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**Observation of Eating Habits between  
Cambodian and Japanese**

On Sothida, Ry Manydine

**Original****Impact of Utility Damage on Meals for Older Adults after the Kumamoto Earthquake, Japan**Hiroka Sato<sup>1</sup>, Noriko Sudo<sup>2,\*</sup><sup>1</sup> *Department of Food and Nutritional Science, Division of Life Sciences, Graduate School of Humanities and Sciences, Ochanomizu University, Tokyo, Japan*<sup>2</sup> *Natural Science Division, Faculty of Core Research, Ochanomizu University, Tokyo, Japan*

**ABSTRACT** In the post-disaster period, providing food especially for older adults is important since they require dietary care despite being in a lifeline disruption. In this study, we examined food service relating to utility disruption and explored the hardship of meals provision in older adult-care facilities after a disaster. Out of 96 facilities which answered our first questionnaire survey, we targeted 43 older adult-care facilities that were affected by the 2016 Kumamoto Earthquake. We analyzed the records of six facilities from our second survey which reported the changes in meals provision due to the earthquake. One facility without water, gas, and electricity supply served only two meals per day mostly consisting of ready-to-eat foods. On the contrary, facilities with lifeline supply could serve regular meals with just a few changes in dishes. Food delivery was disrupted during emergency. A hospital lost contact with dealers and could not get foods due to loss of communication tools. The number of staff was fewer than usual, which resulted in increased pressure sore patients. Utility outage and difficulties of delivery or manpower led to skipping meals and were an obstacle to serve meals. This study would contribute to preparation of meal provision in older adult-care facilities.

**Keywords:** disaster management; older adults; lifeline; meal provision, Kumamoto Earthquake

**INTRODUCTION**

Japan is a disaster-prone country and has experienced countless earthquakes, typhoons, and other disasters (1). The 2016 Kumamoto Earthquake, a recent large-scale disaster, damaged 198,000 homes and disrupted electricity, gas, and water supply infrastructure (2).

Lifeline outages after disasters are serious issues. For instance, Ulak et al. demonstrated that areas with many older adult residents were more susceptible to blackout in Hurricane Hermine occurred in 2016 (3). Puerto Rico faced long-term power outage due to Hurricane Maria in 2017 (4). In 2018 Hokkaido Eastern Ibari Earthquake, elevator outages had a negative impact on residents in high-rise building (5).

Under these circumstances, providing adequate food and nutrition is necessary in every phase of the disaster, particularly for older adult (6). The shortage of foods in proper form and manpower to take care of them during disasters links to aspiration or undernutrition of individuals requiring special meal attention (7). In fact, older adults complained that the food at evacuation centers after 2016 Kumamoto Earthquake was uncooked and hard to swallow (8). After the 1999 Athens earthquake, nutritional intake among older adults was insufficient (9). The residents of older adult-care facilities depend on their facilities for most of their life support, so facilities need to continue operations even during emergencies.

Despite these facts, the meals provided in older adult-care facilities following disasters remain understudied. It is unclear as to what is served and how

staff change meal contents during emergencies. Moreover, the relationship between available utilities and meals which can be prepared under those conditions has not been verified. Therefore, this study examines the relationship between utility disruption and food service in the immediate aftermath of earthquake and explores the actual situation of meal provision in older adult-care facilities.

**MATERIALS AND METHODS****Study setting and design**

Kumamoto Prefecture is located in Southern part of Japan. In November 2020, the authors conducted the first questionnaire survey on disaster preparedness for food service to all older adult-care facilities in Kumamoto, comprising 125 welfare facilities for the elderly requiring long-term care, 92 health care facilities for the elderly requiring long-term care, 50 sanatorium type medical care facilities for the elderly requiring care, and 6 integrated facilities for medical and long-term care (10). Out of 96 facilities which responded to the survey (response rate = 35.2%) (10), we targeted 43 facilities affected by the 2016 Kumamoto Earthquake. The second questionnaire was mailed in August 2021 to the food service managers of those facilities. Although some facilities presented meal contents of several weeks, we focused on only 1–3 days after the main shock that occurred at 1:25 a.m. JST on April 16, 2016, during the acute phase of the disaster (11).

**Data sources and data collection methods**

In the second survey, we inquired about (1) the number of meals per day in normal times, and the following for each meal occasion immediately after the Kumamoto Earthquake: (2) type of tableware

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(daily use or disposable), (3) manpower, (4) whether or not providing meals to non-residents, and (5) to staff.

We also asked (6) whether meal contents were changed due to the disaster, and if so, what changes were made, (7) the state of utilities; water, gas, electricity, and food delivery, (8) the frequency of regular and disaster meals, and (9) the overall impression about the disaster by free-text description. Disaster meals are alternative menus for emergency, which mainly consist of ready-to-eat foods.

### Data analysis methods

Fifteen facilities responded to the second survey (response rate = 34.9%); among them, six facilities reported the changes in meals due to the earthquake. We thoroughly analyzed daily meal descriptions. The location of each facility was available on the website of the Ministry of Health, Labour and Welfare (12), and the damage sustained was drawn from the website of the Cabinet Office (13). According to that information, the seismic intensity of those six facilities was above the upper range of 6. Data from the first survey was used in determining the presence or absence of a private generator, as well as the number of electrical outlets from the generator in the kitchen (10). Supplements 1–3 show the contents of menus categorized into food groups based on the Japanese Food Guide Spinning Top (grain-based dish; vegetable-based dish; fish, eggs, and meat dish; milk; fruits; and others) (14). In this manuscript, we only summarized the changes in meal contents for three days after the main shock and examined the relationship with lifeline usage. In addition, we

extracted some free responses to describe the challenges in emergency meal provisions in detail.

### Ethical considerations

The following was explained in writing: that participation in the questionnaire survey is voluntary and even if they do not answer, they would not be disadvantaged at all, that the respondent's name and contact information are used only for inquiries regarding their answers, that responses would be anonymized and used only for research. By receiving the completed questionnaire, we obtained the consent. The Ochanomizu University Humanities and Social Science Research Ethics Review Board (approval number 2021-56) granted ethical approval for this study.

## RESULTS

### Facility attributes

Table 1 lists the attributes of the six facilities. Welfare facilities for the elderly requiring long-term care and health care facilities for the elderly requiring long-term care were represented as "Home". Sanatorium type medical care facilities for the elderly requiring care were described as "Hospital". Almost all facilities, with the exception of Hospital F, had private generators. However, only the kitchens of Home C and Hospital D had outlets connected to private generators. The tableware used in Homes A–C and Hospitals D and E were disposable. Most facilities had reduced the number of staff compared to usual. Homes A–C distributed meals to non-residents as well. Most facilities, except for Hospital D, prepared meals for staff.

Table 1 Characteristics of six elder-care facilities (Days 1–3)

	Home A	Home B	Home C	Hospital D	Hospital E	Hospital F
Facility type*	a	b	b	c	c	c
<b>Number of meals per day in normal times</b>						
• Breakfast	52	120	121	118	38	25
• Lunch	76	170	187	120	55	25
• Dinner	52	120	149	118	38	25
<b>Possession of private generator</b>	Yes	Yes	Yes	Yes	Yes	No
<b>Outlets in the kitchen connected to the private generator</b>	0	0	5	1	0	Not applicable
<b>Tableware</b>	Disposable	Disposable	Disposable	Disposable	Disposable	Unknown
<b>Number of staff (compared to usual)</b>	Fewer	Fewer	Fewer	Day 1: Fewer Days 2, 3: Same	Same	Same
<b>Providing meals to non-residents**</b>	Yes	Yes	Yes	No	No	No
<b>Providing meals to staff</b>	Yes	Yes	Yes	No	Yes	Yes

\* a: welfare facility for the elderly requiring long-term care

b: health care facility for the elderly requiring long-term care

c: sanatorium type medical care facility for the elderly requiring care

\*\* Neighbourhood residents who have evacuated to the facility, older adults at-home care, and older adults living in other facilities, etc.

### Relationship between lifeline utilities and meal contents

Tables 2–4 summarize the status of lifeline utilities and use of disaster meals for three days after the earthquake (Days 1–3). Although Home B described the meal contents on Day 1 only, other facilities provided descriptions of three days. On Day 1, gas was fully available as usual only in Home A (Table 2). That facility could serve three regular meals, omitting one vegetable-based dish for supper. Home B could not utilize most of the lifelines, leading it to serve only instant rice with canned or packaged foods as disaster meals. Hospital D changed the meal contents for lunch in response to the disaster and used in-stock items for supper. Hospital F had a disruption of water, gas, and electricity compelling staff to use perishable foods from refrigerator and freezer as priority. They served only two disaster meals in a day, such as instant rice. On Day 2, Home A, where only water was not available in perfect condition, could prepare three regular meals omitting some dishes in each meal (Table 3). Home C still had water outage. Staff utilized food aid and foods that were close to their expiry dates. That facility served only disaster meals as alternative. Hospital D did not serve miso soup due to elevator outage as it was too difficult to carry using the stairs. Hospital E, which had water and gas disruption, provided disaster foods such as canned miso mackerel stew. Water, gas, and electricity in Hospital F had still not recovered. The staff only provided two disaster meals. On Day 3, neither water nor gas was recovered in Hospitals E and F (Table 4). Hospitals C, E, and F, where some lifeline outages occurred, served disaster meals at least once in a day. These three facilities utilized relief supply.

Hospital F still provided only two disaster meals in a day.

#### Water

Table 5 shows the detailed usage status of lifeline during emergency. Home B failed to make use of food aid due to water outage. That facility covered the normal plate with plastic wrap to deal with the water shortage. Hospital D could purify cloudy water. The staff in that facility also indicated the necessity of having disposable dishes to prevent infectious diseases. Those dishes were also reported as a more convenient resource than a large water tank in Hospital F.

#### Gas

Home A was offered an electric rice cooker by a local resident (Table 5). Portable stoves (Hospitals E and F) and propane gas (Hospital F) were utilized to provide meals and sterilize water by boiling. Hospital E, where there was no outlet in the kitchen (Table 1), cooked and served meals in the staff cafeteria (Table 5).

#### Electricity

As shown in Table 5, outage of steam convection oven required alteration of meals. Electricity outage forced staff to use foods stocked in refrigerator and freezer. An elevator outage in Hospital E forced staff to carry meals by bucket brigade method.

#### Food delivery

Food delivery did not recover in Hospital D even on Day 3 (Table 4). As the staff could not connect with dealers, they experienced hardship in procuring foods (Table 5). Hospital E did not indicate supply disruption (Tables 2–4); however, staff could not procure fresh vegetables in the usual way. In Home A and Hospital E, special foods for older adults were delivered.

Table 2 Status of utilities and meal frequency on the first day after the earthquake (Day 1)

Facilities	Water	Gas	Electricity	Food delivery	Frequency of		Changes made (free description)
					Regular meals	Disaster meals	
A	Δ	○	○	○	3	0	● <b>Supper:</b> One vegetable-based dish was omitted.
B	×	×	○ except for morning	×	0	3	● <b>All meals:</b> Instant rice was served with canned or packaged food.
C	×	×	Δ	○ except for morning	0	3	Not specified
D	○	○ except for morning	○ except for morning	×	2	1	● <b>Breakfast:</b> Staff just provided what they had available at that time. ● <b>Lunch:</b> Meal content was changed according to the situation. ● <b>Supper:</b> Food in stock were used.
E	○cloudy	×	○	○	1	2	Not specified

<b>F</b>	×	×	×	○	0	2	● <b>All meals:</b> Food from refrigerator and freezer were used as priority. Instant rice was served.
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○: available, △: partly available, ×: not available

Table 3 Status of utilities and meal frequency on the second day after the earthquake (Day 2)

Facilities	Water	Gas	Electricity	Food delivery	Frequency of		Changes made (free description)
					Regular meals	Disaster meals	
<b>A</b>	△	○	○	○	3	0	<ul style="list-style-type: none"> <li>● <b>Breakfast:</b> The content of vegetable-based dish was changed according to the situation.</li> <li>● <b>Lunch:</b> Bread could not be provided.</li> <li>● <b>Supper:</b> One vegetable-based dish was omitted.</li> </ul>
<b>C</b>	×	○	△	○	0	3	<ul style="list-style-type: none"> <li>● <b>Breakfast:</b> Rice was cooked on gas (not using instant rice as previous day)</li> <li>● <b>Lunch:</b> Food aids were served.</li> <li>● <b>Supper:</b> Sauté was prepared using near-expired food.</li> </ul>
<b>D</b>	○ cloudy	○	○	×	3	0	<ul style="list-style-type: none"> <li>● <b>Breakfast:</b> Miso soup was not served when the elevators were not working due to difficulty in carrying it on the stairs.</li> <li>● <b>Lunch/Supper:</b> Stocked food was used to prepare regular meals.</li> </ul>
<b>E</b>	×	×	○	○	2	1	<ul style="list-style-type: none"> <li>● <b>Breakfast:</b> Disaster food, canned mackerel stew was used.</li> <li>● <b>Snack:</b> Instead of lunch, a snack was served.</li> </ul>
<b>F</b>	×	×	×	○	0	2	● <b>All meals:</b> Food from refrigerator and freezer were used as priority. Instant rice was served.

○: available, △: partly available, ×: not available

Table 4 Status of utilities and meal frequency on the third day after the earthquake (Day 3)

Facilities	Water	Gas	Electricity	Food delivery	Frequency of		Changes made (free description)
					Regular meals	Disaster meals	
<b>A</b>	△	○ except for morning	○	○	3	0	<ul style="list-style-type: none"> <li>● <b>Breakfast:</b> One vegetable-based dish was omitted.</li> <li>● <b>Lunch:</b> One vegetable-based dish was omitted.</li> <li>● <b>Supper:</b> One vegetable-based dish and clear soup were omitted.</li> </ul>
<b>C</b>	×	○	△	○	2	1	● <b>Supper:</b> Milk and strawberries were added. Strawberries were provided by a local farmer.
<b>D</b>	○ cloudy	○	○	×	3	0	<ul style="list-style-type: none"> <li>● <b>Breakfast:</b> The president provided large amount of food from areas with minimal damage. Staff went shopping in a nearby prefecture to overcome food shortage.</li> <li>● <b>Lunch:</b> Meals were provided using what they had in the facility (including relief supply).</li> </ul>
<b>E</b>	×	×	○	○	2	1	<ul style="list-style-type: none"> <li>● <b>Lunch/snack:</b> Instead of lunch, snack was served.</li> <li>● <b>Supper:</b> "Protein jelly," a relief food, was provided.</li> </ul>

F	×	×	○	○	0	2	● <b>All meals:</b> Meals were prepared using food aids.
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○: available, △: partly available, ×: not available

Table 5 The lifeline situations of each nursing care facility

<b>Water</b>	<ul style="list-style-type: none"> <li>● <b>B:</b> Although we received food aid, the vegetables could not be washed due to the lack of water. The length of the water outage was unknown, so we decided to cover normal plates with plastic wrap for several days after the disaster.</li> <li>● <b>D:</b> As the water was cloudy, we used a water purifier and used purified water in cooking. On Day 5, norovirus-infected individuals entered our facility, infecting other residents. There was insufficient disposable tableware from that day.</li> <li>● <b>F:</b> The family of a staff member brought a large water tank to wash dishes. However, disposable ones were more convenient.</li> </ul>
<b>Gas</b>	<ul style="list-style-type: none"> <li>● <b>A:</b> An electric rice-cooker was provided by a local resident.</li> <li>● <b>E:</b> Staff used some portable stoves in the cafeteria and provided hot meals.</li> <li>● <b>F:</b> We could serve meals and boil water to disinfect using portable stoves and propane gas thanks to lifeline providers.</li> </ul>
<b>Electricity</b>	<ul style="list-style-type: none"> <li>● <b>E:</b> The cooking methods were changed for the regular meals due to the outage of the steam convection oven. All staff served meals by bucket brigade method because the elevator had stopped due to an aftershock.</li> <li>● <b>F:</b> On Days 1 and 2, food in refrigerator and freezer were used as priority. Because of the elevator outage, we carried cooked meals manually to a hospital ward and served them.</li> </ul>
<b>Food delivery</b>	<ul style="list-style-type: none"> <li>● <b>A:</b> Dealers provided us with food thickeners and some food.</li> <li>● <b>D:</b> Despite calling contractors, they had no explanation for delivery failures. We worked hard to procure food.</li> <li>● <b>E:</b> Fresh vegetables were difficult to get for a few days. We could get eternal feeding products and special food for vulnerable as usual.</li> </ul>

A, B, and D–F refer to different facilities (Table 1).

We only chose comments describing difficulties and coping methods which would contribute to disaster preparedness for the future.

**Manpower**

Some staff from Home A and Hospital D were forced to stay in the gymnasium or their cars overnight (Table 6). Under these situations, volunteers or staff from other facilities helped their works. Due to the lack of available care in Home B, the number of residents with bedsores increased.

**Food**

Local residents and farmers donated foods to Homes A and C. Hospital D reported that it was hard to serve milk or fruit. Hospital F had difficulty in

utilizing food aid because of the close to expiry date and high-sodium content food (Table 6).

**Nutrition**

Home A, which was damaged the least of all six facilities (Tables 2–4) provided meals considering nutrition as usual (Table 6). In Home B, staff worried about nutrient deficiencies among residents due to food shortage. Although Hospital D tried to provide balanced and delicious diets, the nutrients appeared to be deficient.

Table 6 Situations other than lifelines of each elder-care facility

<b>Manpower</b>	<ul style="list-style-type: none"> <li>● <b>A:</b> Some of the staff slept in the gymnasium or in their cars. Volunteers came to help out with our work.</li> <li>● <b>B:</b> Because staff could not provide enough care for older adults, there were more patients with bedsores.</li> <li>● <b>D:</b> Some staff had difficulty in commuting and camped in their cars. Staff in charge of morning</li> </ul>	<b>Food</b>	<ul style="list-style-type: none"> <li>● <b>A:</b> Food was provided by local residents.</li> <li>● <b>C:</b> Farmers near the facility provided asparagus and strawberries.</li> <li>● <b>D:</b> Milk and fruit were difficult to serve after the disaster.</li> <li>● <b>F:</b> Food aid, such as instant rice, noodles, and canned food were</li> </ul>
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delivered. However, some of them were near their expiry dates and/or were high in sodium, which made it difficult to use them.

<b>Nutrition</b>	<ul style="list-style-type: none"> <li>● <b>A:</b> Nutritional considerations were given to older adults as usual.</li> <li>● <b>B:</b> Staff were concerned that residents took lower amounts of nutrition than usual due to food shortage.</li> <li>● <b>D:</b> We made all the efforts to serve balanced and delicious diet as much as possible, but the nutrition seemed to be insufficient.</li> </ul>
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A-C, and F refer to different facilities (see Table 1). We only chose comments describing difficulties and coping methods which would contribute to disaster preparedness for the future.

### DISCUSSION

Lifeline disruption made food provision difficult. Hospital F, where water, gas, and electricity had been cut off on Days 1 and 2, served only two meals per day. Meals in this facility were all disaster foods as alternative of regular menus. On the contrary, three meals were served as usual in Home A, where only the water supply was partially disrupted. That home simply omitted a few dishes without any other difficulty. This result shows that meal provisions had a definite link to utilities. Older adults in disaster-stricken areas require special dietary care (70), so the disruption of lifelines precludes appropriate food supply and the use of cooking appliances which require gas and electricity.

Disposable dishes were used in most facilities (Table 1), which are convenient resources under suspension of water supply. However, garbage-disposal facilities might stop working due to the malfunctioning of incinerator after the disasters (15). The excess garbage accumulation in health care facilities and hospitals for long period could lead to sanitary and health problems (16). This might particularly affect older adults, who are susceptible to infection<sup>7</sup>. Although disposable dishes might be user friendly for staff (Table 5), they are usually thin and fragile making it difficult for older adults to eat (17). Therefore, normal dishes covered with plastic wrap (Table 5), might be preferable in terms of reducing the volume of waste and improve usability for older adults unless there is no virus-infected individual.

