the required criteria during the study period. Patients were chosen based on the criteria: people who were above 18 years, were treated with oral anticoagulant VKA drugs, and had agreed for the researcher to keep in contact to ask for 24-hour recall dietary meals after discharging from the hospital. The study excluded patients who were in serious conditions, had disabilities such as dumbness or deafness, or refused to take part in this study (figure 1).

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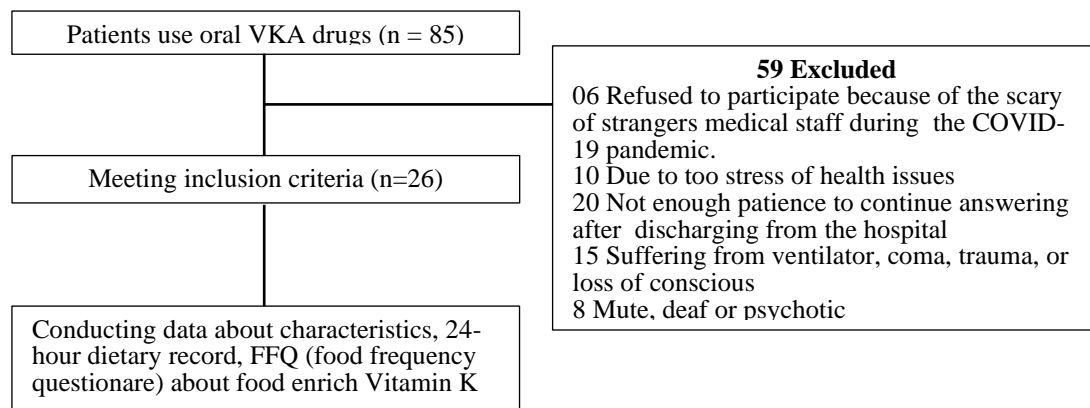


Figure 1. Diagram of study participants

Data collection

Demographic characteristics (gender, age, academic levels (primary/secondary/high school /college /university/postgraduate) and address (rural or urban areas)).

The average amount of vitamin K and the proportion of patients which achieve recommended vitamin K allowances of subjects.

The variation of vitamin K intake in groups with knowledge and without knowledge during the study period.

Knowledge of patients: Knowledgeable patients when they have been consulted directly by medical staff/ received nutritional leaflets/ self – educate information through media and then answering the correct answer about the name and the principle of using enriched vitamin K vegetables. Non-knowledge patients when they have not been consulted by medical staff or they have not learned by themselves about nutrition while using oral anticoagulant VKA drugs or have been consulted by medical staff but answered wrongly about the name and the principle of using enriched vitamin K vegetables.

The amount of vitamin K had been evaluated by the 24-hour recording method in three consecutive weeks. Each week, 24-hour dietary record in three consecutive days. The patient's dietary intake information was taken by face-to-face questionnaires during the hospital stay and by telephone interviews during the patient's discharge period from the hospital. General information of patients and the frequency of using food containing a high level of vitamin K in the past 12 months were gathered by using questionnaires. Food that contains a high level of vitamin K is divided into 3 main groups: the cruciferous vegetable group, the seasoning vegetable group, and other vegetables group. The cruciferous vegetable group includes: green cruciferous vegetables, watercress, spinaches; the seasoning vegetable group includes: cilantro, saw leaf, basil. Others include Morning glory, amaranth, and lettuces. Patients would be asked about the

frequency of using these food in a week in its season and out of season. The frequency of food was calculated by the total number of consumption in a week multiplied by the number of weeks in a season. Biases were controlled by using a single equipment tool and one researcher to collect the data for all subjects.

The assessing criteria about the amount of vitamin K in dietary

Based on the recommended vitamin K allowance for Vietnamese adults: Recommended vitamin K allowance for male and female: 150µg/day (13).

Currently, we have not referred to any recommendation in the amount of vitamin K daily for patients who use oral VKA drugs. The most important thing is that patients should keep on stability regularly.

Statistical analysis

The data were entered by using Microsoft Excel Workbook 2019 (Microsoft Corporation) and Stata 15.1 statistical software (StataCorp LLC) for analysing. The intergroup comparisons were performed using the Mann-Whitney test. Categorical and quantitative variables were expressed as the number of subjects (percentage), and mean (standard deviation), respectively. Statistical differences were considered significant at $p < 0.05$.

Ethics approval

The study has been approved by the research review board of Hanoi Medical University Hospital. All participants are fully informed about the purposes of the study.