Ensuring heat source is also essential because it affects cooking well-balanced diet (18). In fact, Hospital F, the only facility without a private generator, could not serve regular meals at all for three days (Tables 1–4). This presents the necessity to have generators and find other places for cooking, such as a cafeteria as seen in Table 5.

Electricity lead vulnerability in facilities during emergency (19). This study also revealed that power outages limited the range of available foods. As in the case of Hospital D, which refrained from serving easy-to-spill soup for safety (Table 3), meals may need to be transported by hand on a stairway if elevators are unavailable. For that case, facilities should consider using transportable containers to deal with the unavailability of meal carts (20).

Like Hospital F, where foodstuffs in the refrigerator were used first (Table 5), it is recommended to utilize perishable foods as priority,

followed by foods preserved in a freezer (21). Food service facilities always have large refrigerators and freezers. If food there can be stored in good condition, it would ease food shortage in emergencies. Therefore, above everything else, limited electricity from in-house generation should be connected to cold storage equipment. Electricity is also necessary for the purpose of using cooking appliances; if electric appliances such as blenders cannot be used, it is difficult to make appropriate meals for older adults (22). This could cause aspiration pneumonia, a life-threatening illness (7). Although five out of six facilities had private generators, only two of them had outlets in the kitchen which connected to an in-house generator (Table 1). Because the provision of meals will be hindered without refrigerators and cooking equipment, portable generators should also be arranged in advance.

Hospital D struggled with procuring foods due to unavailability of communication tools to connect with dealers (Table 5). Even in a facility that provided meals without missing any, staff was concerned about malnutrition among older adults (Table 6) as they are susceptible to infection<sup>7</sup>. Some food aid they received were close to expiry date or had high sodium content (Table 6), as seen in a previous study (23,24). That meal contents were inadequate for older adults, as hypertension is a concern (7). To deal with this, contact with the outside world is essential because meal scores during the Great East Japan Earthquake were related to that (25). Because email or landline telephone cannot be used during power outage, facilities should create emergency contact lists (17) or utilize social networking services such as LINE to communicate with dealers (26).

Although our respondents did not clearly refer to transportation, its impairment could also cause limited access to foods (19). Special foods are especially vulnerable to stagnation or deterioration (27) due to their production on a small scale. Thus, having food stockpile, not relying on food aid, is essential to ensure consistent provision of special care meals for older adults.

### Manpower

As observed in previous studies (28) some facilities accommodated outside evacuees, although they had fewer staff than usual (Table 1). The manpower shortage might cause increased number of pressure sore patients (Table 6). Moreover, meal provision for the staff (Table 1) is also inevitable because staff tend to suffer from health issues due to overwork under a chaotic situation (29). Because meal preparation under those emergency situation is difficult, human resource planning that utilizes external support is a crucial part of business continuity plan. For example, inter-networks among meal provision facilities are structured within the jurisdiction of the Okayama Bihoku Health Department. This network allows disaster-stricken facilities to request meal delivery from places in regular operation (30).

### Limitations of this study

The first limitation is the small number of facilities analyzed. Our final number of respondents was only six facilities, which is very small since the target of the analysis was narrowed down to facilities in which the disaster affected the content of meals and that described the content of meals for one day or more. The second limitation is that some of their description about changes in meals content were

ambiguous. They provided free responses describing meals changes. At times, it was unclear how ingredients and cooking methods were changed. Therefore, we could not strictly divide between changed and unchanged meals. However, this is the first study to describe the precise meal contents served at senior care facilities in an acute phase of a disaster. We were able to clarify the actual situation of meals provided during disasters and evaluate the direct impact of utilities by taking a descriptive approach rather than statistical analysis.

### CONCLUSION

Utility outage leads to skipping meals and represents an obstacle to serving meals. On the contrary, facilities with lifeline supply can serve regular meals with a few changes in dishes. Moreover, food deliveries were disrupted by the earthquake. The number of staff was fewer than usual in some facilities resulting in increased pressure on staff and patients. Human resource planning utilizing external support thus appears to be crucial for business continuity.

### ACKNOWLEDGMENTS

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Supplement 1: Meal served on the first day after the earthquake (April 16, 2016: Day 1) Homes A-C

	Home A	Home B	Home C
<b>Breakfast</b>	<b>Regular meal</b>	<b>Disaster meal</b>	<b>Disaster meal</b>
Grain-based dish	● Rice	● Instant rice	● Bread
Vegetable-based dishes	● Vegetable dishes ● Japanese pickles	-*	● Vegetable juice
Fish, eggs, and meat dishes	-	● canned or pouched dishes	-
Milk	-	-	-
Fruits	-	-	-
Others	● Miso soup ● Furikake <sup>†</sup>	-	● Strawberry pudding
<b>Lunch</b>	<b>Regular meal</b>	<b>Disaster meal</b>	<b>Disaster meal</b>
Grain-based dish	● Rice	● Instant rice	● Rice
Vegetable-based dishes	● Root vegetable salad	-	● Potato salad
Fish, eggs, and meat dishes	● Yuan-style grilled fish ● Agedashi tofu	● Canned or pouched dishes	● Mapo tofu <sup>‡</sup>
Milk	-	-	-
Fruits	-	-	-
Others	● Clear soup	-	-
<b>Supper</b>	<b>Regular meal</b>	<b>Disaster meal</b>	<b>Disaster meal</b>
Grain-based dish	● Rice	● Instant rice	● Rice
Vegetable-based dishes	● Spaghetti salad	-	● Kidney beans
Fish, eggs, and meat dishes	● Beef miso stew	● Canned or pouched dishes	● Canned mackerel
Milk	-	-	-
Fruits	-	-	-
Other	-	-	-

\* not served

† Furikake: Japanese seasoning sprinkled on the rice, which is made of some mixed ingredients such as sesame seeds, dried fish flakes, seaweed, and so on

‡ Mapo tofu: Stewed tofu and minced meats seasoned with red pepper, Sichuan peppercorns, doubanjiang (chili bean paste), fermented black beans, and so on (Chinese dish)

Supplement 2: Meal served on the first day after the earthquake (April 16, 2016: Day 1) Hospitals D-F

	<b>Hospital D</b>	<b>Hospital E</b>	<b>Hospital F</b>
<b><i>Breakfast</i></b>	<b><i>Disaster meal</i></b>	<b><i>Disaster meal</i></b>	<b><i>-*</i></b>
<b>Grain-based dish</b>	-	● Rice balls	-
<b>Vegetable-based dishes</b>	-	-	-
<b>Fish, eggs, and meat dishes</b>	-	● Crab-flavored omelet	-
<b>Milk</b>	-	-	-
<b>Fruits</b>	-	-	-
<b>Others</b>	● 2 packs of Pempals <sup>†</sup>	● Miso soup ● Furikake <sup>‡</sup>	-
<b><i>Lunch</i></b>	<b><i>Regular meal (changed)</i></b>	<b><i>Disaster meal</i></b>	<b><i>Disaster meal</i></b>
<b>Grain-based dish</b>	● Rice	● Rice balls	● Instant rice
<b>Vegetable-based dishes</b>	● Salad with vinegar and miso	● Broccoli salad	● Vegetable sauté
<b>Fish, eggs, and meat dishes</b>	● Fish-ball stew ● Soy milk tofu	● Stewed fish	-
<b>Milk</b>	● Milk	● Milk	-
<b>Fruits</b>	-	● Canned tangerine	-
<b>Others</b>	-	-	● Miso soup
<b><i>Supper</i></b>	<b><i>Regular meal (changed)</i></b>	<b><i>Regular meal</i></b>	<b><i>Disaster meal</i></b>
<b>Grain-based dish</b>	● Rice	● Rice balls	● Instant rice
<b>Vegetable-based dishes</b>	● Sweet potato salad ● Japanese pickles	● Egg-bound soup with wheat gluten	● Dressed salad (carrots and green beans)
<b>Fish, eggs, and meat dishes</b>	● Grilled fish with plum sauce	● Beef and tofu stew	● Stewed Ganmodoki <sup>§</sup> and vegetable soup
<b>Milk</b>	-	-	-
<b>Fruits</b>	-	-	-
<b>Other</b>	● Matcha agar	-	-

\* not served

<sup>†</sup> Pempal: Oral nutritional supplement produced by Nestle.

<sup>‡</sup> Furikake: Japanese seasoning sprinkled on the rice, which is made of some mixed ingredients such as sesame seeds, dried fish flakes, seaweed, and so on

<sup>§</sup> Ganmodoki: A fried tofu mixed with some sliced ingredients such as vegetables (Japanese dish).

Supplement 3: Meal served on the second day after the earthquake (April 17, 2016: Day 2) Homes A, C

	Home A		Home C	
<i>Breakfast</i>	<i>Regular meal</i>		<i>Disaster meal</i>	
Grain-based dish	●	Rice	●	Rice
Vegetable-based dishes	●	Japanese pickles	●	Dried daikon strips
Fish, eggs, and meat dishes	●	Fried tofu stew		-*
Milk		-		-
Fruits		-		-
Others	●	Miso soup	●	Miso soup
			●	Furikake <sup>†</sup>
<i>Lunch</i>	<i>Regular meal</i>		<i>Disaster meal</i>	
Grain-based dish	●	Rice balls	●	Bread
Vegetable-based dishes	●	Stewed vegetables		-
Fish, eggs, and meat dishes	●	Cream stew		-
Milk		-		-
Fruits		-	●	Strawberries
Others		-	●	Potage
<i>Supper</i>	<i>Regular meal</i>		<i>Disaster meal</i>	
Grain-based dish	●	Rice	●	Rice
Vegetable-based dishes	●	Sesame-dressed salad	●	Sauté
Fish, eggs, and meat dishes	●	Fish with tomato sauce	●	Curry
Fruits		-		-
Others	●	Miso soup		-
	●	Jelly		-

\* not served

<sup>†</sup> Furikake: Japanese seasoning sprinkled on the rice, which is made of some mixed ingredients such as sesame seeds, dried fish flakes, seaweed, and so on

Supplement 4: Meal served on the second day after the earthquake (April 17, 2016: Day 2) Hospitals D-F

	Hospital D	Hospital E	Hospital F
<b>Breakfast</b>	<b>Regular meal (changed)</b>	<b>Combination of regular &amp; disaster foods</b>	<b>-*</b>
<b>Grain-based dish</b>	● Rice	● Rice	-
<b>Vegetable-based dishes</b>	-	● Grated daikon	-
<b>Fish, eggs, and meat dishes</b>	● Tofu stew	● Miso mackerel stew	-
<b>Milk</b>	-	-	-
<b>Fruits</b>	-	-	-
<b>Others</b>	● Furikake	● Miso soup ● Furikake <sup>†</sup>	-
<b>Lunch</b>	<b>Regular meal (changed)</b>	-	<b>Disaster meal</b>
<b>Grain-based dish</b>	● Rice	-	● Rice
<b>Vegetable-based dishes</b>	● Stewed hijiki <sup>‡</sup> ● Cream stew	-	-
<b>Fish, eggs, and meat dishes</b>	-	-	● Stewed Ganmodoki <sup>§</sup> and vegetable
<b>Milk</b>	-	-	-
<b>Fruits</b>	-	-	-
<b>Others</b>	● Apple jelly	-	● Miso soup
<b>Supper</b>	<b>Regular meal (changed)</b>	<b>Combination of regular &amp; disaster foods</b>	<b>Disaster meal</b>
<b>Grain-based dish</b>	● Rice	● Rice balls	● Rice
<b>Vegetable-based dishes</b>	● Vegetable omelet ● Cauliflower salad	● Steamed eggplant ● Pickled cucumber	● Stir-fried salmon flakes and cabbage
<b>Fish, eggs, and meat dishes</b>	-	● Stew with meat-stuffed inari ● Pork miso soup	● Chinese-style shrimp stew
<b>Fruits</b>	-	-	-
<b>Others</b>	Clear soup	-	-
<b>Snack</b>	-	<b>Disaster meal</b>	-
<b>Grain-based dish</b>	-	-	-
<b>Vegetable-based dishes</b>	-	-	-
<b>Fish, eggs, and meat dishes</b>	-	-	-
<b>Milk</b>	-	● Milk	-
<b>Fruits</b>	-	-	-
<b>Others</b>	-	● Castella manju or Isocal jelly <sup>  </sup>	-

\* not served

† Furikake: Japanese seasoning sprinkled on the rice, which is made of some mixed ingredients such as sesame seeds, dried fish flakes, seaweed, and so on

‡ Hijiki: One of the seaweeds which is usually used in stewed dishes

§ Ganmodoki: A fried tofu mixed with some sliced ingredients such as vegetables (Japanese dish)

|| Isocal jelly HC: Oral nutritional supplement produced by Nestle

Supplement 5: Meal served on the third day after the earthquake (April 18, 2016: Day 3) Homes A, C

	Home A		Home C	
<i>Breakfast</i>	<i>Regular meal</i>		<i>Regular meal</i>	
Grain-based dish	●	Rice	●	Rice
Vegetable-based dishes	●	Tsukudani*	●	Hijiki†
	●	Japanese pickles	●	Japanese pickles
Fish, eggs, and meat dishes		-‡		-
Milk		-		-
Fruits		-		-
Others	●	Miso soup	●	Miso soup
<i>Lunch</i>	<i>Regular meal</i>		<i>Disaster meal</i>	
Grain-based dish	●	Rice	●	Mixed rice
Vegetable-based dishes	●	Sesame-dressed salad		-
Fish, eggs, and meat dishes	●	Chicken stew	●	Canned saury
Milk		-		-
Fruits		-		-
Others	●	Clear soup	●	Stew
<i>Supper</i>	<i>Regular meal</i>		<i>Regular meal</i>	
Grain-based dish	●	Rice	●	Rice
Vegetable-based dishes	●	Plum vinegar-dressed salad	●	Dressed salad
Fish, eggs, and meat dishes	●	Boiled fish with grated radish	●	Stir-fried soboro§
Milk		-	●	Milk
Fruits		-	●	Strawberries
Others		-		-

\* Tsukudani: Shellfishes boiled in soy sauce and sugar

† Hijiki: One of the seaweeds which is usually used in stewed dishes

‡ not served

§ Soboro: Minced and cooked fishes or meats



**Supplement 6: Meal served on the third day after the earthquake (April 18, 2016: Day 3)  
Hospitals D-F**

	<b>Hospital D</b>	<b>Hospital E</b>	<b>Hospital F</b>
<b>Breakfast</b>	<i>Regular meal (changed)</i>	<i>Combination of regular &amp; disaster foods</i>	-*
<b>Grain-based dish</b>	● Rice	● Rice balls	-
<b>Vegetable-based dishes</b>	● Tsukudani†	● Salad with grated daikon	-
<b>Fish, eggs, and meat dishes</b>	● Simmered pumpkin and deep-fried tofu	● Teriyaki‡ fish stew	-
<b>Milk</b>	-	-	-
<b>Fruits</b>	-	-	-
<b>Others</b>	-	● Miso soup	-
<b>Lunch</b>	<i>Regular meal (changed)</i>	-	<i>Disaster meal</i>
<b>Grain-based dish</b>	Rice	-	● Rice
<b>Vegetable-based dishes</b>	● Vegetable salad ● Stew with dried daikon strips	-	● Vegetable sauté
<b>Fish, eggs, and meat dishes</b>	Grilled fish	-	-
<b>Milk</b>	-	-	-
<b>Fruits</b>	-	-	-
<b>Others</b>	Tangerine jelly	-	● Miso soup
<b>Supper</b>	<i>Regular meal (changed)</i>	<i>Combination of regular &amp; disaster foods</i>	<i>Disaster meal</i>
<b>Grain-based dish</b>	● Rice	● Wakame rice	● Rice
<b>Vegetable-based dishes</b>	● Dressed daikon ● Yogurt-dressed salad	-	● Salad
<b>Fish, eggs, and meat dishes</b>	● Chicken and egg stew	● Babaocai§ ● Egg soup	● Simmered mackerel in miso
<b>Milk</b>	-	-	-
<b>Fruits</b>	-	-	-
<b>Others</b>	-	● Protein jelly	-
<b>Snack</b>	-	<i>Disaster meal</i>	-
<b>Grain-based dish</b>	-	-	-
<b>Vegetable-based dishes</b>	-	-	-
<b>Fish, eggs, and meat dishes</b>	-	-	-
<b>Milk</b>	-	● Milk	-
<b>Fruits</b>	-	-	-
<b>Others</b>	-	● Citrus madeleine ● Protein jelly	-

\* not served

† Tsukudani: Shellfishes boiled in soy sauce and sugar

‡ Teriyaki: Fishes or meats grilled or boiled with soy sauce, mirin, and sugar

§ Babaocai: Thickened stew made of various foods including meat, shellfishes, vegetables, eggs and so on (Chinese dish)

## Original

# A Pragmatic Approach towards Healthcare Needs in Malaysia through Student-led Dietetics Clinic

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**ABSTRACT** *Background and purpose* While the concept of student-led clinics is well-established, the available evidence has been limited to multidisciplinary teams, and in North America. There is a notable gap in researching and implementing this model within dietetics, especially in resource-scarce and high disease-burden developing countries. *Methods.* The student-led dietetics clinic began with the formation of a project management team, a 2-tier team in December 2022. The implementation of SDC was carefully considered by multiple factors including operation, finance, and public outreach. The academic team consist of faculty members providing guidance and oversight on the setting up and operations of the clinic to meet students' learning outcomes. The students' team planned the daily operations of the clinic and developed resources for its operations including rotation of students on duty to manage the clinic, and strategies to obtain referrals for the clinic. *Result.* The student-led dietetics clinic presents valuable opportunities for early clinical exposure, leadership development, interprofessional skills, and practising empathy. Its accessibility to address underserved community needs should be explored more effectively. *Conclusion.* Therefore, this pragmatic approach not only benefits the student dietitians' professional development but contributes to the overall improvement of public health through specialised dietary services.

**Keywords:** Community dietetics, student-led clinic, education, dietary services, Malaysia

## INTRODUCTION

The rise of non-communicable diseases (NCDs) in developing nations (1), highlights the urgency for a paradigm shift in dietetics education to meet the population's health needs. Integrating competency-based education can optimally train dietitians as healthcare professionals by bridging theory and practice while developing core clinical skills (2). Therefore, the dietetics programmes offered by higher education institutions must evolve to meet contemporary healthcare demands. Malaysia, an Asian developing country, faces a significant burden of NCDs linked to major nutrition transitions. The latest national health survey shows the population's high dependency on public healthcare (3). However, there exist opportunities to address the issue through accessible and affordable healthcare services. In addition, specific health-seeking behaviours such as the willingness to seek advice from healthcare

Professionals and paying out of pocket could be advantageous for dietetics services offered privately. Global shortages of clinical placement for allied health professionals including student dietitians, necessitate innovative solutions. The international competency standards for dietitians stipulated the minimum competencies to be met at the point of entry. In Malaysia, student dietitians must fulfil 1200 hours of dietetics practicum, mostly in hospitals and primary care facilities. While the concept of a student-led clinic is underexplored in dietetics in developing countries (4), a student-led dietetics clinic emerges as a pragmatic approach to address the demand effectively (5). The student-led clinic presents valuable opportunities for early clinical exposure, leadership development, interprofessional skills, and practising empathy. Additionally, the student-led clinics can be more accessible and affordable, addressing underserved community needs more effectively

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**MATERIALS AND METHODS**

The setting up of a student-led dietetics clinic (SDC) in a local private university began with the formation of a project management team, a 2-tier team in December 2022 (Figure 1). The implementation of SDC was carefully considered by multiple factors including operation, finance, and public outreach. The academic team consist of faculty members providing guidance and oversight on the setting up and operations of the clinic to meet students' learning outcomes. The students' team

planned the daily perations of the clinic and developed resources for its operations including rotation of students on duty to manage the clinic, and strategies to obtain referrals for the clinic. The specific activities include public announcements on social media, booking of appointments, managing the patient flow, patient consent and confidentiality process, patient documentation and collecting patient feedback on the services provided.

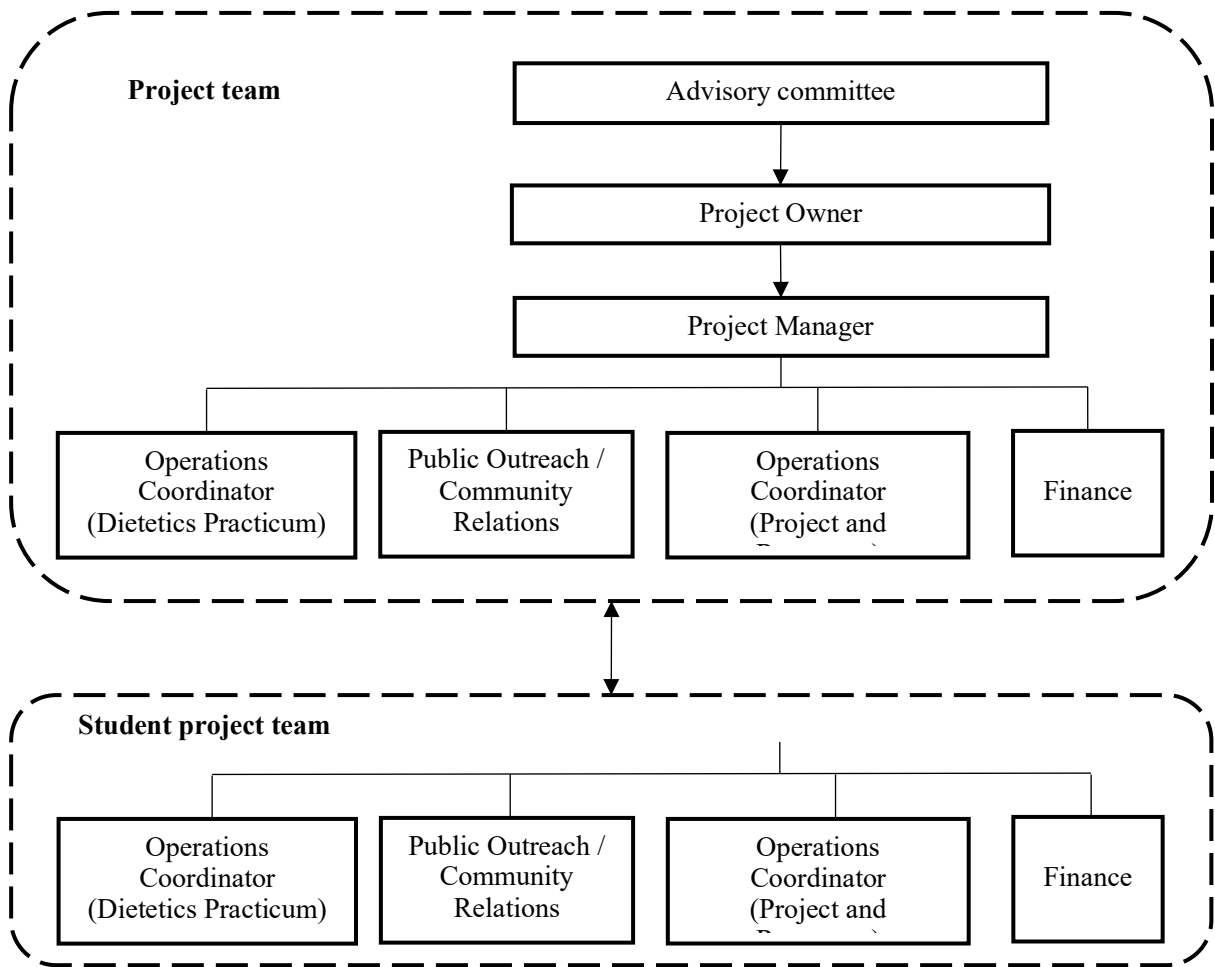


Figure 1: Student-led dietetics clinic project management team

## RESULTS

Launched in August 2023, the SDC served as a free clinic and a clinical training site for the final-year dietetics programme, supervised by clinical educators. The Nutrition Care Process was fully implemented in managing patients supported by multi-frequency body impedance analysis (Figure 3), anthropometry kits, real food models, and household measurement tools. Physical copies of patient documentation using ADIME, and medical documents were stored confidentially. Since its inception, a total of 138 patients received individual consultations (Figure 2), and 90 individuals have undergone nutrition screening which mainly consists of students and working professionals in the university. The student dietitians were able to provide medical nutrition therapy primarily for obesity, diabetes, and hyperlipidaemia. All patients seen expressed their satisfaction with the services provided including the quality of nutrition care provided especially on personalised advice and new information acquired, activities conducted, ease of making appointments, minimal waiting times, and overall benefits.

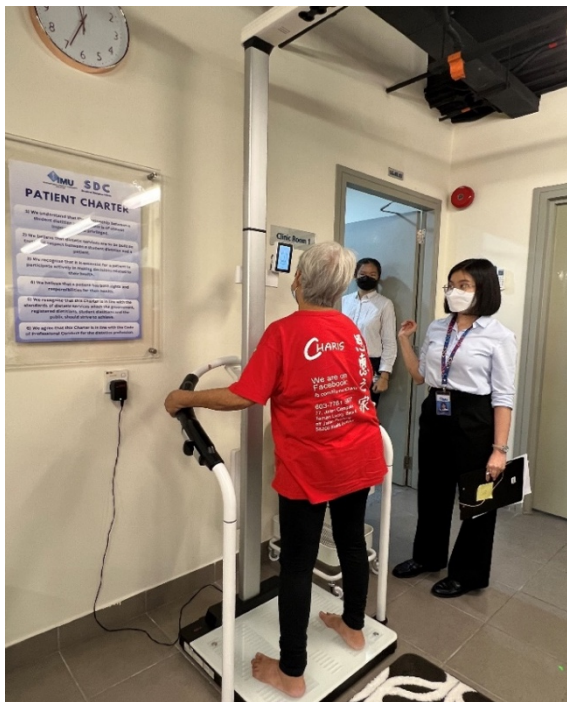


Figure 2: Individual diet consultation by a student dietitian as part of their daily activities



Figure 3: Body composition analysis using a multi-frequency body impedance analyser

The activities created the learning opportunity to conduct nutrition screening, manage adult-related NCDs through individual diet consultation, and implement a thematic-based group education project (Figure 4 and Figure 5) for the community in the form of live talks, webinars, or recorded videos (Figure 6 and Figure 7). The free dietetics services by SDC were promoted to increase public awareness through participation in health events and fairs (Figure 8).



Figure 4: Group education session on malnutrition among the elderly conducted by student dietitians



Figure 5: Healthy meal preparation workshop during a weight management campaign

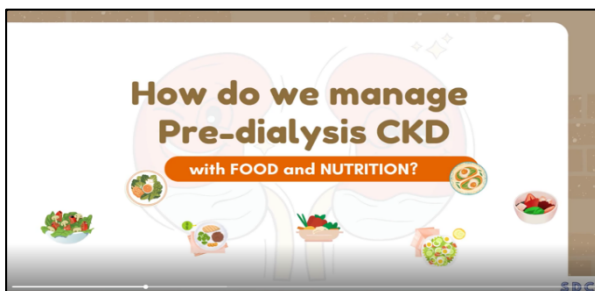


Figure 6: Educational videos on various nutrition-related topics for different target populations

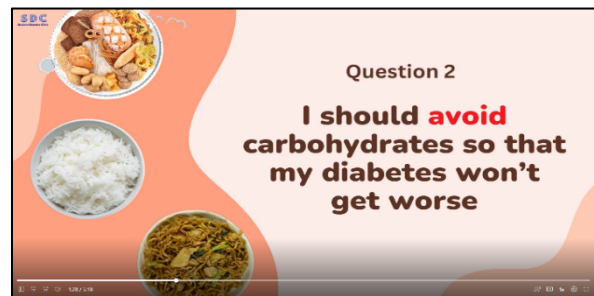


Figure 7: Live webinars to educate on medical nutrition therapy for non-communicable diseases



Figure 8: Name

## DISCUSSION

A key advantage of SDC is the student-led approach while maintaining skills development through continuous feedback and guidance from the registered dietitians to the student dietitians. The student board plays a pivotal role in overseeing all clinic aspects, including delivering diet consultations, programme development, and daily operations management. This structure fosters transparency and allows younger students to volunteer and participate in clinic activities, gaining valuable insights into clinical settings. The hands-on experience not only allows all stakeholders to be involved in management, planning, and implementation but also provides beneficial exposure into the diverse and evolving needs of patients.

For student dietitians, the advantages of the SDC are multifaceted. Firstly, it offers a unique opportunity to apply and refine the skills acquired during their final year academic journey, providing practical experiences to work with real patients in an authentic clinical environment. Secondly, it provides a platform to develop effective communication strategies, fostering connections with patients from diverse backgrounds and age groups. Thirdly, students will receive invaluable feedback from supervising professionals, enhancing their documentation, practical skills, and decision-making abilities. This mentorship is recognized as a critical component in the dietetics workforce preparation and at the early stages of one's professional career (6). In addition, the SDC plays a pivotal role in nurturing professionalism and altruism, contributing to their growth as compassionate healthcare practitioners.

In conclusion, the SDC has the potential to address the gap in dietetics training in Malaysia by providing timely and cost-free dietetics services. Establishing the SDC elevated the experience of dietetics students by offering a unique platform to foster entrepreneurship, leadership, teamwork and problem-solving skills besides enhancing clinical competencies and improving client interactions. These are real-world experiences to prepare work-ready graduates for the country in combating NCDs. Ensuring the sustainability of SDC requires securing funding, expanding partnerships, integrating it into healthcare systems, and leveraging telehealth opportunities.

## ACKNOWLEDGEMENT

We thanked the student committees from two cohorts (DN119 and DN120) who took charge of operations coordination in dietetic practicum, public outreach and community relations, operations coordination in project and resources, and finance. We would also like to thank the International Medical University for their support in the establishment of the student-led clinic in the setting.

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**Original****Replacement of Sea Salt with Aizuyamajio may Reduce Salt Consumption in Japan**Shin Yamaoka<sup>1,\*</sup><sup>1</sup> Department of Food and Nutrition, Junior College Division, University of Aizu, Fukushima Japan

**ABSTRACT** *Background and purpose.* Excessive salt intake is a global health concern. In the Aizu region of Fukushima Prefecture in Japan, Aizuyamajio is made from hot spring water and has a lower salt content than sea salt. In this study conducted a sensory evaluation of Aizuyamajio and sea salt, and compared the differences. *Methods.* Fourteen students from different prefectures consented to participate in this study. For the sensory evaluation method, participants rated sea salt and Aizuyamajio on their sweetness, saltiness, bitterness, sourness, and umami which were further evaluated using the four-point method. Additionally, respondents freely answered questions regarding the use of Aizuyamajio for cooking. *Results.* On comparing the sweet, salty, bitter, sour, and umami tastes between Aizuyamajio and sea salt, a significant difference was noted in the saltiness, however, no other significant differences were observed. Thirty-five methods have been suggested for using Aizuyamajio for cooking. *Conclusion.* The results of this study suggest that sea salt and Aizuyamajio have different tastes and lower salt equivalents. Furthermore, Aizuyamajio has a different taste from sea salt and may be used as a low-salt seasoning.

**Keywords:** Aizuyamajio, sea salt, low-salt, salty, tastes

**INTRODUCTION**

Excessive salt intake is associated with lifestyle-related diseases, such as hypertension (1). Hypertension, in turn, is associated with cerebrovascular diseases including arteriosclerosis (1). World Health Organization (2) recommends a sodium intake of less than 2000 mg/day (equivalent to less than 5 g/day of salt) for adults to maintain good health. However, the global average sodium intake for adults is reported to be 4310 mg/day (equivalent to 10.78 g/day of salt) (3).

In Japan, Dietary Reference Intakes for Japanese (2020) has set the daily salt intake for men and women (for those 18 years of age or older) at less than 7.5 g and less than 6.5 g, respectively (4). However, according to the 2019 Japanese National Health and Nutrition Survey, the average salt intake was 10.1g and 9.3 g for men and women, respectively (5). Hence, efforts to reduce salt consumption are required, which may serve as a role model and contribute significantly to improving health worldwide.

When the body ingests excessive amounts of salt, it increases the salt concentration in the plasma volume, resulting in an increase in water content in the blood and a subsequent increase in plasma volume (6). As a result, contribute to the cause of hypertension develops when the pressure on the plasma volume vessels increases to circulate more plasma (6).

In Japan, sea salt is commonly consumed and is mainly prepared from seawater. There is salt made from hot spring water in the Aizu region of Fukushima Prefecture (7). That salt termed Aizuyamajio (7). The Aizuyamajio content in hot spring water in the Aizu region is 16.5 g/L, lower than the 23 g/L of seawater, the source of sea salt (7). The nutritional value of sea salt (A co. anonymised for commercial purposes) per 100 g is 0 kcal of energy, 0 g of protein, 0 g of fat, 0 g

of carbohydrates, 95.0 g of salt equivalent, 350 mg of potassium, 200 mg of calcium, and 570 mg of magnesium. The nutritional value of Aizuyamajio per 100 g is 0 kcal of energy, 0 g of protein, 0 g of fat, 0 g of carbohydrates, 77.8 g of salt equivalent, 400 mg of potassium, 2200 mg of calcium, and 400 mg of magnesium. Therefore, Aizuyamajio has less salt content compared to sea salt of the same amount. Using Aizuyamajio instead of sea salt as a seasoning may help reduce excessive salt intake. However, very few studies have been conducted between Aizuyamajio and sea salt and their preparation methods. In this study conducted a sensory evaluation of Aizuyamajio and sea salt, compared differences in taste, and examined cooking methods using Aizuyamajio to improve the use of Aizuyamajio in cooking.

**MATERIALS AND METHODS****Participants and methods**

All study participants provided informed consent, and this study was approved by the University of Aizu Research Ethics Committee (2023 University of Aizu Plan No. 77). In this study verbally explained to the participants that their privacy would be protected and that there would be no disadvantages based on whether they responded. Also, participants were given an explanation of the study design and aim of the experiment. Those subject to ethical considerations were informed and consented to participate by signing a consent form. A prepaid card worth 1,500 JPY (approximately \$9.9) was provided to the respondents after survey completion as compensation for their time. Those who were unwell were excluded from the study participant. This study was conducted on 14 students from A junior college in A prefecture who consented to be the research participants of this study. The study was performed in only one day. Study participants conducted a sensory evaluation of Aizuyamajio and cooking methods by eating Aizuyamajio.

The sensory evaluation method was as follows. First, 1 cup (approximately 0.1 g) of sea salt (A co.

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anonymised for commercial purposes) was placed on a cocktail steer (Muddler Spoon Ivory 100 Pieces Artnap). Participants drank one glass of water to get rid of the sea salt left in their mouth. Subsequently, they consumed one cup (approximately 0.1 g) of Aizuyamajio (Purchased from: Aizu Yamajio Kogyo Kumiai, All Rights Reserved Aizu Yamajio Kogyo Kumiai) different from the one that they had consumed earlier. Then filled out a self-administered questionnaire (Questionnaire) about the five tastes of sweetness, saltiness, bitterness, sourness, and umami as well as how to use Aizuyamajio. The study design

is shown in Fig 1. The sweet, salty, bitter, sour, and umami tastes of Aizuyamajio and sea salts were evaluated using the four-point scale, and the appropriate answers were marked with a circle.

**Statistical analyses**

The Student's t-test was performed on the results using Excel statistical software to compare Aizuyamajio and sea salt. In all cases, a p-value of <0.05 was considered statistically significant. Additionally, respondents were free to answer questions regarding the use of Aizuyamajio for cooking.

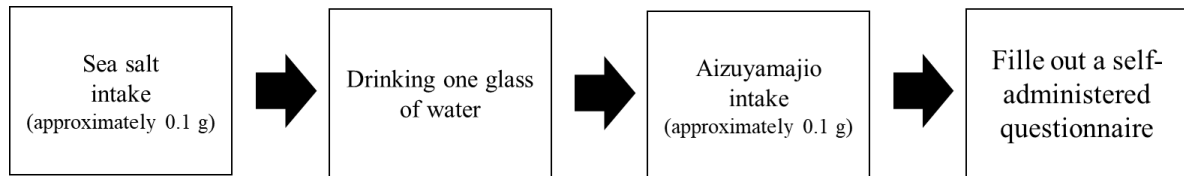


Fig 1. Study design

Questionnaire: Sex                      Age

Please circle the one you think is most appropriate for each category of sea salt and Aizuyamajio.

	Sea salt	Aizuyamajio
Sweetness	Sweet • Somewhat sweet • Somewhat not sweet • Not sweet	Sweet • Somewhat sweet • Somewhat not sweet • Not sweet
Salty	Salty • Somewhat salty • Somewhat not salty • Not salty	Salty • Somewhat salty • Somewhat not salty • Not salty
Bitter taste	Bitter • Somewhat bitter • Somewhat not bitter • Not bitter	Bitter • Somewhat bitter • Somewhat not bitter • Not bitter
Acidity	Sour • Somewhat sour • Somewhat not sour • Not sour	Sour • Somewhat sour • Somewhat not sour • Not sour
Umami	Has umami • Somewhat umami • Somewhat no umami • No umami	Has umami • Somewhat umami • Somewhat no umami • No umami

\*If you use Aizuyamajio, please describe what kind of dishes you would use it for.

**RESULTS**

All the 14 participants were females aged 19.07±1.64 years (mean±SD). The results of comparing Aizuyamajio and sea salt in sweetness, saltiness, bitterness, sourness, and umami are presented in Table 1. A significant difference was

observed in the ‘saltiness’ of the taste, however, no other significant differences were noted.

Thirty-five methods have been proposed for the use of Aizuyamajio in cooking which are listed in Table 2. As a result, dishes that are used with sea salt in Japan were proposed.

Table 1 Comparison of the taste of sea salt and Aizuyamajio (same respondents, n=14)

\*There is a significant difference between sea salt and Aizuyamajio (p<0.05).

	Sea salt				p-value	Aizuyamajio			
		Number of respondents n=14					Number of respondents n=14		
Sweetness	Sweet	Somewhat sweet	Somewhat not sweet	Not sweet	0.15	Sweet	Somewhat sweet	Somewhat not sweet	Not sweet
	0	4	2	8			2	4	4
Salty	Salty	Somewhat salty	Somewhat not salty	Not salty	<0.01*	Salty	Somewhat salty	Somewhat not salty	Not salty
	9	5	0	0			1	9	2
Bitter taste	Bitter	Somewhat bitter	Somewhat not bitter	Not bitter	0.15	Bitter	Somewhat bitter	Somewhat not bitter	Not bitter
	0	4	0	10			3	3	2
Acidity	Sour	Somewhat sour	Somewhat Not sour	Not sour	0.24	Sour	Somewhat sour	Somewhat Not sour	Not sour
	1	5	1	7			0	3	1
Umami	Has umami	Somewhat umami	Somewhat no umami	No umami	0.18	Has umami	Somewhat umami	Somewhat no umami	No umami
	1	9	0	4			4	7	2

Table 2 Suggestion on how to cook Aizuyamajio

Suggested dishes	Number of responses
Ramen	3
Salt rice ball	2
Nigiri meshi	1
Salt soft serve ice cream	1
Sweets (Ice cream, etc.)	1
Ice cream	1
Salted chocolate pie	1
Daifuku (Japanese sweets)	1
Clear soup	1
Soup	1
Miso soup	1
Put on tempura	1
Sprinkle over tempura	1
Tempura	1
Sprinkle on grilled foods (such as shiitake mushrooms)	1
Grilled fish	1
Fish (cooked with plenty of salt)	1
Salt-grilled fish	1
Yakitori salty	1
Sashimi	1
Fried vegetables	1
Cucumber	1
Pickles	1
Ajillo	1
Boiled	1
Boiled dishes	1
Japanese food	1
Chinese cuisine	1
The true taste of Aizuyamajio	1
Put on meat	1
Tamagoyaki	1
Egg dishes	1

Unless the answers were identical, they were written exactly as they were.