RESULTS

The study was conducted on 26 patients who were treated with oral anticoagulant VKA drugs, the proportions of males and females were 26.9% and 73.1% respectively. The percentage of patients who had knowledge and patients did not know were the same, at 50%

Table 1: The amount of vitamin K in 24 - hour recall dietary of participants

	Groups	Mean \pm SD	Nutrients Recommendation (μ g)	Percentage (%)	
				Meet RDA	Did not meet RDA
Age	19-65 (n=16)	255.9 \pm 317.5	150	45.1	54.9
	> 65 (n=10)	227.4 \pm 316.4	150	33.3	66.7
Gender	Male (n=7)	176.1 \pm 254.1	150	33.3	66.7
	Female (n=19)	272.8 \pm 333.4	150	43.8	56.2
Address	Rural areas (n=15)	240.5 \pm 301.9	150	40	60
	Urban areas (n=11)	253.7 \pm 337.4	150	42.4	57.6
Academic level	Before high school (n=7)	215.1 \pm 267.4	150	41.6	58.4
	High school (n=8)	258.9 \pm 327.2	150	41.6	58.4
	College/university/	260.6 \pm 345.1	150	40	60
	postgraduate (n=11)				
Knowledge	Knowledge (n=13)	183.4 \pm 209.4	150	37.6	62.4
	Non - knowledge (n=13)	292.2 \pm 349.7	150	46.2	53.8
Total (n=26)		237.8 \pm 292.7	150	41.4	58.6

Table 1 showed that the average amount of vitamin K intake of participants was 237.8 μ g per day, and the percentage of patients who meet recommended vitamin K allowance was 41.4%. The average amounts of vitamin K in dietary in groups of knowledgeable and non-knowledgeable groups were 183.4 \pm 209.4 μ g and 292.2 \pm 349.7 μ g respectively. The proportions of male and older people who meet the recommended vitamin K allowance were the lowest, at approximately 33.3%. The percentage of patients who meet the recommended vitamin K allowance was the highest in non- knowledgeable patients (46.2%). The average amount of vitamin K and the percentage of patients who meet the recommended allowance of vitamin K, which were classified by living areas and the education levels of subjects, showed no significant difference.

Figure 2 illustrated that the differences in the amount of vitamin K in the diet between two

consecutive investigation days of non-knowledgeable patients were mostly higher than that of knowledgeable patients. In terms of the non-knowledgeable group, the orange line was dramatic fluctuated between investigation days. To be specific, the amount of vitamin K was highest on the third investigation day at 513.3 μ g while the lowest figure on the sixth day was at 114.1 μ g. The coefficient of variation (CV) of vitamin K between investigation days in the group was 1.19. When it came to the knowledgeable group, the blue line slightly fluctuated between investigation days. To be specific, the amount of vitamin K was highest on the eighth investigation day at 269.3 μ g while the lowest figure on the sixth day was at 87.4 μ g. The coefficient of variation (CV) of vitamin K between investigation days in the group was 1.01. Therefore, the amount of vitamin K in the diet of knowledgeable patients was more stable than the figure for non-knowledgeable patients.