## DISCUSSION AND CONCLUSION

In this study observed that the salty taste was perceived to be significantly different among the survey participants at Junior College A in Prefecture A on sensory evaluation of Aizuyamajio and sea salt, and usage of Aizuyamajio in cooking. Additionally, many foods that use sea salt are listed and can be substituted with Aizuyamajio for cooking purposes. The difference in the amount of salt equivalents is considered to be the main reason for the difference in saltiness. The salt equivalent amount of Aizuyamajio used in this study was 77.8 g per 100 g, while that of sea salt was 95.0 g per 100 g. As a result, the ratio of salt equivalent to Aizuyamajio/sea salt was 18% lower at 77.8/95.0; therefore, many participants felt that Aizuyamajio was saltier, whereas others felt that Aizuyamajio was less saltier than sea salt.

For example, in a previous study, sensory tests showed that healthy tasters, who were young Japanese women in their late teens and 20s, were unable to distinguish between salty tastes (sodium chloride concentrations of 0.3%, 1.25%, 5%, 10%, and 20%). Therefore, a difference in the salt equivalent amounting to 18% in this study was recognized (8). These results suggest that on consuming an identical amount of Aizuyamajio as sea salt, one may find it less salty.

Based on the results of the sensory evaluations other than salty taste, there were no significant differences; however, the results for sweetness, bitterness, sourness, and umami, and taste perception differed. This is attributed to the fact that the amount of mineral components is generally different in Aizuyamajio than in sea salt. For example, studies involving mineral water revealed that taste sensations differed depending on the mineral (9). Therefore, although there was no significant difference between the Aizuyamajio and sea salt, the results were not the same.

Many dishes that use sea salt as a seasoning or dishes that are already made using Aizuyamajio have been cited (10,11). Regarding cooking methods for Aizuyamajio, most of the foods mentioned include those that use sea salt as a seasoning in Japan or those that are already prepared using Aizuyamajio. For example, sea salt is used in Japanese food culture (12,13). Furthermore, sea salt is used in products including ice cream. Aizuyamajio is used in cheese, rice balls, and ice cream, and has already been commercialised. Similar foods were proposed in this study, suggesting the possibility of using Aizuyamajio in foods that already use sea salt. The limitation of this study is that, although Aizuyamajio use is popular in one region of Japan, it is unclear whether they are widespread throughout

Japan. Additionally, the number of participants was small and the results were limited to one area. If salt is reduced by using Aizuyamajio, there is no known data regarding its effect on the blood pressure of individuals, creating a need for further investigation of the effects of intake of Aizuyamajio.

In Japan, efforts are being made to reduce salt content by adding glutamic acid, monosodium glutamate, calcium diglutamate, inosinic acid, and guanylic acid to umami substances which has been commercialised (14). The equivalent amount of salt in Aizuyamajio is low, and it is thought that wild salt with a different flavour may be added to the low-salt seasonings used in Japan and used as low-salt foods. However, though Aizuyamajio consumption is practised, is not with the intent of salt reduction. Patients with mild essential hypertension had lower blood pressure when they changed their diet from sea salt to mineral-rich salt (15). Therefore, Aizuyamajio may have the potential to improve hypertension. Furthermore, Aizuyamajio may also be possible to use it as a low-salt food with a different taste than sea salt.

In conclusion, the results of this study revealed that Aizuyamajio can be used as a low-salt food with a different taste from sea salt.

#### ACKNOWLEDGMENTS

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**Original****A Comparison of Physical Activity Among 10-year-old Children Between Suburban Vietnam and Japan**Sumiko Kamoshita<sup>1</sup>, Phuong Mai Nguyen<sup>1\*</sup>, Hitomi Takeichi<sup>2</sup>, Shigeru Yamamoto<sup>1</sup><sup>1</sup> *Nutrition and Food Culture Research Center, Jumonji University, Saitama, Japan*<sup>2</sup> *Faculty of Home Economics, Kobe Women's University, Hyogo, Japan*

**ABSTRACT** Background: The prevalence of overweight and obesity among Vietnamese children is increasing. Meanwhile, Japan is one of the few developed countries with the lowest prevalence of childhood obesity in the world. The Japanese government has many policies to encourage children to be more active. Therefore, Japanese children had higher levels of physical activity compared to other countries. Purpose Evaluation and comparison of physical activity of Vietnamese and Japanese children. Methods: The 7-day and 3-day minute-by-minute activity records were used to assess the physical activity of children aged 10 years old in Hanoi suburban (Vietnam) and Tokyo suburban (Japan), respectively. Results: The physical activity level (PAL) was higher for Japanese children (1.54) than for Vietnamese children (1.42) ( $p < 0.001$ ). Time spent in moderate to vigorous physical activity in Japanese children was about 2 times longer than for Vietnamese children ( $p < 0.001$ ). Conclusion: Japanese children had higher levels of physical activity than Vietnamese children. The Government of Vietnam needs to have appropriate policies to increase the level of physical activity of Vietnamese children in order to prevent and solve the problem of obesity.

**Keywords:** physical activity, children, suburban, Vietnam, Japan

**INTRODUCTION**

In recent years, the increase in childhood obesity has been remarkable in Vietnam. According to the results of the National Nutrition Survey, Vietnam, in the decade from 2010 to 2020, the prevalence of overweight and obesity among 5-19 year olds almost doubled from 15.4% to 26.8% in urban areas and from 8.5% to 19% in rural areas (1). Meanwhile, the prevalence of overweight and obesity in Japanese children was about 11%, one of the lowest in the developed countries (2). Therefore, many countries have taken Japan as a model to compare and find solutions to overcome overweight and obesity.

The low prevalence of obesity in Japan can be explained through healthy lifestyle habits that the Japanese population have continued over time (3). The Japan Sports Association published a guideline entitled "Active Child 60 min" (4). The main target were pre-school and primary school children (Japan Sports Association 2010). Moreover, Japan has high rates (98.3%) of active transport to school among children in public school compared with other similar-income countries (5). Japan has a highly established "walking to school practice" (5).

Meanwhile, in Vietnam, the sedentary lifestyle is increasing in children (6). In addition, at present, most of the studies focus on over intake, but not many studies focus on assessing the physical activity of children. Therefore, this study was conducted with the aim of assessing and comparing the physical activity of Vietnamese and Japanese children.

**MATERIALS AND METHODS****Participants**

A total of 134 children (73 boys and 61 girls) aged 10 years old at a public primary school in suburban Hanoi participated in this study. The school was selected by convenience sampling. All data were collected in October of 2020. Informed consent was obtained from the children, their guardians and teachers according to the Declaration of Helsinki, and the study protocol was approved by the Biomedical Research Ethics Committee of Hanoi Medical University (no. 355/HMUIRB).

A total of 78 children (35 boys and 43 girls) aged 10 years old at an elementary school in Tokyo suburban participated in this study. All data were collected in November of 2022. Informed consent was obtained from the children, their guardians and teachers according to the Declaration of Helsinki.

**Physical activity assessments**

The 7-day and 3-day minute-by-minute activity records were used in suburban Hanoi and Tokyo, respectively to assess the physical activity level. The activity record form is designed based on the template developed by Koebnick et.al. The same recording form was used in both the Vietnam and Japan surveys. Numbers 1 to 24 contain general activities, but activities that do not fit into these categories are written in numbers 25 to 28. The "Other" columns prevent bias due to the recording form. Children were instructed to record the activity by number shown in recording form and mark the start and end times for each activity (Fig 1). The recording method was explained to teachers, children and their guardians with an example of a completed physical activity form. We asked teachers and guardians to help the children to complete the activity record. When collecting the activity record form, we interviewed children to improve the accuracy of the activity record

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by adding and correcting the content regarding omissions and unclear points.

**Statistical analysis**

The physical activity level (PAL) was calculated based on the following formula:

$$PAL = \frac{\sum 24h \{MET \text{ value of physical activity} \times \text{time (min)}\}}{1440 \text{ (minutes of 24 hours)}}$$

In which the MET value of physical activity was referenced from the compendium of physical activities of Ainsworth et al (7).

The time spent in each physical activity intensity each day was calculated using METs for each participant: average minutes spent in sedentary and

light physical activity (METs < 3), moderate to vigorous physical activity (METs ≥ 3.0) (8), (9).

All statistical analyses were performed using SPSS software (version 26; IBM Corporation, Armonk, New York). The data were expressed as mean±SD or %. The study analyses involved comparisons between Tokyo suburban and Hanoi suburban. Differences between groups were assessed using independent t-tests and dependent t-tests for continuous data and chi-squared tests for categorical data. P values less than 0.05 were defined as a statistical difference.

PHYSICAL ACTIVITY RECORD																									
Date: _____				Gender: _____				Class: _____																	
A M	0		1		2		3		4		5		6		7		8		9		10		11		
P M	12		1		2		3		4		5		6		7		8		9		10		11		
		① Sleep		musical instrument (both standing and sitting), sewing		⑨ Walk at normal speed		⊗ Soccer, Rugby, Basketball																	
		② Read (reading), writing, TV, listening to music (including radio), resting, listening to stories,		⑥ Cleaning		⑩ Walk while carrying something (bag, luggage)		⊗ Swimming, strength training																	
		Talking (including phone calls), classes (including cram schools), homework, personal computers, games		⑧ Walk slowly		⑪ Walk fast		⊗ Other.....																	
		③ Meals		⑬ Sit down and ride (car, bus, train, etc.)		⑫ Run slowly and lazily		⊗ Other.....																	
		④ Chat		⑭ Ride while standing (bus or train)		⑮ Normal speed bicycle		⊗ Other.....																	
		⑤ Getting dressed (washing up, changing clothes), Playing a		⑯ Playing in the sand, playing house, dancing, playing in the schoolyard/park (horizontal bar, swing, jungle gym, tree climbing, swing		⑰ Ball Throw, Dodgeball, Baseball, Softball		⊗ Other.....																	
						⑱ Run normally to fast																			
						⊗ Tennis, Volleyball, Badminton, Judo, Kendo																			

Fig 1. Physical activity recording form

**RESULTS**

Figure 2 shows the comparison of PAL between Vietnamese and Japanese girls. In total, the PAL of girls in Tokyo suburban was significantly higher than those of Hanoi suburban at 1.45±0.10 and 1.40±0.12 (p<0.05), respectively. The PAL of girls on weekdays and weekends in Tokyo suburban was significantly higher than those of Hanoi suburban were 1.45±0.11 vs 1.41±0.09 (p<0.05) and 1.46±0.18 vs 1.38 ±0.15 (p<0.05), respectively. In overall, there was no significant differences between PAL on weekdays and weekends in both Tokyo and Hanoi suburban (p>0.05).

Figure 3 shows the comparison of PAL between Vietnamese and Japanese boys. In total, the PAL of boys in Tokyo suburban was significantly higher than those of Hanoi suburban at 1.69±0.15 and 1.45±0.13, respectively (p<0.001). The PAL of boys on weekdays and weekends in Tokyo suburban was significantly higher than those of Hanoi suburban were 1.67±0.14 vs 1.47±0.14 (p<0.001) and 1.74±0.29 vs 1.41±0.23 (p<0.001), respectively. In overall, there was no significant differences between PAL on weekdays and weekends in both Tokyo and Hanoi suburban (p>0.05).

Figure 4 shows the comparison of time spent on moderate and vigorous physical activity between Vietnamese and Japanese girls. In total, time spent for moderate to vigorous physical activity of girls in Tokyo suburban was significantly higher than those of Hanoi suburban at 153±59 and 85±37 min/d (p<0.001), respectively. Average time spent on moderate to vigorous physical activity of girls on weekdays and weekends in Tokyo suburban was significantly higher than those of Hanoi suburban were 145±62 vs 80±46 min/d (p<0.001) and 171±103 vs 95±62 min/d (p<0.001), respectively. In overall, there was no significant differences between average time spent on moderate to vigorous physical activity on weekdays and weekends in both Tokyo and Hanoi suburban (p>0.05).

Figure 5 shows the comparison of time spent on moderate and vigorous physical activity between Vietnamese and Japanese boys. In total, time spent for moderate to vigorous physical activity of boys in Tokyo suburban was significantly higher than those of Hanoi suburban at 175±93 and 97±43 min/d (p<0.001), respectively. Average time spent on moderate to vigorous physical activity of boys on weekdays and weekends in Tokyo suburban was

significantly higher than those of Hanoi suburban were  $157 \pm 74$  vs  $99 \pm 45$  min/d ( $p < 0.001$ ) and  $212 \pm 192$  vs  $92 \pm 67$  min/d ( $p < 0.001$ ), respectively. In overall, there was no significant differences in average time

spent on moderate to vigorous physical activity between weekdays and weekends in both Hanoi and Tokyo suburban ( $p > 0.05$ )

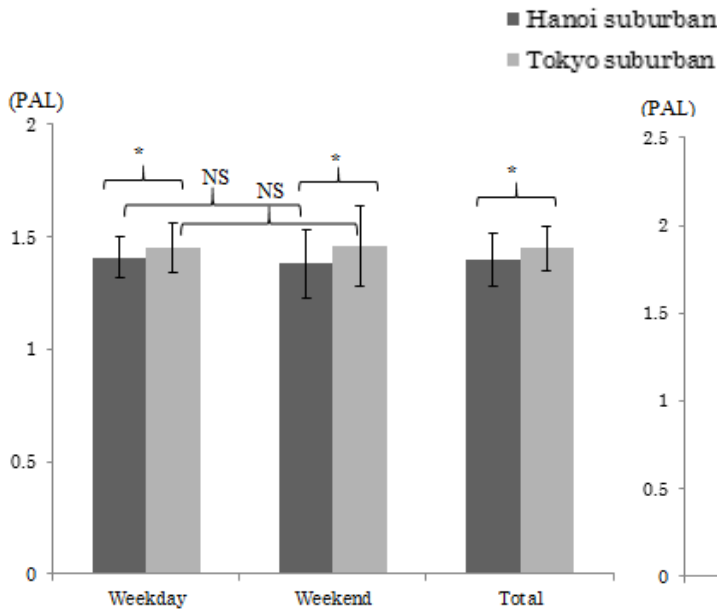


Figure 2. Comparison of PAL between Vietnamese (n=61) and Japanese girls (n=43)

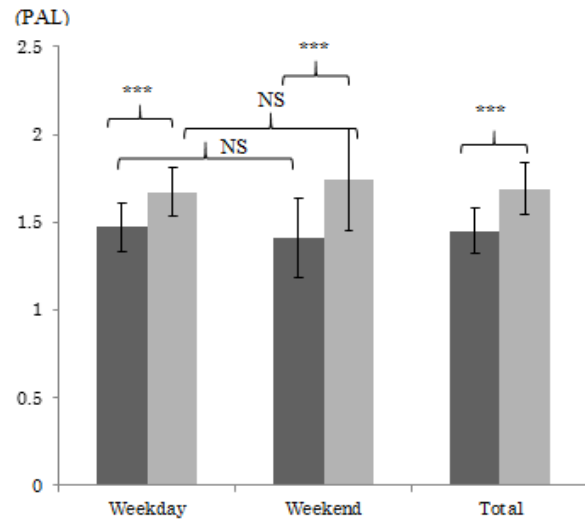


Figure 3. Comparison of PAL between Vietnamese (n=73) and Japanese boys (n=35)

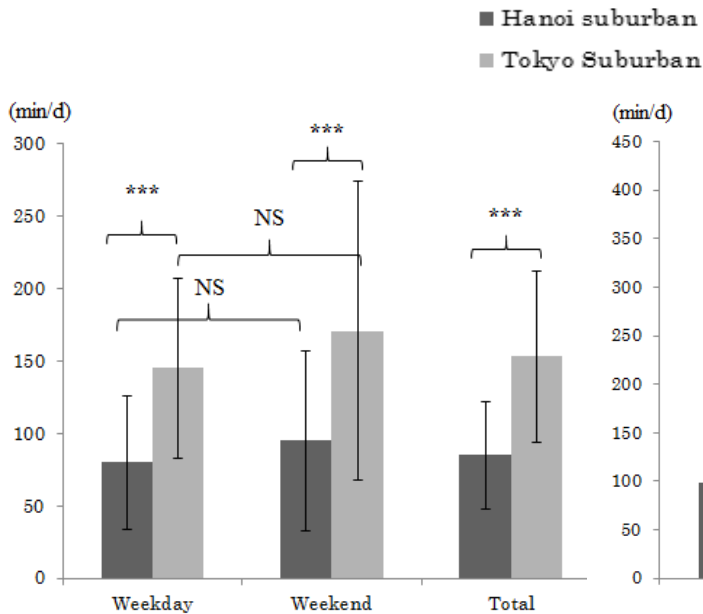


Figure 4. Comparison of time spent on moderate to vigorous physical activity between Vietnamese (n=61) and Japanese girls (n=43)

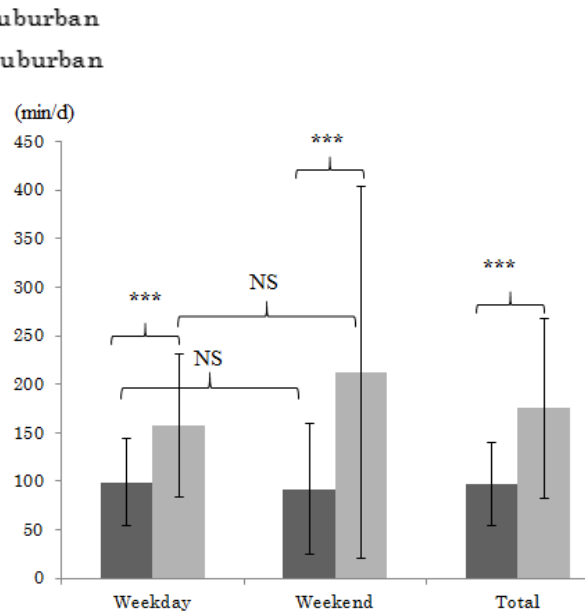


Figure 5. Comparison of time spent on moderate and vigorous physical activity between Vietnamese (n=73) and Japanese boys (n=35)

All values are mean $\pm$ SD.

P-values were computed using an independent *t*-test between groups and a dependent *t*-test within group.

NS: non-significant differences and \*\*\*: significant differences at  $p < 0.001$ .

PAL was calculated by  $\sum 24h \{MET \text{ value of physical activity} \times \text{time (min)}\} / 1440 \text{ min}$ . It is the same as the average METs.

Table 1 compares some factors of physical activity in children aged 10 years old between Hanoi

suburban and Tokyo suburban. The sleeping time of girls and boys in Hanoi suburban was significantly

longer than that in Tokyo suburban, with a difference of 67 minutes and 39 minutes, respectively ( $p<0.001$ ). Time spent for moderate to vigorous physical activity of girls and boys in Tokyo suburban was significantly higher than those of Hanoi suburban at  $153\pm59$  vs  $85\pm37$  min/d ( $p<0.001$ ) and

$175\pm93$  vs  $97\pm43$  min/d ( $p<0.001$ ), respectively. 100% of children in the Tokyo suburban walked to school while about 50% of children in the Hanoi suburban walked or biked to school. The commute time from school for children in Tokyo was about 3 times longer than that of Hanoi suburban ( $p<0.001$ ).

Table 1 Comparison of some factors of physical activity in children aged 10 years old between Hanoi suburban (N=134) and Tokyo suburban (N=78) by gender

	Girls			Boys		
	Hanoi (n=61)	Tokyo (n=43)	<i>p</i> -value <sup>†</sup>	Hanoi (n=73)	Tokyo (n=35)	<i>p</i> -value <sup>†</sup>
<b>Sleeping time (min/d)</b>	621±38	554±37	<0.001	611±49	572±56	<0.001
<b>Moderate to vigorous physical activity (min/d)</b>	85±37	153±59	<0.001	97±43	175±93	<0.001
<b>No. of children walking or biking to school (%)</b>	50.8	100	<0.001	52.1	100	<0.001
<b>Time of walking or biking to school (min/d)</b>	7±9	26±11	<0.001	7±8	24±9	<0.001

Values are mean±SD and %.

<sup>†</sup>Independent *t*-test except Chi-squared test for walking or biking to school (%). Significant difference:  $p<0.05$ .

## DISCUSSION

The purposes of the present study was to assess and compare the physical activity in Vietnamese and Japanese children. The physical activity level in Japanese children was higher than that of Vietnamese children. The sleep time of Vietnamese children is longer than that of Japanese children. 100% of Japanese children walked to school that was 2 times higher than Vietnamese children. In particular, the time spent on moderate and vigorous physical activities of Japanese children was about 2 times higher than that of Vietnamese children.

The research period for this study was 7 days in Vietnam and 3 days in Japan. In terms of physical activity assessment, previous research has shown that with the minute-by-minute activity record method, the 7-day study period gives reliable results (10). However, in Japan, the Japanese Ministry of Education applied the physical activity record method for three non-consecutive days (11). Therefore, most of the studies on physical activity of Japanese children were conducted over a non-consecutive 3-day period and were found to be reliable. In other words, the difference in study period does not affect the results of this study. The two studies in Vietnam and Japan were all conducted around October-November of the year and in suburban area to reduce spatial and temporal errors. This allowed us to rule out differences in exercise that might be caused by season.

Regarding physical activity, the present study indicates that the level of physical activity of Tokyo children is higher than that of Hanoi children of both sexes, with a big difference especially among boys. The sleep duration of Japanese children was about 554 min/d in girls and about 572 min/d in boys. Sleeping time of girls and boys in Tokyo suburban were significantly shorter than those of Hanoi suburban at 67 and 39 min, respectively. This difference may be due to the nap habits of Vietnamese. In Vietnam, after lunch, children have

about 45-60 minutes to take a nap before the afternoon class starts. In the present study, 100% of children in Tokyo suburban walked to school while the percentage of children in Hanoi suburban walked or cycled to school only about 50%. A cross-sectional study in 2020 reported that 53% of school children (aged 5-15 years) used active transport to and from school in Hanoi city (12). Promotion of active school travel (e.g., walking and cycling to/from school) may be a way to improve children's health due to its association with levels of physical activity (13). In Japan, more than 90% of children travel to school on foot, which may partly contribute to the relatively low prevalence of childhood obesity and being overweight (14). According to the 2018 Report Cards on Physical Activity for Children and Youth from 49 countries (also known as the Global Matrix 3.0) (15), Japan was highly rated as "A-" (i.e., 80–86% prevalence) for active transportation (16). Previous research has shown that active school travel was positively associated with neighborhood physical and social environments, safety, walkability, and neighborhood social interactions, and negatively associated with travel distance and car ownership (17), (18). In particular, safety has been identified as the core concept of school travel policies (19), (20), most studies have focused on traffic safety (21), (22). In the present study, the average time children walked to school about 30 minutes was an appropriate time because normally, the walking distance to school ranges between 2 and 4 kilometers for elementary school (3). In Vietnam, to increase the rate of children walking to school, it is necessary to improve the level of traffic safety as well as social security.

The difference in physical activity levels between children in Tokyo and Hanoi is mainly due to the difference in time spent on moderate to vigorous physical activities. A survey conducted in 2021 in Japan revealed that almost 55% of girls and close to 62% of boys aged between 4 and 11 years

participated in sports teams and clubs (23). Besides sports clubs, schools often also offer clubs for cultural activities, such as playing music instruments (23). In Vietnam, percentage of students who were physically active for a total of at least 60 minutes per day on all seven days during the past seven days was 13.6% (6). Additionally, for female students aged 10-11 years old showed that in 2012 only 11.9% of the grade 5 students in Ho Chi Minh City participated in active play after school (6). Time spent for moderate to vigorous physical activity of girls and boys in Tokyo suburban was significantly higher than those of Hanoi suburban at 68 min/d and 78 min/d, respectively. Consistently, the previous studies indicated that more than half of the children participated in organized sports for at least 60 minutes per day (4).

The evidence suggests that Vietnamese children had low levels of physical activity. Physical activity initiatives in Vietnamese children are largely focused on enhancing physical education in schools (24). Public health policy initiatives should focus more on community-based programs and promoting physical activity environments for children outside school settings (6). As recommended by the WHO ACTIVE toolkit, countries should focus on four policy action areas: changing the population's perception of the importance of physical activity; providing safe and well-maintained facilities and green areas for physical activity; encouraging people of all age groups to engage in regular physical activity, and to build a strong leadership and governance system to support successful policy implementation (6).

The present study has several limitations to note. In terms of physical activity, the present study was conducted in suburban areas of two big cities in Vietnam and Japan at the same time of year. However, the effects of the covid-19 pandemic may affect children's physical activity in both countries. A study to be conducted after the covid-19 pandemic is needed. In addition, the cross-sectional design used in the present study could not determine causality. Therefore, cohort studies should be conducted among Vietnamese and Japanese children in the future.

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#### CONFLICT OF INTEREST

The authors has no conflicts of interest to disclose.

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**Original**

**Effectiveness of Medical Nutrition Therapy in Improving Prognostic Nutritional Index Scoring among Dietitian Referred Chronic Kidney Patients: A Retrospective Study at Hospital Kuala Lumpur, Malaysia**

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**ABSTRACT**

**Background and purpose:** The prognostic nutritional index (PNI) is a simple assessment tool to determine the nutritional status of patients. The purpose of this study was to assess the effectiveness of MNT in improving PNI scoring among chronic kidney patients.

**Methods:** This retrospective study used data of patients seen by Dietitians in 2022. Descriptive analysis was used to describe patient characteristics, prevalence of CKD patients and PNI scoring. Analysis of PNI towards factor and parameter associated was done using Generalized Estimating Equation (GEE). A *p*-value of < 0.05 was set as the cutoff for statistical significance.

**Results:** There were significant association (*p*<0.05) for variables such as PNI, hemoglobin, total protein, albumin and urea. There was also positive improvement for PNI scoring, hemoglobin, total protein, albumin. There was also reduction in urea, potassium, phosphate, uric acid, fasting blood sugar and total cholesterol among referred patients to dietitian. Significant association of PNI with hypercholesterolemia (*p*=0.017), albumin (*p*=0.003), total protein (*p*=0.003), creatinine (*p*=0.01), phosphate (*p*<0.001), uric acid (*p*=0.043) and eGFR (*p*=0.013) among patients referred to dietitian. No significant association was noted between BMI and PNI.

**Conclusion:** Results of current study suggests that medical nutrition therapy is an important aspect of management for chronic kidney patients. Patients with improved PNI scoring which were seen by dietitian showed better nutritional status compared to those patients who did not receive dietary consultations from dietitians. Further study with large coverage may give a concrete or better results in future

**Keywords:** Prognostic Nutritional Index, Chronic Kidney Disease, End Stage Kidney Disease, Low Protein Diet, Medical Nutrition Therapy

**INTRODUCTION**

The prognostic nutritional index (PNI) is a simple assessment tool to determine the nutritional status of patients (1). It is calculated by combining serum albumin levels and total lymphocyte counts, which are two indicators of nutritional status or malnutrition and immune function (2). PNI has been shown to be a useful tool in predicting mortality among many populations, including end stage renal patients on dialysis (3).

A study published in the Journal of Renal Nutrition in 2021 investigated the prognostic value of PNI in predicting mortality in 671 hemodialysis patients with CKD (4). The study found that lower PNI values were associated with higher mortality rates, even after adjusting for other factors such as age,

sex, and comorbidities (4). Similarly, a study published in the Journal of Cachexia, Sarcopenia and Muscle in 2020 found that PNI was a significant predictor of mortality among Chronic Kidney Disease (CKD) patients undergoing hemodialysis (5). The study also found that PNI was more accurate than other nutritional indices such as the geriatric nutritional risk index and the controlling nutritional status score (5).

PNI has also been also researched among peritoneal dialysis patients. A study conducted by Sijia et al concluded that low PNI levels were independently associated with the first occurrence of pneumonia in PD patients (6-8). PNI was an independent predictor of new-onset pneumonia in PD patients (6-8).

PNI has been also used as a prognostic tool among diabetic nephropathy patients. This study aimed at the long-term effects of prognostic nutritional index (PNI) on renal outcomes in patients with diabetic nephropathy (DN) and type 2 diabetes mellitus (9-10).

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Results from this study proved that PNI correlated with eGFR and glomerular injury and was an independent predictor for DN progression in patients with T2DM (9-10).

This study might help to strengthen the PNI as tool to determine as a strong prognostic tool for CKD patients. PNI is a simple tool that can be used to determine nutritional status of CKD patients. Since it is easy to use and only requires two variables (albumin and lymphocytes level) to calculate malnutrition status of CKD patients, it will enable clinicians to better diagnose malnutrition among CKD patients.

Medical nutrition therapy (MNT) has been proven in effectively improving CKD patients' nutritional status (11). However, research on effectiveness of MNT improving patients PNI scoring among CKD patients has not done before in Malaysia. We hope the results of this study will help dietitians and other healthcare personnel to use PNI as a diagnostic tool for better patient outcome in terms of improving nutritional status and patient care.

### Objective

#### General Objective

To assess the effectiveness of MNT in improving PNI scoring among CKD patients

### Specific Objectives

To determine the effectiveness of Medical Nutrition Therapy (MNT) in improving patients' nutritional status

To determine the association between Prognostic Nutritional Index (PNI) and clinical outcomes (nutritional status and renal function) in patients with Chronic Kidney Disease (CKD) receiving dietary counselling.

### MATERIALS AND METHODS

#### Study Type and Design

This was a retrospective study that was conducted at Hospital Kuala Lumpur. This study used Malaysian Dietetics Care Notes (DCN) which is the standard documentation form used by Dietitians. Sample size targeted for this study was 352 patients. Chronic Kidney Disease patients at Nephrology outpatient clinic referred to Dietitian and patients not referred to Dietitian from 1<sup>st</sup> January 2022 until 31<sup>st</sup> December 2022 were included in this study. A minimum of at least two follow up by dietitian was required for analysis purposes. The end point of the study was the accuracy of PNI in determining nutritional status of CKD patients. Flow chart of this study is explained as below.

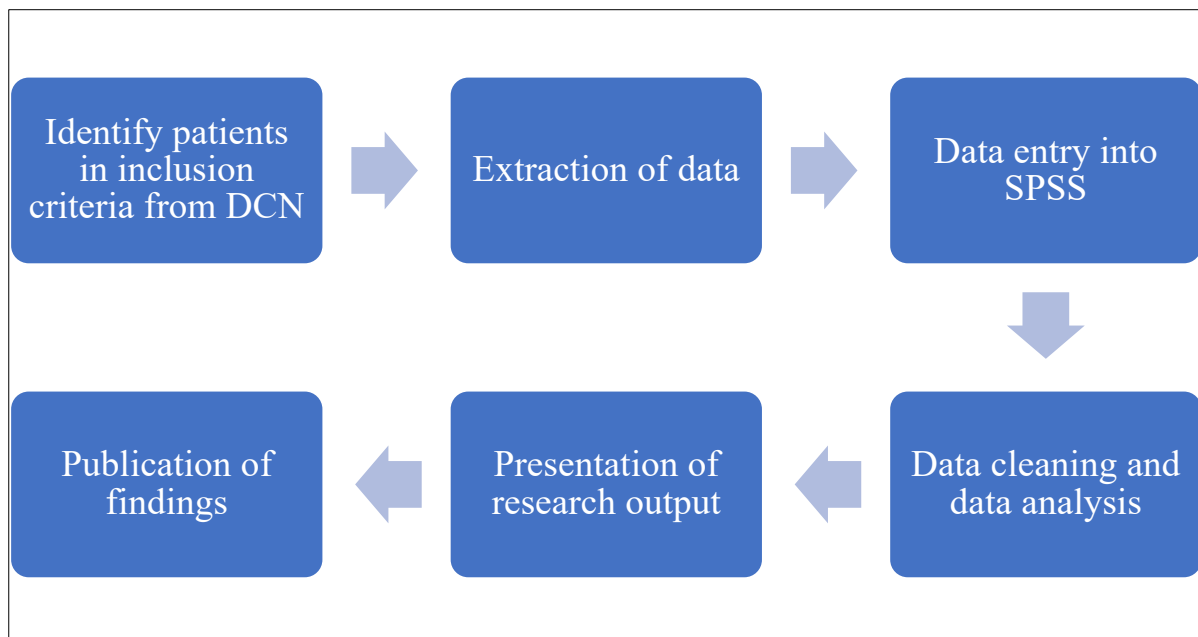


Figure 1: Flow chart for data collection

### Study Tool

This study used PNI scoring as a nutritional tool. The PNI was calculated by  $5 \times \text{lymphocyte count (10}^9/\text{L)} + \text{serum albumin (g/L)}$  in this study. Scoring for PNI was determined by low (<40), moderate (40-45), high >45. Clinical information of patients was collected

from DCN. Laboratory test results was obtained from Lab Information System (LIS) at Nephrology Clinic, Hospital Kuala Lumpur, Malaysia. All information included demographic data such as age, gender, ethnicity, medical history such as hypertension, diabetes, heart disease, examination data such as

weight, height, blood pressure, laboratory data such as serum creatinine, blood urea nitrogen, total serum uric acid, total cholesterol, HbA1c, fasting blood sugar, proteinuria.

Medical nutrition therapy based on The National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (KDOQI) Guidelines 2020 was given to patients that were referred to dietitian (12). Patients were given a diet comprised of 1) dietary protein intake of 0.6 to 0.8 g/kg/day from 50% plant-based sources, 2) fiber intake of 25 g/day, 3) low-sodium intake of less than 5 g/d and 4) adequate caloric intake of 30 to 35 kcal/kg/day. If patient has a co-morbidity of diabetes and other form of non-communicable diseases, the MNT shall be individualized according to the patient's diseases.

### Study Population & Sampling Method

This was a simple random sampling that referred to eligible patients (chronic kidney disease patients) referred and seen by Dietitian as well as patients not referred to Dietitians from 1st January 2022 until 31st December 2022.

### Inclusion Criteria

- a) All patients referred to dietitian by medical officers/nephrologists
- b) Aged 18 years and above
- c) Available PNI values (albumin and lymphocytes count)
- d) Complete medical records
- e) Patients with follow up at least 1 year

### Exclusion Criteria

- a) Patients with a history of cancer, autoimmune diseases, or chronic infections.
- b) Missing data
- c) Patients with end stage renal disease at baseline
- d) Deaths

### Withdrawal Criteria

Not applicable

### Sample Size

We used G\*Power version 3.1.9.4 to determine the required sample size for detecting an improvement in PNI scoring with a medium effect size of 0.3, a significance level of 5%, and a power of 80%, this study required sample 176 per arm. The two arms were referring to patients referred to dietitians and patients not referred to dietitians. Total patients for both required arms were 352 patients. As no information on effect size was available for this particular factor, we chose to use Cohen's guidelines for effect size interpretation to determine the target effect size.

### Study Duration and Timeline

- Stage 1, proposal development - 1 month
- Stage 2, data collection and data analysis - 2 months

- Stage 3, presentation and publication - 2 months

### Study Visits and Procedures

The data of concern involved outpatient patients seen by Dietitian and not seen by Dietitian at Outpatient Nephrology Clinic from 1st January 2022 until 31st December 2022. These data were retrieved from copies of Dietetic Care Notes (DCN) which was stored at Dietetic Clinical Store Office. The days of referral and follow ups were within the stipulated time of 1st January 2022 until 31st December 2022. Dietitians of Hospital Kuala Lumpur retrieved the data from Dietetic Clinical Store Office and Lab Information System (LIS) and entered the variables of concern into SPSS for further analysis. These data collection period commenced from 1st January 2024 until 31st January 2024.

### Statistical Analysis

The Statistical Package for the Social Sciences (SPSS, IBM, Chicago, IL) version 26 was utilized for data analysis. Continuous variables were assessed for normality using the Kolmogorov-Smirnov test. Normally distributed variables were presented as mean  $\pm$  standard deviation and compared using t-tests or one-way analysis of variance (ANOVA). Non-parametric variables were presented as median (interquartile range) and compared using the Mann-Whitney or Kruskal-Wallis test. In cases where significant differences were observed in ANOVA or Kruskal-Wallis test, post-hoc Tukey comparison or Bonferroni correction was employed.

Categorical variables were presented as counts and percentages and analyzed using Pearson's chi-squared test or Fisher's exact test. The strength of the relationship between variables was assessed using Pearson's bi variate correlation. Kaplan-Meier and Cox-regression was used to estimate disease progression. A significance level of  $p < 0.05$  was used to determine statistical significance.

### Risk and benefit to study participants

There were no risk and benefit to the participants as this was a retrospective study which did not involve direct contact with any patient.

### Risk Benefit Assessment

Assessment using PNI should be considered to treat malnutrition which might lead to significant improvement in relation to treating and improving nutritional status of CKD patients. The results of this study may help clinicians identify patients with low PNI scores and improve their clinical outcome. Clinicians will be able to accurately identify the impact of PNI scoring on patient nutritional outcome. Results from this study will enable Dietitians to further strengthen the usage of PNI as a prognostic tool for treating malnutrition.

### Ethics of Study

Ethical approval was needed from the Medical Research and Ethics Committee, Ministry of Health Malaysia. This research was registered with National Medical Research Register (NMRR), Malaysia under the registration identification number of NMRR ID-23-03077-3ZW.

Ethical approval was obtained from other relevant approvals prior to the start of any study related activities. The study was performed in compliance with the principles of the Declaration of Helsinki, in accordance with the International Conference of Harmonization Guideline for Good Clinical Practice, and in accordance with applicable regulatory requirements.

#### Informed Consent/Assent Process

Waiver of consent was requested and was granted by Medical Research and Ethics Committee (MREC) in view of retrospective study and no patient/participant contacts.

#### Privacy and Confidentiality

Subject's names were kept on a password-protected database and were linked only with a study identification number for this research. The identification number instead of patient identifiers was used on subject data sheets. All data were entered into a computer that was password protected. On completion of study, data in the computer was copied to thumb drives and the data in the computer erased. Thumb drives and any hard copy data were stored in a locked office of the investigators and maintained for a minimum of three years after the completion of the study. The thumb drives and data will be destroyed after that period of storage. Study will not be shared with any third party.

#### Termination of Study

Not applicable

## RESULTS

Table 1: Patient characteristics stratified by Dietitian Referred (N=300)

Variable	Dietitian Referred			p-value
	Yes	No	Total	
Gender				
Female	73 (50)	73 (50)	146	>0.999 <sup>a</sup>
Male	77 (50)	77 (50)	154	
Ethnicity				
Malay	93 (48.7)	98 (51.3)	191	0.393 <sup>b</sup>
Chinese	34 (51.5)	32 (48.5)	66	
Indian	21 (51.2)	20 (48.8)	41	
Others	2 (100)	0 (0)	2	
Diabetes mellitus				
Yes	108 (56.5)	83 (43.5)	191	0.003 <sup>a</sup>
No	42 (38.5)	67 (61.5)	109	
Hypertension				
Yes	131 (51.6)	123 (48.4)	254	0.200 <sup>a</sup>
No	19 (41.3)	27 (58.7)	46	
Hypercholesterolemia				
Yes	81 (48.5)	86 (51.5)	167	0.561 <sup>a</sup>
No	69 (51.9)	64 (48.1)	133	
Heart Disease				
Yes	25 (52.1)	23 (47.9)	48	0.753 <sup>a</sup>
No	125 (49.6)	127 (50.4)	252	
BMI category				
Underweight	7 (70)	3 (30)	10	0.092 <sup>a</sup>
Normal	41 (53.2)	36 (46.8)	77	
Overweight	47 (50.5)	46 (49.5)	93	
Obese	46 (68.7)	21 (31.3)	67	

<sup>a</sup>Chi Square, <sup>b</sup>Exacts

Table 2: Parameter changes for overall patients and stratified by dietitian referred.