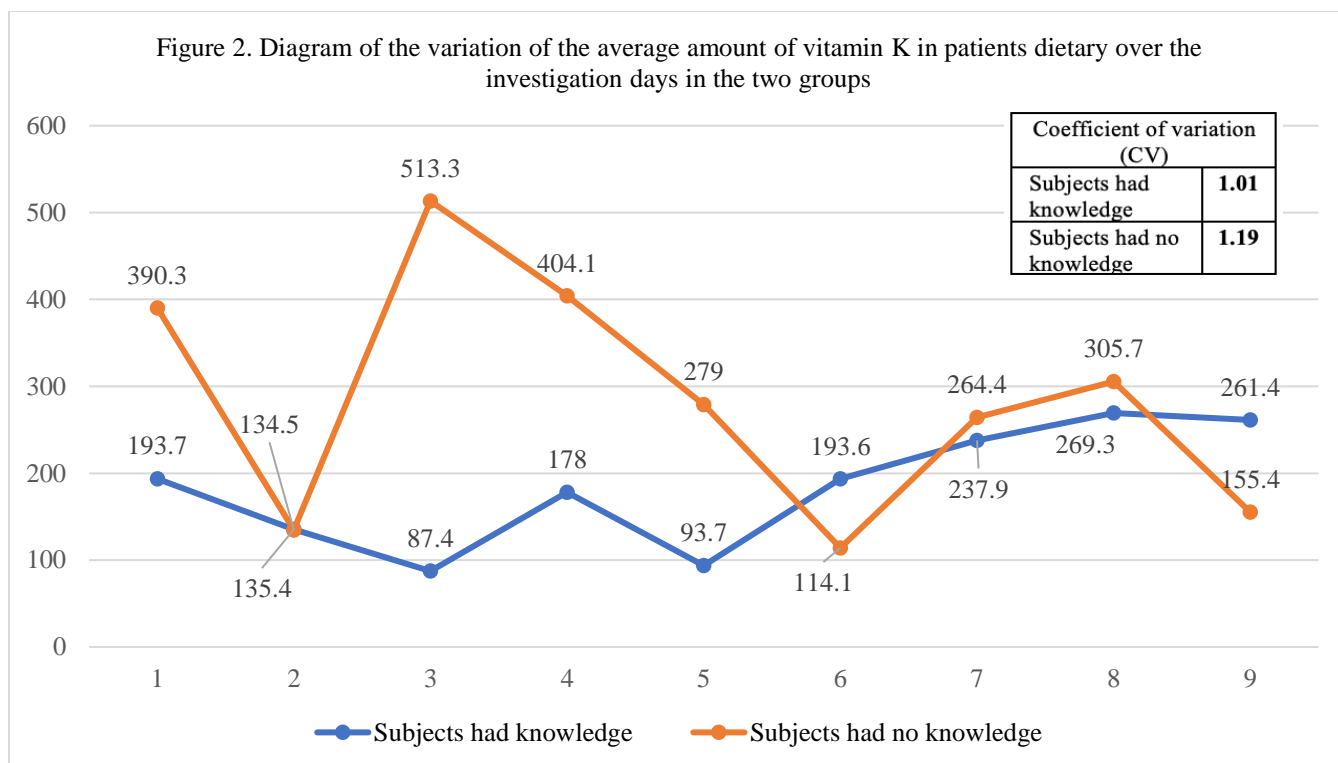


Figure 2. Diagram of the variation of the average amount of vitamin K in patients dietary over the investigation days in the two groups

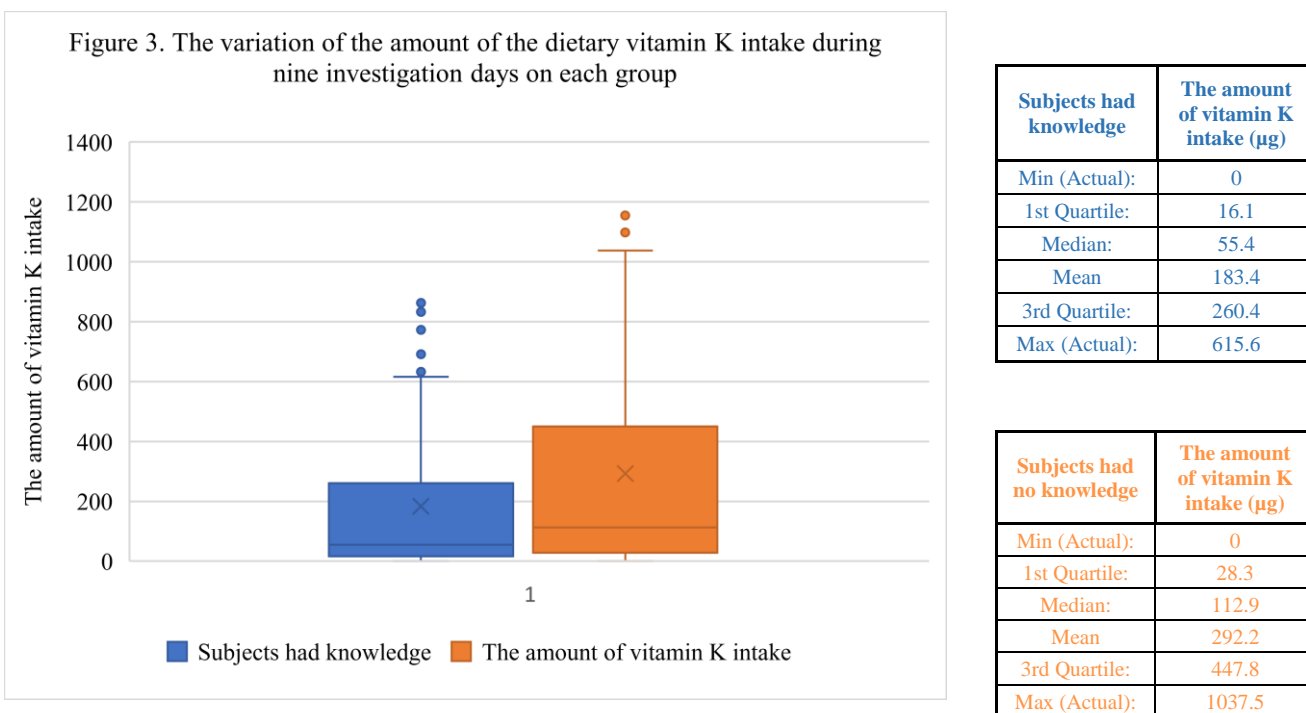


Figure 3. The variation of the amount of the dietary vitamin K intake during nine investigation days on each group

Figure 3 provided data on the variation of the amount of vitamin K between nine investigation days on two groups. In terms of the knowledgeable group, the average amount of vitamin K consumption and the median were 183.4 μg and 55.4 μg respectively. The data tended to toward the above of the mean. The interquartile range $\text{IQR} = \text{Q3} - \text{Q1} = 244.3 \mu\text{g}$. The difference between the highest and the lowest amount of vitamin K in the patients' diet was 866 μg . Regarding the non-knowledgeable group, the average amount of vitamin K consumption and the median were 292.2 μg and 112.9 μg respectively. The data had a tendency toward the above of the mean. The interquartile range $\text{IQR} = \text{Q3} - \text{Q1} = 419.3 \mu\text{g}$. The difference between the highest and the lowest amount of vitamin K in the patients' diet was 1171.6 μg . Thereby, there was a large variation in the amount of

vitamin K in patients' diets in both groups. But, the swing of the amount of vitamin K in the non-knowledgeable group was worse than the figure for the knowledgeable group.