Parameter	Referred (n=150)			Not-Referred (n=150)		
	Mean (SD)		Mean diff (95%CI)	Mean (SD)		Mean diff (95%CI)
	Before	After		Before	After	
Prognostic Nutritional Index	46.79 (5.31)	47.72 (4.87)	0.93 (0.32, 1.54)**	46.92 (5.27)	46.55 (4.72)	-0.37 (-0.94, 0.2)
Hemoglobin	11.93 (1.84)	12.1 (1.92)	0.17 (0.04, 0.31)*	11.87 (2.04)	11.96 (1.87)	0.09 (-0.11, 0.28)
Total Protein	76.11 (5.67)	76.97 (5.92)	0.86 (0.15, 1.57)*	71.97 (6.77)	72.07 (6.23)	0.1 (-0.58, 0.78)
Albumin	35 (4.06)	35.4 (3.73)	0.4 (0.01, 0.79)*	35.35 (3.6)	35.63 (3.32)	0.28 (-0.17, 0.73)
Urea	11.39 (7.22)	10.25 (3.94)	-1.14 (-2.18, -0.1)*	7.58 (3.39)	7.86 (3.41)	0.28 (0, 0.56)
Creatinine	198.12 (89.22)	202.41 (87.73)	4.29 (-0.99, 9.58)	153.8 (82.86)	155.44 (84.71)	1.64 (-4.57, 7.85)
Potassium	4.62 (0.73)	4.55 (0.67)	-0.07 (-0.18, 0.04)	4.7 (0.69)	4.73 (0.68)	0.03 (-0.09, 0.15)
Phosphate	1.24 (0.21)	1.22 (0.21)	-0.02 (-0.05, 0.01)	1.25 (0.34)	1.29 (0.44)	0.04 (-0.01, 0.08)
Uric acid	471.26 (113.1)	464.36 (105.49)	-6.9 (-20.86, 7.06)	461.33 (101.22)	464.53 (91.05)	3.21 (-8.65, 15.06)
Fasting Blood Sugar	7.28 (3.43)	7.11 (3.64)	-0.17 (-0.71, 0.37)	6.14 (1.95)	6.39 (2.32)	0.25 (-0.02, 0.53)
HBA1C	7.64 (1.36) <sup>a</sup>	7.49 (1.76) <sup>a</sup>	-0.16 (-1.56, 1.24)	8 (0) <sup>b</sup>	8.3 (0) <sup>b</sup>	-
EGFR	33.44 (19.31)	32.8 (19.35)	-0.64 (-1.5, 0.23)	44.13 (17.07)	42.87 (17.34)	-1.26 (-2.04, -0.49)**
Total Cholesterol	4.7 (1.36)	4.53 (1.31)	-0.17 (-0.36, 0.01)	4.46 (1.09)	4.44 (1.17)	-0.02 (-0.19, 0.14)

\*p<0.05, \*\*p<0.05, \*\*\*p<0.001, <sup>a</sup>n=7, <sup>b</sup>n=1. cN=8

Table 3: Analysis of PNI towards factor and parameter associated using Generalized Estimating Equation (GEE)

Variable	Overall		Referred		Not-Referred	
	β (95%CI)	p-value	β (95%CI)	p-value	β (95%CI)	p-value
Dietitian						
Referred	0.52 (-0.54, 1.58)	0.336				
Not referred	1					
Gender						
Female	-1.01 (-2.07, 0.05)	0.061	-0.74 (-2.24, 0.76)	0.334	-1.28 (-2.77, 0.20)	0.090
Male	1		1		1	
Ethnicity						
Malay	0.53 (-0.70, 1.75)	0.398	-0.47 (-2.31, 1.38)	0.620	1.11 (-2.30, 4.52)	0.523
Indian	0.59 (-1.39, 2.57)	0.561	0.10 (-1.93, 2.13)	0.924	-	
Others	1.78 (0.56, 3.01)	0.004	0.83 (-0.83, 2.50)	0.328	1.58 (0.05, 3.11)	0.043
Chinese	1		1		1	
Diabetes mellitus						
Yes	-1.00 (-2.07, 0.07)	0.068	-1.00 (-2.67, 0.68)	0.243	-1.23 (-2.69, 0.23)	0.099
No	1		1		1	
Hypertension						
Yes	-1.49 (-3.12, 0.14)	0.074	-2.45 (-5.49, 0.59)	0.115	-0.88 (-2.62, 0.86)	0.322
No	1		1		1	
Hypercholesterolemia						
Yes	-0.48 (-1.58, 0.63)	0.398	-1.84 (-3.36, -0.32)	0.017	0.95 (-0.62, 2.51)	0.235
No	1		1		1	
Heart disease						
Yes	0.03 (-1.42, 1.47)	0.973	1.03 (-0.96, 3.01)	0.312	-1.07 (-3.05, 0.91)	0.289
No	1		1		1	
Body Mass Index						

Variable	Overall		Referred		Not-Referred	
	$\beta$ (95%CI)	p-value	$\beta$ (95%CI)	p-value	$\beta$ (95%CI)	p-value
Underweight	1.19 (-2.40, 4.77)	0.516	0.05 (-4.52, 4.62)	0.984	3.81 (-0.77, 8.38)	0.103
Normal	0.16 (-1.55, 1.86)	0.858	0.67 (-1.28, 2.62)	0.502	-0.14 (-3.58, 3.29)	0.934
Overweight	0.83 (-0.85, 2.52)	0.333	0.92 (-1.07, 2.92)	0.365	1.06 (-2.33, 4.45)	0.540
Obese	1	1	1	1	1	1
Age	0.01 (-0.04, 0.06)	0.618	-0.01 (-0.09, 0.07)	0.798	0.02 (-0.04, 0.08)	0.463
Body Mass Index	-0.02 (-0.14, 0.10)	0.751	-0.04 (-0.19, 0.11)	0.611	0 (-0.2, 0.21)	0.970
Total Protein	0.13 (0.06, 0.20)	<0.001	0.17 (0.06, 0.27)	0.003	0.11 (0.02, 0.21)	0.023
Albumin	0.80 (0.69, 0.90)	<0.001	0.80 (0.67, 0.93)	<0.001	0.79 (0.64, 0.95)	<0.001
Urea	-0.09 (-0.22, 0.04)	0.191	-0.09 (-0.25, 0.07)	0.260	-0.16 (-0.30, -0.02)	0.023
Creatinine	-0.01 (-0.01, <-0.001)	0.007	-0.01 (-0.02, <-0.001)	0.010	-0.01 (-0.01, <-0.001)	0.044
Potassium	0.49 (-0.08, 1.06)	0.093	0.24 (-0.58, 1.06)	0.564	0.73 (0.02, 1.43)	0.043
Phosphate	-1.13 (-2.23, -0.02)	0.046	-4.67 (-7.25, -2.08)	<0.001	0.12 (-0.87, 1.12)	0.809
Uric Acid	0.00 (-0.01, 0.00)	0.214	-0.01 (-0.01, <-0.001)	0.043	0.00 (0.00, 0.01)	0.640
Fasting Blood Sugar	-0.12 (-0.26, 0.03)	0.119	-0.05 (-0.18, 0.08)	0.428	-0.36 (-0.82, 0.10)	0.126
HBA1C	0.19 (-0.61, 0.98)	0.644	0.93 (-0.65, 2.51)	0.247	-0.11 (-1.10, 0.89)	0.831
EGFR	0.03 (0.00, 0.06)	0.025	0.05 (0.01, 0.09)	0.013	0.03 (-0.02, 0.08)	0.241
Total Cholesterol	-0.26 (-0.61, 0.10)	0.155	-0.29 (-0.75, 0.17)	0.222	-0.22 (-0.76, 0.32)	0.430

Table 1 showed a total of 300 patients were finally recruited after considering the inclusion and exclusion criteria. There was equal distribution of respondents between gender (50%) with Malay ethnicity being the majority (48.7%). Most respondents had comorbidities such as diabetes (56.5%), hypertension (51.6%) and high cholesterol (48.5%). Most of the respondents were obese (68.7%).

Results from Table 2 showed significant association ( $p<0.05$ ) for variables such as PNI, hemoglobin, total protein, albumin and urea. There was positive improvement for PNI scoring, hemoglobin, total protein, albumin. There was also reduction in urea, potassium, phosphate, uric acid, fasting blood sugar and total cholesterol among referred patients to dietitian.

Results from Table 3 showed significant association of PNI with hypercholesterolemia ( $p=0.017$ ), albumin ( $p=0.003$ ), total protein ( $p=0.003$ ), creatinine ( $p=0.01$ ), phosphate ( $p<0.001$ ), uric acid ( $p=0.043$ ) and eGFR ( $p=0.013$ ) among patients referred to dietitian. No significant association was noted between BMI and PNI.

## DISCUSSION

To the best of our knowledge, this is the first study that has been done in Malaysia involving MNT and its effect on improvement of PNI scoring. Besides improvement of PNI scoring, clinical implications of our findings is that delivery of MNT by Dietitians showed improvement in chronic kidney disease and its related parameters such as fasting blood sugar, urea, total cholesterol and albumin.

Improvement of variables such as hemoglobin, albumin, phosphate and total protein was very much relayed to the adequate protein that was provided during dietary counseling (12). A low protein diet helped improved and lower down the urea levels of respondents (13,14). A plant dominant diet generally reduces uremic levels in the body (12,13,14). The low protein diet is beneficial, because they reduce the production of protein-derived waste products, the retention of protein-derived toxins and fixed acids, lower single nephron glomerular hyper filtration and proteinuria, and reduce dietary phosphate load (15). Since albumin levels had increased significantly, this might had contributed to the improved scoring of PNI.

Improvement of fasting blood sugar and total cholesterol in general was attributed by the adequate fiber intake (13-14). This plant based diet helps to regulate lipids and achieve better glycemic control among diabetic nephropathy patients (13-14). The KDOQI 2020 guidelines also emphasized on interventions using omega 3 and 6 fats for better lipid control (12). A reduction of saturated fatty acids (SFA) and trans-fat intake contributes to a reduction in risk of cardiovascular disease in patient which is part of the KDOQI 2020 guidelines (12).

In CKD clinics, medical nutrition therapy (MNT) should be emphasized and requires the same level of importance as pharmacological treatment (16). In this study, we would like to highlight that MNT should be a cornerstone of the management of CKD as well as of other chronic diseases. Provision of MNT for pre dialysis patients has proven evidence of delaying the need for dialysis (17,18). All patients regardless of stages of chronic kidney disease should be referred to dietitian for better disease management and patient outcome.

Limitations of our study was that it has a small sample size and it was a single center study. A prospective intervention study with larger sample size would yield stronger clinical results. The main strength of our study was that the results were similar and consistent with other studies that indicates the effectiveness of MNT in patients' nutritional status. Future studies on effectiveness of PNI in improvement of patient survival should be considered. A cohort study specially designed to determine whether a high PNI scoring can delay the need for dialysis or delay the progression of kidney disease among Malaysian CKD patients.

### Conclusion

Results of current study suggests that medical nutrition therapy is an important aspect of management for chronic kidney patients. Patients with improved PNI scoring showed better nutritional status compared to those patients who did not receive dietary consultations from dietitians. Further study with large coverage may give a concrete or better results in future.

### Conflict of Interest

The investigators declared they had no conflict of interest

### Publication Policy

No personal information was disclosed when the findings of the survey were published. Manuscript were submitted to National Institutes for Health, Malaysia for Director General's approval prior to any publication and presentation.

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## **Special Report: Asian Young Dietitian Network**

### **Introduction of AYDN activities: Participation at the Thai Dietetic Association Conference**

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Thai Dietetic Association (TDA) held the annual conference on April 28th-30th 2024 at Bangkok, Thailand, marking TDA's 50th anniversary, was a special event themed "Application of Diet Therapy into Lifestyle Medicine: What We Should Know." It provided an excellent opportunity for engagement with leading dietitian practitioners and academics. The

conference was attended by representatives from Thailand's Health Ministry, the Asian Federation of Dietetic Associations, the Japan Dietetic Association, and dietitian representatives from various Asian countries. The Asian Young Dietitian Network (AYDN) had the honor to be invited in this important event for TDA.



Fig 1. Photo of AYDN members at the Thai Dietetic Association Annual Conference 2024

The AYDN is a group of young dietitians from various Asian countries pledged to work collaboratively to enhance the status of dietitians in each country and the recognition of societies towards dietitians' careers. The network was established following the workshop "Let's Talk about the Future of Young Dietitians in Asia" at the Asian Congress of Dietetics in Yokohama, Japan, in 2022. With concern about the future of dietitians, Prof. Shigeru Yamamoto from Jumonji University yearns to establish a core group of dietitians and nurture them to become the future leaders of dietitians in the region. With the support of Ajinomoto Co., Inc., on December 1, 2023,

a successful kick-off meeting was held in Tokyo, Japan, which brought 20 dietitians from 12 Asian countries. In the meeting, all members of AYDN agreed to work towards the three main objectives: 1) Sharing information and experiences about participants' country nutritional issues and experiences they have which could contribute to other participants, 2) Conducting researches and publish them to an academic journal (such as Asian Journal of Dietetics) to increase skills in investigation and research to find the problems and solutions in a logical thinking. 3) Carry out webinars and workshops to increase scientific and non-scientific knowledge.

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In 2024, a total of 21 AYDN members participated in the TDA conference. They were from Bangladesh, Bhutan, India, Indonesia, Japan, Malaysia, the Philippines, Sri Lanka, Taiwan, Thailand, and Vietnam. AYDN members, dressed in their traditional clothing, showcased their cultural heritage, unified in their goal to advance dietetics.

In the opening ceremony, Prof. Chanida Pachotikarn from Mahidol University and president of the Thai Dietetic Association, delivered the presidential speech, emphasizing the importance of updated nutrition education and the future of dietitians. On the other hand, various organizations and institutes presented research awards to encourage more research in the dietetic field. Prof. Shigeru Yamamoto's guest lecture on "What Dietitians Need for the Future: Evidence-based Dietetics" highlighted the use of technology and creative cooking in daily practice, urging dietitians to publish more researches, especially for those who work in hospital. The challenge is not easy, however, it is a way to enhance the respect dietitians work.

### **Goal of AYDN symposium**

The 50th anniversary of the TDA marked a significant milestone with the symposium section held by the AYDN, themed "Exploring the Landscape of Nutrition and Dietetic Training Program: A Comprehensive Study Among Asian Young Dietitians Network Member Countries." The symposium commenced with Ms. Nguyen Thu Trang from Vietnam and Ms. Andrea Wakita (Ajinomoto Co., Inc.) introducing the establishment of AYDN and unveiling the annual plan for 2024 to 2026. Esteemed speakers, including Mr. George from Malaysia, Mr. Tzu Yun Cha from Taiwan, and Mr. Prem Kumar from Bhutan, highlighted the symposium's three primary objectives: assessing the diversity of curriculums and educational

pathways, examining practical training opportunities for nutrition and dietetics students, and identifying strengths and areas for improvement in AYDN member countries' degree programs to become a registered dietitian. With the presence of several senior Asian dietitians at the conference, AYDN successfully communicated its mission to the participating young dietitians and garnered valuable insights and support from senior dietitians regarding the budding AYDN network.

### **Acknowledgement**

On behalf of AYDN, we express our deepest gratitude to TDA for the invitation and kind hospitality. We are thankful for the opportunity to present our research at such a significant event. Our appreciation extends to Professor Shigeru Yamamoto of Jumonji University for his long cherished dream, vision and dedication, which made our participation possible. We also thank Jumonji University for their support and Ajinomoto Co., Inc. for their sponsorship, enabling such as our face-to-face meeting at the TDA conference. This support is vital for our growth, and we are committed to continue our collaboration to reach the goals of the network.

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## Report (Bangladesh) on the Asian Young Dietitians Network Meeting in Thailand

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### Introduction

AYDN was established on December 1, 2023 with the general objective to elevate the status of Dietitians in Asian countries. We desire for such a society where people will trust dietitians, recognize, and respect their roles. To achieve that goal we have to take proper initiatives, our gathering in Thailand was a step towards the goal. We would like to extend our deepest gratitude to TDA for inviting us in their remarkable 50th anniversary. It was a great opportunity to meet, greet

and exchange ideas among young dietitians of 11 Asian countries under the umbrella of AYDN. We also got the rare opportunity to receive the affection and valuable directions from the respected mentors and senior Dietitians.

We also express our sincere gratitude to Professor Yamamoto for establishing AYDN and nurturing us towards success and honor. Moreover, our heartfelt gratitude goes to Ajinomoto Company for sponsoring us which is crucial for our development and growth.



Fig 1. Introducing ourselves and sharing Greetings to TDA members and participants (Tapati Saha: Left, Sumaya Islam: Right)

### Personal Reflections

The warm hospitality and generosity of TDA and Thai people have truly touched our hearts. From the moment we arrived we were greeted with open arms and treated with utmost kindness that gave us a homely and festive feeling. Thailand has a very rich food culture and its street food is really exemplary. Enjoying Thai cuisine together was a great experience for us specially Tom Yum Soup, Mango Sticky Rice with Coconut cream dessert, Rambutan and Dragon fruit. Thai food is unique, tasty, simple, easy to digest & healthy. We also realized that people of Thailand maintain religious ethics and respect others religious norms, it is really heart soothing and comfortable for all of us. The TDA Conference itself was enlightening and

the inspiring presentation from esteemed figures such as Prof. Yamamoto, Madam Mary Easaw, Dr. Teiji Nakamura, Dr. Chwang Leh Chii, Asst. Prof. Dr. Chanida, and Senior Dietitians showed us the next path of Asian Dietetic Profession and guided us about what we need for the future.

While delivering his special lecture, Professor Yamamoto explained with examples what we dietitians need to think about what we should do so that the importance of Dietitians role is recognized. With his wisdom, he pointed out what are our challenges and how we can overcome it. His lecture is eye opening and very motivational for us. He showed a figure about the authors of journal articles in clinical nutrition, unfortunately there are very few Dietitians as authors.

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Fig 3. AYDN members enjoying dinner together

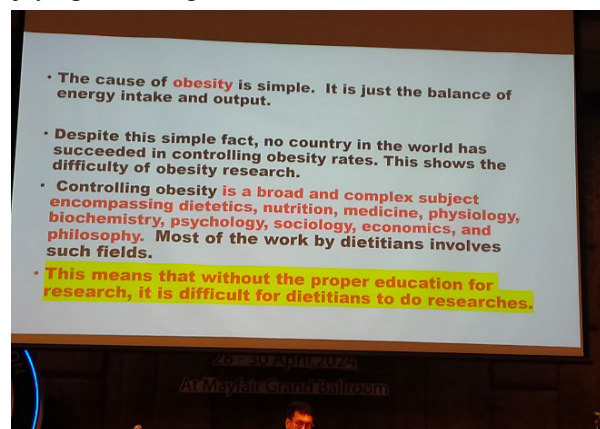
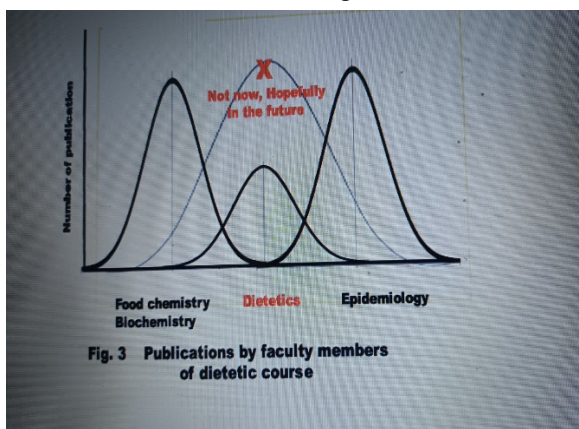


Fig 4. Less publications from faculty members of dietetic course and important messages from Prof. Yamamoto

We must focus in this area and try our best to change the scenario. He also mentioned that we need proper education for research. Prof. Yamamoto believes that the cause of obesity is simple. It is just the balance of energy intake and output despite this simple fact, no country in the world has succeeded in controlling obesity rates. Controlling obesity is a broad and complex subject encompassing dietetics, nutrition, medicine, physiology, biochemistry, psychology, sociology, economics & philosophy. This means that without the proper education for research, it is difficult for dietitians to do research. He also showed examples of Dietitians research. One example was modifying the school lunch. With almost the same price how more nutrients were added in the school lunch and it became healthy. Moreover the children liked there new food and ate with smiling face. The other one was use of full automatic rice cooker which is certainly food for thought.

Madam Mary Easaw's passion to her profession inspired us. Among many important messages she highlighted on culinary skills which is very essential for dietitians. She encouraged to modify traditional and festival recipes in healthy ways. We also got some precious Take Home Messages, like, collaboration with continuity, devotion with empowerment and professionalism with qualification from Dr. Chwang Leh Chii.

Dr. Teiji Nakamura motivated dieticians and AYDN members to continue pursuing excellence in the nutrition and dietetics field. Dr. Nakamura wants to unify the Asian dietetics system with ICDA standards and also focuses on quality assurance by training courses for dieticians and expansion of postgraduate education for dieticians. Moreover, he highlighted sustainable healthy diets, body, and planet friendly diet with the emphasis on reduction of environmental impact. If the advices provided from our mentors can be implemented, there will be a new era for dieticians and dietetics.

Moreover, we also gained lots of valuable ideas from our AYDN member friends, because they are working as dieticians in diverse settings, which is not yet common in our country. For example, dietitians working in community level, schools etc. and contributing in the various areas of the society. We are hopeful that we can also implement these ideas in our country and our working places.

### Bachelor of Nutrition program

In Bangladesh our Bachelor of Nutrition Program is not unified in all the institutions. However we can notice gradual improvement in the curriculum. There are strengths and weaknesses as well. About the strengths, we have 4 year long BSC programme which consist of coursework combined with Hospital/NGO,

Food Industry internships. The curriculum focuses on Research methods, Research project, Field assignment. Furthermore our present curriculum includes new areas like food technology, We have many areas of improvement also.

In Bangladesh we need certified programmes in specialized areas. The curriculum does not include dietician’s training programme. Moreover number of Professors or faculty members who are dietitians is very low.

**Insights gained and Action Plan to Foster AYDN in the Future**

TDA was an excellent learning platform for dietitians. From our wise mentors we are inspired that we should be devoted to our work, acquire several essential skills, we have to be innovative and do quality research work and publication. We should think more to understand our shortcomings and accept the challenges for our professional growth. We should expand our network and learn from each other.

We have learned a lot from our fellow AYDN members too, as they have knowledge and skills on various areas of dietetics. They possess sound knowledge on school lunch, culinary skill, analytical skill, nutrition for autistic children etc. We can learn from each other and share the ideas in our country so

that our people also get these services at wide level. For example, school healthy tiffin or lunch program is not regular and does not cover vast area in Bangladesh, we will try to start these programs in various schools, it will contribute in the physical and mental development of our school children.

Currently AYDN is assessing the BSc in Nutrition curriculum among the AYDN member countries. The assessment provides a comparative scenario, where we can observe the diversity and understand the strengths and weaknesses of the education system of different member countries. From the research result each country can find out their area of improvement. For example, there is no national examination for graduates to be registered dietitian in Bangladesh; we have to work in this area.

For the development of AYDN, firstly we have to love our profession by heart. Strong bonding and understanding among AYDN members is also important. Furthermore, we have to earn necessary knowledge and skills. We should emphasize on necessary research work in dietetics and publish quality research work. We believe that if we work together with determination success is not far

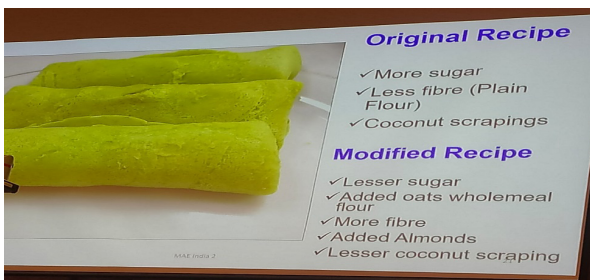


Fig 5. Modifying traditional snacks to healthy snacks by Madam Mary Easaw

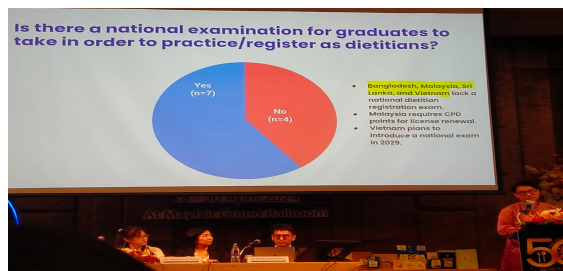


Fig 6. No opportunity for Graduates to be Registered Dietitians in Bangladesh yet

# Report (Bhutan) on the Asian Young Dietitians Network Meeting in Thailand

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## Introduction

The Young Asian Dietitian Network (AYDN) was founded in the beginning 2022 and has been just able to conduct some online meetings to strengthen the network amongst the dietetic professionals in the member countries (11 Asian countries). The network aims to establish a reliable and accessible platform for exchange of knowledge, skills and jointly conduct researches in the areas of Nutrition and Health.

The AYDN have been doing a comparative study on the curriculum of Dietetic training programs across the member nations and the same was presented during the 50th Anniversary of Thai Dietetic Association (TDA) which was held in Bangkok from 28 to 30th April, 2024.

The opportunity to introduce and meet different professionals among the network at such an established forum was only possible with the generous support from TDA and Ajinomoto. We were invited to attend the 50th TDA anniversary meet and travel was supported by Ajinomoto Company's. Professional guidance and support from esteemed Professor Yamamoto was instrumental in making a meeting a success as he was involved in securing financial support and logistic arrangement.

## Personal Reflections

Initially the Bhutanese team was a bit apprehensive as we have not travelled much to Bangkok and have known Thai people but to our surprise we found almost all the Thai people we encounter were very humble, loyal and friendly that has given us much confidence and added comfort during our stay there. Besides that, TDA in particular was found so supportive and considerate in accommodating and accepting all our needs particularly to do with attending meeting and letting us to introduce AYDN and lastly in showcasing our work done thus far to all the attendees of TDA meeting. On the other note, it was very good to see that Thailand has very rich dietary diversity extending from sea foods to seasonal fruits and vegetables.

We could also learn so much insights both professionally and personally from the presentations made by scholars like Prof. Yamamoto, Madam Mary, Dr. Teiji Nakamura, Prof. Chanida and of courses from all other esteemed presentations on latest advancements in the field of diet and nutrition for the global population. The insights gained especially in the areas of diet and nutritional research enabled us to engage in clinical researches at our work places once we get back to the country respective work places.

## Bachelor of Nutrition program

Currently Bhutan does not have any institute/college/ university offering any level of diet and nutrition training. All the Dietitians working in the country have mostly completed bachelors in Nutrition and Dietetics from India, Thailand and a few from other countries. In Bhutan, dietitians are regulated by Medical and Health Professionals Council, a body further governed by Bhutan Qualifications and Professionals Certification Authority functioning under the Ministry of Education and Skills Development, Royal Government of Bhutan. No dietitians are allowed to practice, without getting registered with the council be it in the academia or in the clinical setups.

## Action Plan to Foster AYDN in the Future

Meeting at Thailand, Bangkok was an eye opening for all of us (Bhutanese) as we have hardly attended such regional meetings/ conferences on diet and nutrition alone, that too organized by the dietetic professionals. The very meeting enabled us to exchange information on dietetic practices across member countries and it also served a great platform for exchange of knowledge and skills amongst the fellow dietitians. The meeting and the presentation particularly by AYDN on curriculum comparative study, for Bhutan it equipped us to go for the best dietitian training programs practiced in countries like Thailand, Malaysia, Japan and Philippines when in future Bhutan aspires to start training programs for dietitians.

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# Report (India) on the Asian Young Dietitians Network Meeting in Thailand

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## Introduction

The Young Asian Dietitian Network (AYDN), established in early 2023, embarked on a mission to strengthen the ties among dietetic professionals across 11 Asian countries. Through online meetings, AYDN aims to foster a platform for the exchange of knowledge, skills, culinary, cultural habits, and collaborative research in the domains of Nutrition and Health. The first successful study was of Cuisine and food culture understanding, Dietitian's presence in the community, and an overview of Diseases in the country presented in Japan on December 2023. The Second initiative AYDN includes a comparative study on the curriculum of dietetic training programs across member nations. This study culminated in a presentation at the 50th Anniversary of the Thai Dietetic Association (TDA) in Bangkok from April 28th to 30th, 2024.

## Acknowledgments

We as AYDN are in deep appreciation for Professor Yamamoto's guidance. He continues to play a pivotal role in ensuring the success of the Asian Young Dietitian Networking enabling unity, Friendship, Scientific exchange, and Cultural and Culinary Understanding among members from Asian Countries. The generous support from Ajinomoto to propel AYDN from its inception is highly appreciated. 50th. Unmatched hospitality was truly. TDA anniversary provided an invaluable opportunity for AYDN to showcase its work and interact with professionals from diverse backgrounds. The deep dive into Thai Cuisine, culture, and Hospitality was highly appreciated. TDA's support in accommodating our needs and facilitating introductions enhanced our sense of belonging

**Personal Reflections:** The experience in Bangkok was enriching on both professional and personal fronts. Our Thai colleagues were extremely humble, friendly, and immaculate in the organization leading to seamless learning. Moreover, Thailand's rich dietary diversity left a lasting impression, offering insights into regional nutrition practices. The presentations by esteemed scholars like Prof. Yamamoto, Madam Mary Esow, Dr. Teiji Nakamura, Dr Chawng Leh Chii, and Prof. Chanida provided valuable insights into the latest

advancements in diet and nutrition research. These learnings not only broadened our professional horizons but also inspired us to engage in clinical research upon our return. Easy to execute research proposal with significant impacts on communities was a great learning, One particular example that I want to elaborate on is a research study quoted by Dr Yamamoto-Where he explained the change in form of cutting vegetables from coarse to fine and smaller pieces and easy to chew for young school going children greatly increased consumption, making the meal enjoyable -hence no wastage and better nutritional status among school children.

## Study on Bachelor of Nutrition Program of different countries.

Every member nation representative presented their unique data of Bachelor programs. It encompassed Subjects of Basic Science and Nutrition. Also Number of hours and credits devoted to subjects in the syllabus. The study also evaluated Trainers, and instructors- specifically scientists, clinical dietitians, food service managers, food technologists, Nurses, Doctors, and others. The study also attempted to understand the role of Regulation by the Medical and Health Professionals Council standards set by the country Qualifications and Professionals Certification Authority, mandating registration for practice in academic and clinical settings. In India, the Dietetic Association is under the Allied Health Council of the government. This was an interesting activity as we realized that every Institute even in India had varied and unique subjects and Syllabus. Lack of Standardization was seen across curriculum across member nations.

## Action Plan to Foster AYDN in the Future

The TDA anniversary catalyzed future endeavors within AYDN. The exchange of information on dietetic practices among member countries highlighted the need for continued collaboration. AYDN's presentation on curriculum comparison provided valuable insights for India's future endeavors in establishing dietitian training programs, drawing from best practices in countries like Thailand, Malaysia, Japan, and the Philippines. In conclusion, the 50th TDA anniversary was a transformative experience, reaffirming AYDN's commitment to advancing the field of dietetics in Asia through collaboration, knowledge exchange, and collective growth

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# Report (Indonesia) on the Asian Young Dietitians Network Meeting in Thailand

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## Introduction

To mark a significant milestone, the 50th anniversary of the Thai Dietetic Association (TDA), the Asian Young Dietitian Network (AYDN) participated in a series of events organized by the TDA. Among the twenty AYDN members who attended the events held in Bangkok, Thailand, at the end of April 2024, two Indonesian representatives, Achmed Forest Khan and Nur Ayu Ruhmayanti, actively participated in the symposiums, the AYDN meeting, and other events. This event served as an excellent platform for Asian dietitians and Thai dietitians to foster mutual understanding and cooperation. It was particularly fruitful in sharing insights on nutrition and dietetics education at the undergraduate level in Asian countries. The event also facilitated a discussion session for the young dietitians to strategize future activities of AYDN.

We would like to thank the TDA for their invaluable support in making this event possible. We also sincerely appreciate the generous sponsorship from Ajinomoto Co., Inc. Last but not least, we would like to express our sincere thanks to Prof. Shigeru Yamamoto of Jumonji University for his unwavering dedication and support since the inception of AYDN. Your contributions have been instrumental in our journey.

## Personal Reflections

One of the event's highlights was a thought-provoking lecture by Prof. Shigeru Yamamoto of Jumonji University, who shared insights on the dietary standards of Japan, as well as the challenges and opportunities faced by dietitians in Japan. His lecture included a practical example of food modification, where several food ingredients were added to school children's lunch menus to enhance their nutritional value. This modification, it is hoped, will lead to improved academic performance among school children without significantly increasing the menu cost. All the presenters delivered their material with outstanding clarity and received high praise from the entire audience and all the parties involved in the series of activities commemorating the TDA. AYDN Meetings are usually held online, but on this occasion, they were held onsite. On this occasion, we discussed the follow-up to the delivery of study results from the dietitian education system of each AYDN member country. After this activity, it is hoped that all AYDN

members will be directed to convey the study results back to the relevant parties in their respective countries to become discussion material to improve the quality of dietitian education in each AYDN member country. AYDN's activities continue to enhance the reputation of dietitians, which is in line with the primary goal of AYDN. For the next step, we will discuss the legal system and its application to the world of work for dietitians. On that occasion, we also agreed on the official logo for AYDN and the management structure of AYDN, which consists of a coordinator and secretary as well as other supporting roles so that AYDN can run better and provide more significant benefits to the progress of the Asian Dietitian profession, especially AYDN member countries.

Together with AYDN Thai members, TDA and Ajinomoto Co., Inc. have provided us with the warmest hospitality. Our members have gratefully enjoyed the halal Thai cuisine, the beautiful scenery, and the rich culture of Thailand during our stay in Bangkok. With the AYDN members from other countries, we have shared the diverse Asian culture during our companionship. Together, we celebrated not only the 50th anniversary of TDA but also the eclectic culture of Asia.

We were deeply inspired by Prof. Yamamoto's dedication and passion, the Thai dietitians' diverse perspectives, and the innovative ideas shared by the AYDN members. This experience has reinforced our belief in the importance of international collaboration and knowledge sharing in advancing the field of dietetics in Asia.

## Bachelor of Nutrition program

We collect data on dietitian education based on regulations from the Association of Indonesian Higher Education Institutions for Nutrition (AIPGI) as a reference for universities providing dietetic education and the Association of Higher Education Institutions for Vocational Nutrition in Indonesia (AIPVOGI) as a reference for vocational colleges providing education for dietitians in Indonesia. After holding discussions with representatives from other countries, it was agreed that the data from Indonesia used dietitian education at universities ranging from undergraduate education to professional dietitian education<sup>1</sup>. There are differences in the undergraduate education system based on the AIPGI and AIPVOGI references; however, dietitian professional education is similar to the professional

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education administration system based on these two references.

Among the 118 universities that provide Bachelor of Nutrition education and nine institutions providing professional dietitian education in Indonesia, an institution was selected as a reference for the Bachelor of Nutrition and professional dietitian education

curriculum. A curriculum example of a Bachelor of Nutrition education was obtained from Brawijaya University, under the Ministry of Education, Culture, Research, and Technology (Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi)<sup>2</sup>. For professional dietitian education, the curriculum of Makassar Health Polytechnic of the Ministry of Health was referred to.



Fig 1. Halal dining and heartfelt hospitality of the Thai Dietetic Association



Fig. 2. Breathtaking scenery of Bangkok we enjoyed with young dietitian fellows of Asia

Indonesia's undergraduate nutrition education curriculum has approximately 150-175 credits for undergraduate programs and professional education for dietitians. Each credit is equivalent to 170 minutes and

consists of theory (onsite), practice, independent learning, or other forms of learning. The professional dietitian education curriculum comprises 26 practical credits, equivalent to 1032 practical hours in one year

of dietetic internship education (2 semesters). The duration of the dietetic internship hours exceeds the 500-hour standard set by the International Confederation of Dietetics Association (ICDA)<sup>3</sup>.

Several courses are also the focus of our discussion. In Indonesia's Bachelor of Nutrition curriculum, there are still many general courses that students must take. On the one hand, several nutrition courses are elective courses, such as food microbiology, sports nutrition, nutrition program planning, and other elective courses, while in different countries are core courses in undergraduate nutrition education. This will be one of the things that needs to be discussed with nutrition education organizers in Indonesia.

Teaching resources in Indonesia are diverse. The teaching staff consists of nutrition staff themselves, both dietitians and nutritionists, doctors, nurses, midwives, environmental health, and public health, and the teaching staff may come from outside the field of science, such as science, food technology, and even teaching staff from the legal field are also covered inside it. As for the professional education program (dietetic internship), all clinical instructors come from dietitians for clinical and public health programs. For food service management programs, there are other

staff from food technology, human resource management, catering services, and nutrition and food services entrepreneurs.

#### **Action Plan to Foster AYDN in the Future**

For instance, we discussed the extent of practical training in dietetics education, the need for an updated curriculum reflecting the latest research, and the role of technology in enhancing nutrition and dietetic education corresponding to nutrition issues in Asia. In Indonesia, improving nutrition and dietetic education must address the needs of different communities across the archipelago. We must enhance the curriculum to equip our graduates, the future nutritionists and dietitians, with skills for local nutritional interventions.

In the future, we suggest that AYDN organize more symposiums, workshops, and exchange programs to improve its members' knowledge and skills. We also aim to strengthen our collaboration with other dietetic associations and organizations to promote the field of dietetics in Asia. We hope that activities like this can continue and produce the best ideas to increase the competence of young dietitians worldwide, especially young dietitians in Asia.

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# Report (Japan) on the Asian Young Dietitians Network Meeting in Thailand

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At the symposium held at the Thai Dietetic Conference in Thailand, the Asia Young Dietitian Network (AYDN) introduced a comparative study of dietitian academic and training programme from the members' countries. There were differences in the programmes among countries, and it was able to find advantages and disadvantages in each country. Through the gathering of AYDN's members in Thailand, the goal was to share and deepen the education system of each country to understand the current situation to improve the education system of each country in the future.

At the TDA conferences, we it was able to listen to Prof. Shigeru Yamamoto's lecture (Jumonji University) about "What dietitians need for the future: Researches at their workplace". The author agree that Japanese university system for dietitians do not place emphasis on investigation of methodology. However, the study of dietitians in their workplaces introduced by Prof. Yamamoto was very interesting. One of the example was the cooking area for the preparation of school lunch with the incorporation of new technologies to improve dietitians' work environment in Japan and another example was the challenge for dietitians from Vietnam to increase variety of vegetables and other nutritious foods added in school lunch meals keeping a low cost. These cases were published in an academic journal in order to spread to other colleges the information which would be very useful because it has many similarities with the problems faced by other dietitians in the world. Unfortunately in Japan, the researches are only reported within a particular community or region and there are few opportunities to refer them. Therefore, the author believe that dietitians should disseminate the results of their researches outside the community.

On the other hand, during the conference, it was possible to interact with the members of AYDN, which was very inspiring. The sharing of educational programs from various countries through AYDN activities would help to identify differences between own and other countries, and provide an opportunity to reconsider our the educational programs for the next generation of dietitians. Furthermore, in countries that do not yet have an established dietitian system, it may help to create educational programs. By cooperating and working together in the network, it is possible to contribute not only in Japan but also in Asia as a whole for a better academic system. Lastly, but not the least, the author would like to acknowledge to the warmth welcome and the hospitality of Thai Dietetic Association (TDA) for giving the change to be present

in the conference and to Jumonji University for the preparation of the trip and the support and valuable comments from Prof. Shigeru Yamamoto to guide the AYDN and the sponsor from Ajinomoto Co., Inc. This trip allows to the author to experience the treat of dietitians of other countries, such as the participants of TDA, and also to experience the food culture of Thailand, such as the "Khow niew ma-muang", which combine cold sticky rice, coconut milk and ripe mango. Event that it was sweet, it was refreshing to eat when it was around 40 celcius degree in Thailand. In Japan, it is common to combine rice with sweet beans, but not with fruits, which made this dish interesting.