Figure 4 showed that the frequency of using food that contains a high amount of vitamin K increased significantly in two seasons (winter and spring), especially in the cruciferous vegetable group (higher than that of summer and autumn for about six times). The frequency of using vegetable seasoning group showed little difference between seasons. Some types of vegetables that contain a high amount of vitamin K such as morning glory water or lettuce, were consumed much higher in summer and autumn. The consumption of these vegetables in winter and spring was only one-third.

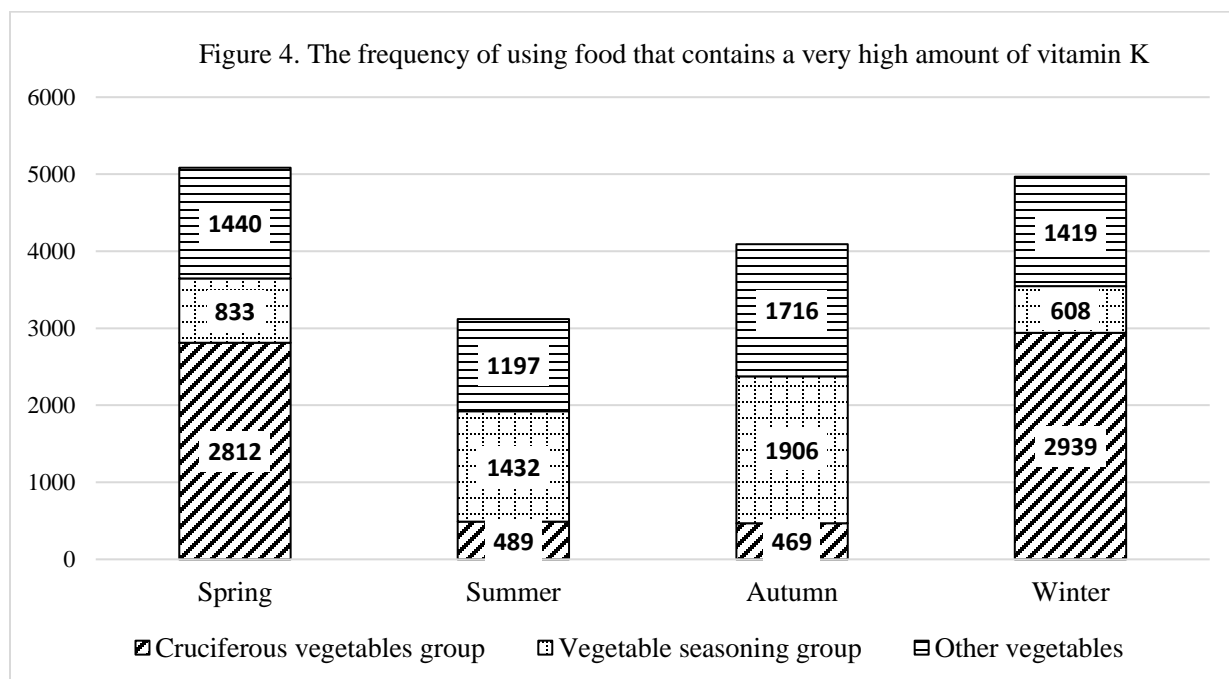


Figure 4. The frequency of using food that contains a very high amount of vitamin K in four seasons

DISCUSSION

In terms of the average amount of vitamin K, the result in the study was 237.8 μg per day, lower than the study of Pham Van Bac in Bac Ninh General hospital (346.6(μg)) and higher than the result of Kim K.H et al., 2010 in Korean (161.3 μg), Lubetsky A in Israel (176 $\mu\text{g/day}$) or Custodio das Dores SM in Brazil (76-120 $\mu\text{g/day}$) (5,14,15,16). The result can be explained by eating habits and the availability of vitamin K-rich food in different countries. Other studies about the vitamin K diet in Vietnamese people showed that the average amount of vitamin K in the diet was higher than the recommended allowance. However, based on our study, the percentage of patients who did not achieve the recommended allowance as normal adults was still significantly high

(58.6%). The result shows that the amount of vitamin K intake in the patients' diet was unstable. Patients may much food enriched with a high amount of vitamin K on some days to make up for the other days, which could lead to a high average amount of vitamin K in general. The study also showed that the proportion of people who meet the recommended vitamin K in knowledgeable patients was lower than the figure for non-knowledgeable patients. This shows that instructing patients to eat limited foods containing vitamin K leads to unnecessary abstinence. And there should be more specific instructions to help patients maintain a diet with a stable vitamin K content.

To assess the stability of the amount of vitamin K in the patients' diet, we used the coefficient of variation (CV) and the interquartile range (IQR). The

CV of knowledgeable patients about nutrition relating to vitamin K was 1.01 while the figure for non-knowledgeable patients was 1.19. The coefficient of variation of knowledgeable patients was lower, which proved that the amount of vitamin K of the knowledgeable patient's diet was more stable than the figure for non-knowledgeable subjects. The result showed that it is important to consult nutritional information carefully for patients who use oral anticoagulant VKA drugs. However, this effect was not high enough and had not led to a significant difference in controlling the stability of vitamin K dietary intake of patients. This could show that consultation for these patients about the diet patterns was effective. The amount number of Vitamin K in knowledgeable patients' diets was less changing than the figure for non-knowledgeable patients' diets. However, this effect on these patients was not high and was not leading to many differences in controlling the stability of the amount of vitamin K in patients's diets. So it is necessary to establish an intensive intervention strategy, which could help patients to have a deep understanding of their diets and its importance. The limitation of our research is the basic in studying design, which only accessed patients' knowledge while using oral VKA drugs. Change in attitudes and practices is extremely hard. Therefore, there is a need for more new nutritional intervention patterns, which are not only focussing on knowledge but also on how to do the right practice.

Moreover, vitamin K dietary intake was also affected by the frequency of consumption and the availability of foods. With the development of technology and farming techniques, most of these food was available all year round. However, some types of food are not usually consumed because Vietnamese people have the tendency to eat a particular kind of food in its main season. Therefore, vitamin K dietary intake was indirectly affected by the seasonal nature of these food, especially in the group of vegetables and fruits. In addition, this group has the highest amount of vitamin K compared with other food groups. This was the main reason why we decided to survey the frequency of using types of vegetable which contains the highest amount of vitamin K in a year. The results showed that the frequency of using foods containing a high amount of vitamin K increased remarkably in the two seasons: winter and spring, especially in the group of cruciferous vegetables. The frequency of using cruciferous vegetables in winter and spring was about six times as many as in other seasons. The frequency of using seasoning vegetables had a little variation between each season of the year. Other food containing a very high level of vitamin K such as water spinaches, amaranths, lettuces, which had a frequency of use in summer and autumn was about three times as many as other seasons. The frequency of vegetable consumption with a very high amount of vitamin K was closely related to the patients' vitamin K intake mainly because even a small amount of these foods can contribute a significant part to the amount of vitamin K intake. It is clear that not every vegetable has vitamin K, so it is easy to point out the difference in the amount of vitamin K in the patients' diet.

CONCLUSION

The average amount of vitamin K intake of all patients was higher than the recommendation for vitamin K but there were 58.6% of patients' dietary did not meet the recommendation as normal adults. The study showed that the instability of vitamin K in patient's diets who used oral anticoagulant VKA drugs, and the amount of vitamin K in the diet of knowledgeable patients was more stable than the figure for non-knowledgeable patients. The amount of vitamin K in diet of the knowledgeable patients compared with non-knowledgeable patients showed that the intervention in order to raise the awareness of patients using oral anticoagulant VKA drugs was effective. The frequency of using vitamin K enriched food in winter and spring was significantly higher than in summer and autumn, which indirectly showed the instability of vitamin K in the patient's diet in different seasons.

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Original**Development and Acceptability of New Japanese Menus
with Soy-based meat substitute**

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ABSTRACT *Background and purpose.* Textured Soybean Protein (soy-based meat substitute: hereafter called SOY MEAT), is rich in fiber (13.6g/100g) and a good protein source (about 56g/100g). Substituting SOY MEAT for meat in the diet may have beneficial effects in preventing lifestyle-related diseases as well as in preserving the Earth. *Purpose.* To establish a new food culture with Textured Soybean Protein and to assess the palatability of TSP dishes. *Method.* There were two phases in the study. The research group created 30 new menus using SOY MEAT. From the traditional recipes, meat was replaced with about 6g SOY MEAT/dish. The acceptability of new dishes using SOY MEAT was assessed by a Hedonic 5-point scale in 6 subjects. The points were; extremely like 5, like 4, neither like nor dislike 3, dislike 2 and extremely dislike 1. There were 11 dishes with the score higher than 4 and only one dish was scored less than 3. *Results.* The average score of overall taste of SOY MEAT was 3.8 and 11 dishes scored higher than 4.0. *Conclusion.* We found that most of the SOY MEAT dishes are well accepted by Japanese

KEY WORDS: Textured Soybean Protein, meat analog, livestock, environment.

INTRODUCTION

There are many vegetarians in the world. One of the important reasons seems to be the moral idea that we should avoid eating creatures that think and act like we humans do. A good example would be the idea that the act of killing and eating animals is not morally permissible in some Buddhist denominations. I think the next reason for advancing vegetarian diet is to think of it as a healthy diet. Animal fat is a cause of heart disease, so the idea is to refrain from eating meat for the sake of health. The idea of avoiding carnivorous food that has recently arisen is probably due to the idea of preventing global warming. Cows, goats, sheep, etc. used as carnivorous animals are called ruminants. These animals live on grass and the like. To digest the grass, these animals have four stomachs, reciprocating between them many times. In the process, the bacteria that live in the stomach help digest the plants. It was known that this bacterium produced methane gas, but we didn't feel that it had any adverse effect on us. In recent years, human life has produced a large amount of carbon dioxide, which has increased in the atmosphere surrounding the earth, causing global warming, abnormal weather changes, and changes in the ecosystem.

It has become a problem for the survival of humankind. Raising livestock for meat is responsible for about 14.5% of total anthropogenic greenhouse gas (GHG) emissions, including methane gas (a gas which has an effect on global warming 28 times higher than carbon dioxide) and nitrous oxide (a molecule with a global warming potential 265 times higher than carbon dioxide) (1). Animal agriculture is also a sector which requires a significant amount of natural resources like water and landmass when compared with other foods as a protein source (2).

Based on this idea, textured soy protein has been considered as a meat-like food from vegetable foods (soy-based meat substitute. Hereafter we called it SOY MEAT). Based on this idea, the commercialization of SOY MEAT has recently become active. SOY MEAT is a meat analog which is produced through an extrusion process. The defatted thermoplastic protein is heated to 150–200°C, which denatures it into a fibrous, insoluble, porous network that can soak up as much as three times its weight in liquids. As the pressurized molten protein mixture exits the extruder, the sudden increase in pressure causes rapid expansion into a puffy solid that is then dried. It is rich in fiber (13.6g/100g) and plant protein (about 56g/100g).

Our expectation is its high fiber concentration. The role of fiber in controlling metabolic disease in Asian countries has been reported (3-5).

In order to realize the expected effects of soybean meat as described above, it is necessary to develop

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delicious dishes. We have been developing Vietnamese and Indonesian food (6,7). This research was conducted to develop delicious Japanese food.

METHODS

Creating new menus using SOY MEAT: We made 30 types of traditional dishes with Soy Meat replacing the meat ingredient. The dishes were made for lunch on different days. The subjects were 6 (female 5, average age 31 ± 6 years, male 1, age 55 years). Details of the

cooking methods for the 30 Soy Meat dishes are listed in Figure 1. Each dish contained about 6g Soy Meat.

Assessing the palatability of new dishes using Soy Meat: We asked to score for each dish in terms of appearance, aroma, taste, texture, overall was recorded by using the Hedonic 5-point scale (1-point. Dislike very much, 2-point. Dislike moderately, 3-point. Neither like nor dislike, 4-point. Like moderately, and 5-point. Like very much).

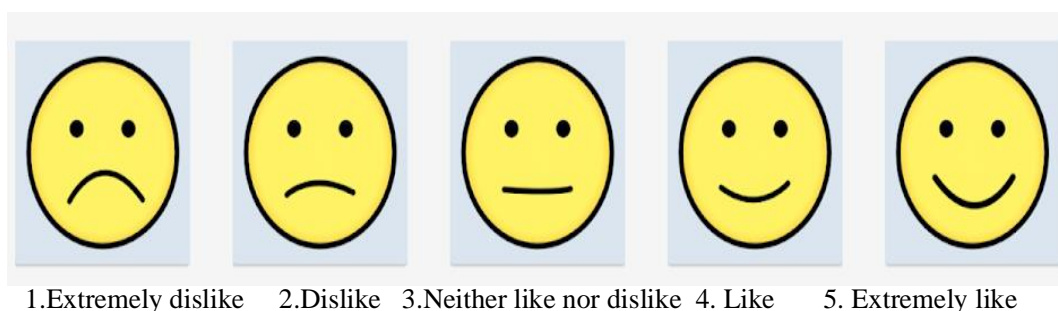






Fig. 1 Hedonic 5-point scale of the sensory test

	<p>Fried purse</p> <p>Deep-fried soy meat, asatsuki, and shiitake mushrooms are stuffed and boiled in soup stock, soy sauce, salt, sake, and potato starch.</p>	<p>Omelet</p> <p>Fry the minced onion in a frying pan, put it in a bowl and remove the heat. Add soy meat beef, eggs and mayonnaise and mix well. Add oil to the frying pan again, bake the mixed ingredients, put the finished omelet in a bowl, and sprinkle with ketchup and parsley.</p>	
	<p>Dry curry</p> <p>Fry chopped onions, carrots, peppers and soy meat rehydrated in hot water in a frying pan. Add water and curry roux, heat and serve on rice.</p>	<p>Paprika stuffed with cheese</p> <p>Put minced meat and soy meat chicken together in a bowl and knead by hand, cut paprika in half, remove seeds and cotton, put a pinch of cheese in the bottom, and add plenty of meat from above. Place the paprika in an oiled frying pan. When it gets a little browned, add water, cover and steam. 5-7 minutes</p> <p>Put the tomato soup in a frying pan, put it on low heat for about 10 minutes, put the lettuce in a bowl and sprinkle with parsley.</p>	

**Dumplings**

Wrap chopped garlic, garlic, and soy meat rehydrated in hot water in dumpling skin, and steam in a frying pan with sesame oil.

Gapao Rice

Add chopped garlic and onions, rehydrated soy meat, soy sauce, nam pla and sugar and fry in a frying pan. Add shredded peppers, red paprika and basil, fry and serve on rice.

**Chinese Yam with starchy**

Sprinkle Japanese-style ankake made from soy meat and soup stock on the long potatoes.

Fried rice

In a frying pan with sesame oil, add soy meat, rice, eggs, green onions, soy sauce, salt, and pepper in that order, and fry.

**Cabbage roll**

cooked [cabbage](#) leaves wrapped around a variety of [fillings](#).

Taco rice

Fry the chopped garlic, onions and soy meat rehydrated in hot water in a frying pan. Season with ketchup, worcestershire sauce, and soy sauce. Serve on rice in the order of shredded lettuce, diced tomatoes, and soy meat.

**Soboro bowl**

Cut the trumpet mushrooms in half and stir-fry them in a frying pan with sesame oil over medium heat. When it gets brown, add soy meat pork and all-purpose onion, add sake, sugar, soy sauce, water, chicken gala, and oyster sauce, simmer for 3 minutes on medium heat, add ginger, mix, and reduce to low heat to add water-soluble potato starch. Put it in a bowl and

Beef soboro

Put the soy meat beef, water, and soup in a frying pan, soak the soy meat beef for about 30 seconds, turn on the heat, add the ginger tube, and fry until the water is removed.



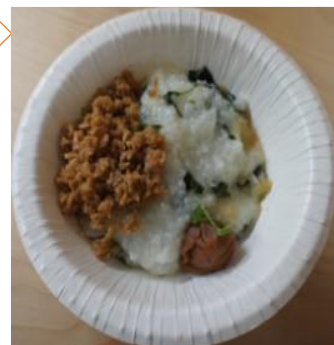


Fried rice with ankake

Add starch to the broth, heat it, thicken it, and sprinkle it on fried noodles to eat.

Western-style Nanakusa-gayu

Western-style seven herbs cut to a size that is easy to eat to the porridge and warm it. Rehydrate the soy meat with hot water, add soy sauce, sugar and ginger and fry. Serve soy meat on Nanakusa-gayu.



Corn soup

Warm corn cream, chicken sardines, sake, ginger, soy meat (beef), corn, add beaten egg and water-soluble potato starch, and season with salt.

dumplings

Put cabbage, minced chives, minced pork soy meat beef, soy meat pork, lard soy sauce, and pepper in a bowl, knead well, wrap in skin, grind oil in a frying pan, and heat for 1 minute. Add water and cook over medium heat for 5 to 8 minutes to complete the dumplings. Put water and noodle soup in a pot and add



Croquette

Boil the potato carrots so that the bamboo skewers stick to them, fry the minced soy meat beef and chopped onions, peel the boiled potatoes in a bowl, and mash them while warm.

DIY soybean meat and tofu suki

Boil soy meat, tofu, and green onions rehydrated in hot water with ginger, sugar, sake, soy sauce, and granulated potato starch. Add shichimi to your liking.



Soy meat miso rice ball

Add soy meat, shiso, miso, sugar, sesame, dried bonito, and sesame oil that have been rehydrated with hot water. Serve with rice balls.

Beef soboro sprinkle

Add oil to the pan, add soy meat pork and minced pork, and when it's cooked a little, add all the ☆ and simmer on low heat for 15 minutes.





Picture 1. Thirty types of traditional dishes with Soy Meat replacing the meat ingredient.

Table 1. Acceptability for new Soy Meat dishes

No	Name of dishes	Aroma	Basic taste	Apperance	Texture	Overall taste
1	Fried purse	3.7±0.8	3.7±0.8	4.5±0.7	4.5±0.5	4.3±0.5
2	Omelette	4.2±0.4	4.0±0.9	3.8±0.8	3.7±0.5	4.3±0.8
3	Dry curry	4.0±0.6	4.3±0.5	4.2±0.4	4.3±0.5	4.3±0.5
4	Paprika cheese	3.8±1.0	4.3±1.0	4.5±0.8	4.2±0.8	4.3±0.8
5	Boiled dumpling	3.7±0.8	4.2±0.8	4.3±0.7	4.0±0.6	4.3±1.0
6	Gapao Rice	3.5±0.5	3.7±0.8	4.0±0.7	4.2±1.0	4.2±0.8
7	Chinese Yam with starchy sauce	3.3±0.5	4.2±0.8	4.5±0.5	3.8±1.0	4.0±0.6
8	Fried-rice	3.8±0.8	4.0±0.6	4.0±0.5	3.5±0.5	4.0±0.6
9	Cabbage Rolls	4.2±0.8	3.7±0.8	4.5±0.9	4.3±0.8	4.0±0.6
10	Taco rice	4.0±1.1	4.2±1.0	4.0±0.5	3.8±0.8	4.0±0.6
11	Soboro bowl	3.3±0.5	3.5±0.5	4.5±0.	3.8±0.8	4.0±0.6
12	Sticky meat soboro sprinkle	4.0±0.0	3.7±0.5	3.7±0.8	3.7±0.5	3.8±1.0
13	Fried Noodles with Starchy Sauce	4.3±0.5	3.8±0.8	4.5±1.3	2.8±0.4	3.8±0.4
14	Western style Nanakusa gayu	4.0±0.6	4.0±0.9	3.8±0.8	4.0±0.6	3.8±0.8
15	Corn soup	4.0±0.6	4.2±1.0	3.8±0.5	3.8±0.8	3.8±0.8
16	Dumpling	3.8±1.0	3.8±0.8	4.8±0.8	3.8±0.8	3.8±0.8
17	Croquette	4.3±0.8	3.8±0.8	3.8±0.8	3.5±0.8	3.7±0.8
18	Soy meat and tofu sukiyaki donburi rice bowl	4.0±0.9	4.3±0.5	4.2±0.8	3.8±0.4	3.7±0.8
19	Soy meat miso rice ball	2.8±0.8	3.3±1.0	3.7±0.9	4.0±0.6	3.7±1.4
20	Beef soboro	3.7±0.8	3.0±0.6	3.8±0.5	3.5±0.5	3.7±1.0
21	Mabo tofu	3.2±0.8	3.5±0.5	3.8±0.7	3.7±0.5	3.7±0.5
22	Omelette rice	3.0±0.6	3.2±0.8	3.5±1.2	3.2±0.4	3.5±0.5
23	Curry udon	3.5±0.5	3.7±0.8	3.2±0.8	3.2±0.4	3.5±0.5
24	Udon	3.7±0.8	3.2±0.8	3.7±0.6	3.5±0.8	3.5±0.5
25	Hachis Parmentier	3.8±1.0	3.8±1.0	3.3±0.7	3.5±0.5	3.5±0.8
26	spinach miso soboro	3.3±0.5	3.8±0.8	3.5±0.7	3.7±0.5	3.5±0.5
27	Meet udon	3.2±0.4	3.2±0.8	3.7±1.0	3.3±1.0	3.3±0.5
28	Chicken meatball	3.7±0.5	3.5±0.5	3.8±0.8	3.0±0.6	3.3±0.5
29	Soy meatball	2.8±1.2	3.3±1.4	3.7±0.9	3.0±0.6	3.2±0.8
30	Pumpkin stew	3.2±1.2	3.2±0.8	3.7±0.9	2.7±0.5	2.8±0.8

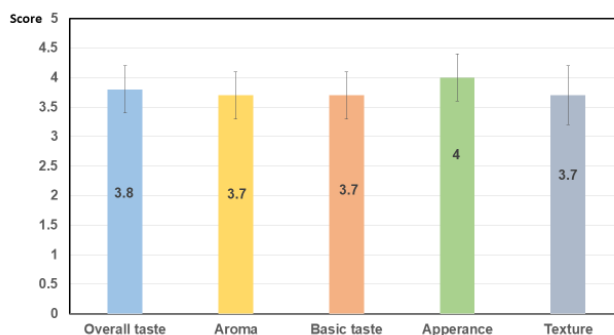


Fig. 3 Average score of the sensory test

RESULTS

Table 1 shows 30 dishes in descending order of score. Fig. 3 shows the average score of each item. The average score of overall taste of SOY MEAT was 3.8 and 11 dishes scored higher than 4.0. The score of only a dish was less than 3. The results suggest the good acceptability of Soy Meat dishes. It can be said that the deeply seasoned dishes were highly evaluated as the cause of such a difference.

DISCUSSION

In this study, 30 kinds of dishes were made and a sensory test was performed by the 5-point method. As a result, 11 kinds were very delicious, 18 kinds were delicious, the remaining one was normal, and most of the dishes were highly evaluated. I was able to get it.

For fried purse, omelet, dry curry, Paprika cheese, and dumplings, which had the highest sensory test value of 4.3, simmered pumpkin, which had the lowest 2.8 points, and soybean meatballs. The possible cause of such a difference is that if the tissues are similar, it is difficult to tell the difference between meat and soybeans due to the strong seasoning. In other words, it can be said that it is important to erase the characteristics of soybeans and how the characteristics resemble meat in determining the taste. With this in mind, soy meat may be quite close to cooking close to minced meat, but it may not be suitable for cooking as chunks of meat, such as beefsteak and pork cutlet.

In other words, this also leads to how to eliminate the characteristics of soybeans. However, this idea is an effort similar to how to bring pork closer to beef or tofu taste closer to beef taste, and does not try to make the best use of the good taste of soybean itself. Comparing milk and soy milk, the question of which one is more delicious is close to nonsense. For example, in hot pot dishes, soy milk will be better than milk. The effort we should make in the future will be the pursuit of dishes that should express the deliciousness of soybean meat itself.

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