Fig 1. Khow niew ma-muang

## Bachelor of Nutrition program

Through the discussions at AYDN, it was able to identify the characteristics of Japan's dietitian training programme. Japan's dietitian training programme has a general framework, but not in detail comparing with other countries. Therefore, the number of faculty members and the types of courses offered differ from university to university in Japan. The fact that educational programme are not defined in detail is a strength of the Japanese educational programme.

In Japan, dietitians work in a wide range of workplaces, including not only hospitals, but also public health centers, private institutions, schools, and restaurants. Therefore, the flexibility of the curriculum allows students to learn about matters in the field that interest the undergraduate students while acquiring the necessary knowledge as a dietitian. Another strength is the curriculum to obtain the nutrition teacher's license. A nutrition teacher is a position that combines the qualities of both, a dietitian and a teacher. The nutrition teacher system began in Japan in 2005. This licence allows dietitians to play a central role in promoting nutrition education in school. The curriculum for

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nutrition teachers includes various subjects such as child development, psychology, and educational methods. On the other hand, one of the weakness of Japan's dietitian training programs is the short time for practical training comparing to other countries. One of the reasons is the busy schedules of dietitians in their workplace. When it comes to accepting training students, dietitians have to supervise the students in addition to their regular tasks. However, it is not only a problem in Japan that dietitians are busy. Therefore, we should learn more about the situation from other countries to improve the Japan's dietitian training programme.

#### **Action Plan to Foster AYDN in the Future**

Through the TDA conference, it was possible to learn the long history working together the Asian countries. The Asian Federation of Dietetic Associations, AFDA, was created in Malaysia in 1991. At the time of its founding, there were nine member

countries, including Japan, but now twelve countries are members. Nowadays, the Internet has become widespread, which able to organize meetings and sending messages anytime, and anywhere. It makes possible to easily transmit and receive information to and from people around the world. The young dietitians should cooperate with pioneers of AFDA.

As part of the future development of AYDN, its need to learn more about each country. The kick-off meeting helped us to understand each other's culture and general nutritional situation. However, learning more in details about the nutritional situation of each country, its able to share appropriate information to each problem. Although Asian countries have great differences such as in history, food culture and climate, the nutritional problems they face are similar. What is adaptable in one country may be adaptable in another. The hope is that this network will usher in a solution to Asia's nutritional problems by improving the education system of each country to enhance knowledge of dietitians.

# Report (Malaysia) on the Asian Young Dietitians Network Meeting in Thailand

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## Introduction

The goals of the Asian Young Dietitian Network (AYDN) for this gathering in Bangkok, Thailand, in conjunction with the Thai Dietetic Annual Conference, are to foster collaboration, share knowledge, and strengthen the network of young dietitians across Asia. This event aims to enhance professional development, elevate the standards of nutrition practice in the region, and present insights from our research on the dietetic education system among AYDN member countries.

We gratefully acknowledge the hospitality and generous support from the Ajinomoto company. Special thanks to Prof. Yamamoto and TDA for sponsoring AYDN's activities, ensuring a successful and enriching experience for all participants.

## Personal Reflections

During our time in Thailand, we were deeply moved by the warmth and hospitality extended by the Thai Dietetic Association and the locals in Bangkok. The vibrant Thai cuisine, delightful street food, and rich food culture left a lasting impression.

The TDA conferences were particularly impactful, featuring inspiring presentations from esteemed figures such as Prof. Yamamoto, Madam Mary Easaw, and Dr. Teiji Nakamura. Their remarkable careers serve as powerful motivation for dietitians and AYDN members to pursue excellence in the field of nutrition and dietetics.

Interactions with fellow AYDN members were enlightening. The exchange of ideas and experiences provided valuable insights that we can apply to our work upon returning home. Discussing the education and working systems from different countries highlighted the diverse approaches to nutrition and dietetics, emphasizing the importance of a collaborative and inclusive network.

## Dietetics Program in Malaysia

Dietetics education in Malaysia is governed by rigorous standards to ensure the competence and professionalism of dietitians. Aspiring dietitians must complete a bachelor's degree in Dietetics or Nutrition and Dietetics from a recognized university, encompassing extensive coursework coupled with a mandatory clinical internship. These programs must be accredited by the Malaysian Qualifications Agency (MQA) and recognized by the Ministry of Health. Currently, there are 9 universities in Malaysia offering dietetics programme that is designed in accordance with

the Programme Standards: Medical and Health Science provided by MQA.

The Programme Standards document provides guidelines for minimum acceptable practices in various aspects of educational programs, including aims and learning outcomes, curriculum design, assessment, student selection, academic staff, resources, program monitoring, leadership, governance, and quality improvement. It does not specify detailed characteristics for curricula or educational resources, instead encouraging diversity and innovation. This allows programme providers to customize their offerings to create unique niches while ensuring graduates meet professional and societal needs.

In dietetics, this Programme Standards document aims to train dietitians to, at least but not limited to, understand food science, interpret nutrition science, assess people's nutritional needs, conduct diet counseling, prescribe diets for medical conditions, implement and manage nutrition services and health promotion programmes, undertake research, deliver evidence-based nutrition care, and undertake development of nutrition and dietetic policies. The document also states 136 credits as the minimum graduating credits for a bachelor's degree in dietetics, in which it should offer supervised professional placement with 28-30 credits (equivalent to 1,120 to 1,200 hours). Supervised professional placement consists of clinical, community dietetics, and food service settings. In the other words, aspiring dietitians are given opportunities to access various settings including government facilities to fulfill the placement requirement, gain experience and advance professional practice.

## Action Plan to Foster AYDN in the Future

From the Thai Dietetic Conference and interactions with other AYDN members, we have learned the importance of continuous professional development and the value of a supportive network. Applying this knowledge, we aim to advocate for more structured specialization programs and increased international collaboration in Malaysia's nutrition education.

AYDN can significantly improve the undergraduate Bachelor of Nutrition program in Malaysia by facilitating knowledge exchange, providing access to international best practices, and offering professional development opportunities. For the future development of AYDN, we propose the following ideas:

1. Establish Mentorship Programs: Pairing experienced dietitians with young professionals to guide their career development.

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2. Promote Research Collaborations: Encouraging joint research projects among AYDN members to address regional nutrition challenges.
3. Expand Training Opportunities: Organizing workshops and training sessions on specialized topics to enhance the skills of young dietitians.

By implementing these initiatives, AYDN can continue to foster excellence and innovation in the field of nutrition across Asia. We hope that AYDN member countries will continue to work closely together, learning from and helping each other to grow, upskill, and improve the standards and recognition of dietitians in the region.

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Fig 1. AYDN Malaysia Representatives Mr. Ng Kar Foo (left) and Mr. Georgen Thye (middle) receiving a souvenir from Prof. Dr. Chanida Pachotikarn, President of the Thai Dietetic Association (right).

## Report (Philippines) on the Asian Young Dietitians Network Meeting in Thailand

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The members of the Asian Young Dietitian Network (AYDN) were invited by the Thai Dietetic Association (TDA) to attend its 50th Anniversary and Annual Conference on April 28-30, 2024 at the Berkeley Hotel Pratunam, Bangkok, Thailand. The AYDN comprises dietitian representatives from various Asian countries: Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Malaysia, Philippines, Sri Lanka, Taiwan, Thailand, and Vietnam. This meeting was made possible through the generous support and hospitality of the Asian Nutrition and Food Culture Research Center of Jumonji University and Ajinomoto Co., Inc. to promote professional development, enhance cross-cultural collaboration, and advance the field of nutrition.

The recent Thai Dietetic Association conference was a remarkable experience enriched by the warm hospitality and vibrant culture of the Thai people. AYDN members attended the opening ceremony and the presentation of the TDA Research Award on April 29, 2024. The conference was incredibly inspiring, especially with the presence of respected nutrition experts. The lectures by Prof. Dr. Shigeru Yamamoto, Dr. Chwang Leh-Chil, Dr. Teji Nakamura, Ms. Mary Easaw, and Asst. Prof. Dr. Chanida Pachitkarn left a lasting impression on the audience. Their careers and contributions in the field of nutrition are strong motivators for dietitians and members of the Asian Young Dietitians Network (AYDN). Their achievements demonstrated the endless possibilities of our profession and the importance of striving for excellence and innovation.

Interacting with other AYDN members was another cornerstone of the conference experience. This was the second meeting after our first meeting in December 2023 in Japan. This exchange was not only social but also deeply educational. The exchange of

insights and discussion of the different education and work systems in different countries enriched our understanding and broadened our perspectives. These discussions fostered a sense of global camaraderie and shared purpose by highlighting the diversity in our field and the universal challenges we face.

At the symposium on April 30, 2024, Asian Young Dietitian Network members Nguyen Thu Trang and Andrea Wakita gave presentations on the network's founding, activities and plans. Georgen Thy Choong Jean, Chu Tzu Yun and Prem Kumar Neopany presented the network's research: "Exploring the Landscape of Nutrition and Dietetics Training Program: A Comparative Study among Asian Young Dietitian Network (AYDN) Member Countries." AYDN members had prepared for months to collect, assess, and report data for each country's Bachelor of Science in Nutrition and Dietetics (BSND) program. The symposium discussed curriculum structures, faculty backgrounds, intern experiences, and common strengths and opportunities for improvement in nutrition and dietetics programs. During the discussion, it was noted that some data collected from other countries were only represented by one school or university, which may not represent all schools or universities in that country. It was also noted that the research compared various aspects such as the number of credits required for a bachelor's degree. Therefore, it is necessary to validate the standards in each country and conduct a new survey to update the results.

The BSND program in the Philippines is designed to provide students with comprehensive training in both theoretical and practical aspects of nutrition and dietetics. The program spans four years and covers a wide range of subjects including biochemistry, physiology, food science, medical nutrition therapy, community and public health nutrition, and food service systems management<sup>1</sup>. In addition to classroom learning, students gain practical experience through supervised internships in hospitals, community health centers, and food service institutions. The BSND program is regulated by the Commission on Higher Education (CHED)<sup>2</sup>, ensuring high academic standards are met. The program aims to establish a strong foundation in both nutritional science and practical applications, preparing graduates for various roles in the field. It offers internships in a variety of settings to provide valuable hands-on experience and focuses on public health nutrition to equip students to address broader nutrition issues in communities. However, some institutions may face challenges due to limited laboratory and research facilities, which can affect the quality of practical training. There may also be significant differences in the quality of education and



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training across institutions, impacting the uniformity of graduate competencies. Rapid advancements in nutrition science require continuous updates to the curriculum, and some programs may be slow in integrating the latest research and technologies. Access to the program can also be limited for students in rural or underserved areas, affecting the diversity and reach

of the profession. Overall, the BSND program in the Philippines aims to produce well-rounded and competent nutritional professionals. However, addressing the challenges related to resources, curriculum updates, and accessibility is crucial for enhancing the program's effectiveness and inclusivity.



The findings and experiences gained from this conference will certainly have a lasting impact on our professional lives. As we return to our respective countries, we carry with us not only the inspiration from the distinguished speakers but also the practical insights shared by our colleagues. This fusion of inspiration and practical wisdom will undoubtedly enrich our work and drive us to implement new ideas and approaches in our daily practice. In summary, the TDA conference in Thailand was a mix of professional development and cultural enrichment. The warmth and hospitality of the

Thai people, coupled with their exquisite cuisine, formed an unforgettable backdrop to an extremely inspiring and educational event. The lectures from leading figures in the nutrition industry and the valuable interactions with other AYDN members have strengthened our overall commitment to excellence in the field. As we continue our journey, these experiences will remain a source of motivation and guidance, encouraging us to make a positive contribution to the global nutrition community.



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# Report (Sri Lanka) on the Asian Young Dietitians Network Meeting in Thailand

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## Introduction

The Asian Young Dietitians Network (AYDN), established on December 1, 2023, held its second physical meeting in Thailand from April 28th to 30th, 2024. This event coincided with the Thai Dietetic Association's (TDA) 50th anniversary celebration, with TDA hosting and inviting AYDN members. Twenty-one dietitians from eleven Asian countries—Bangladesh, Bhutan, India, Indonesia, Japan, Malaysia, Philippines, Sri Lanka, Taiwan, Thailand, and Vietnam participated, Dietitians from Cambodia are part of our member team, but representatives from Cambodia were unable to attend. The Sri Lanka Dietitians Association was represented by Ms. F.A.Z. Firouse and Ms. A.A.K.S. Abeyasinghe.

The 50th anniversary of the TDA was a prestigious event with esteemed guests. Having officials from the Thai Health Ministry underscores the importance of nutrition and dietetics in promoting public health. Additionally, the presence of officials from the Asian Federation of Dietetic Associations (AFDA) highlights the collaborative efforts across the region to address nutritional challenges and promote health status. Also, the participation of academics and dietitians from the Asian region was remarkable. The presidential address by Prof. Chanida Pachotikarn set the tone for the event, highlighting achievements, outlining future goals, and inspiring all attendees to continue their efforts in promoting the field of dietetics and improving public health outcomes (Fig.1).

AYDN members, after several online discussions, aimed to evaluate and enhance the academic curriculum and practical training of nutrition and dietetics programs across their member countries. They surveyed with three primary objectives: assessing the diversity of curriculums and educational pathways, examining practical training opportunities for nutrition and dietetics students, and identifying strengths and areas for improvement in member countries' degree programs. All country representatives were actively involved in carrying out the survey, which culminated in a comprehensive set of information to be presented at the TDA meeting under the theme "Exploring the Landscape of Nutrition and Dietetic Training Program: A Comprehensive Study Among Asian Young Dietitians Network Member Countries."

The AYDN symposium was structured into two main segments. Initially, Ms. Nguyen Thu Trang and Ms. Andrea Wakita played key roles, introducing the establishment of the AYDN and presenting the annual plan for 2024-2025. Following their presentation, Mr. Georgen Thye, Mr. Tzu Yun Cha, and Mr. Prem Kumar

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(representing Malaysia, Taiwan, and Bhutan respectively) shared the collective study findings. The session was moderated and translated by Mr. Samitti Chotsrlnencha from Thailand. These speakers were appointed through AYDN's collective decision-making process, reflecting the organization's commitment to teamwork. (Fig.2).



Fig 1. TDA 50th Anniversary Inauguration Ceremony with prestigious guests



Fig 2. AYDN Symposium

The meeting's success was significantly bolstered by several key contributors. The generous financial support from Ajinomoto Corporation provided crucial resources that facilitated the gathering. Additionally, the invaluable guidance of Professor Shigeru Yamamoto from Jumonji University, Japan, was instrumental. Prof. S.Yamamoto, a visionary leader in dietetics with extensive networking connections among senior Asian dietitians and industrial partnerships in the field of nutrition and dietetics, played a pivotal role in

offering expert insights and strategic direction that significantly shaped the objectives and activities of the AYDN. With his wealth of experience and deep

understanding of the challenges and opportunities in the field (Fig. 3).



Fig 3. Prof.S.Yamamoto directing and networking at the conference



Fig 4. Warm and welcoming hospitality received from TDA members

The TDA also played a crucial role in the event's success. Celebrating its 50th anniversary, the TDA extended warm hospitality to all participants, creating a welcoming and conducive environment for fruitful exchanges and collaboration (Fig:4) This support from the TDA not only enhanced the experience for the attendees but also underscored the collaborative spirit that is essential for advancing nutrition and dietetics across Asia.

### ***Personal Reflections***

The warmth and hospitality at the TDA conference in Thailand left a lasting impression, highlighting the shared richness of Asian hospitality. As a team of dietitians, we were eager to explore different dishes according to local cultures and were delighted to taste some authentic Thai dishes, which are highly nutritious from a dietitian's perspective.

Esteemed figures such as Prof. Shigeru Yamamoto, Prof. Teiji Nakamura, Dr. Leh-Chii Chwang, and Dr. Mary Easaw delivered inspiring presentations, motivating dietitians and AYDN members to pursue excellence in nutrition. This exposure to field experts was particularly beneficial for young dietitians from Sri Lanka. The key takeaway for Sri Lankan dietitians was the importance of engaging in more research in addition to routine clinical practice (Fig.5).

One of the most memorable events was the grand celebration of the TDA's 50th anniversary. The TDA not only marked this milestone with grandeur but also offered several research grants and awards across different categories. These opportunities extended from school students to postgraduate students, involving academic organizations and industrial partnerships to

support and encourage research and innovation in the field of dietetics and nutrition.

Moreover, the conference provided an opportunity to meet key figures from the Asian Federation of Dietetic Associations (AFDA), expanding the Sri Lankan dietitians' network through potential AFDA membership. Interactions with fellow AYDN members offered valuable insights into diverse educational and working systems, presenting potential strategies for implementation in our home country (Fig.6).

As AYDN members chose to represent their countries in their traditional cultural attire, it fostered a deeper understanding and appreciation of each other's cultures. Additionally, AYDN and TDA made sure to arrange food and other facilities following participants' religious values, ensuring a respectful and inclusive environment.

### ***Bachelor of Nutrition program***

In Sri Lanka, only one bachelor's degree is offered to produce registered dietitians recognized by the Sri Lanka Medical Council. The Bachelor of Science in Food Science and Nutrition program at Wayamba University of Sri Lanka features a robust and comprehensive curriculum that integrates essential basic science subjects and professional courses. The program is distinguished by its qualified faculty, predominantly experienced dietitians serving as academics and preceptors, and its emphasis on practical training through extensive clinical internships. Despite these strengths, the absence of a national examination for dietitian registration poses a challenge for standardization and recognition of qualifications. Additionally, while the clinical internships are well-structured, the training in community and food service

settings would benefit from increased and more structured hours.

**Action Plan to Foster AYDN in the Future**

To foster AYDN in the future, several actionable steps for improving nutrition and dietetics education in Sri Lanka include: implementing a standardized national examination for dietitian registration and registration renewal process to enhance professional credibility; increasing the duration and structure of community and food service internships to meet international standards; and maintaining collaboration within AYDN to exchange best practices and

innovative educational strategies, benefiting the undergraduate program in Sri Lanka.

**Future Development of AYDN**

As a young organization, AYDN has established plans extending to 2026. For the years 2024 to 2025, AYDN is focusing on playing a crucial role in standardizing dietetics education across Asia. By creating a network of highly qualified dietitians, AYDN is dedicated to enhancing the field of Dietetics and Nutrition throughout the region.

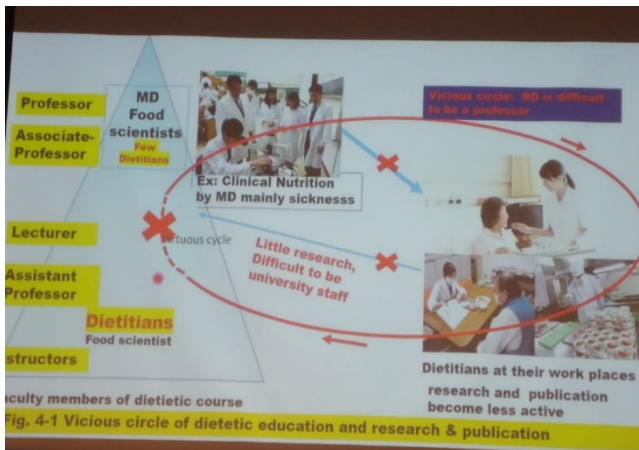


Fig 5. An eye-opening slide presented at the conference by Prof.S.Yamamoto & take-home message of Sri Lankan dietitians



Fig 6. Sri Lankan dietitians networking with AFDA, TDA officials and AYDN team

# Report (Taiwan) on the Asian Young Dietitians Network Meeting in Thailand

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## Introduction

The Asia Young Dietitian Network (AYDN)'s goals for this gathering in Thailand Dietetic Association (TDA) conference, Thailand, are to promote member interaction and cooperation, and to advance the field of nutrition. We acknowledge the hospitality and generous support received from Ajinomoto company, and the sponsorship of AYDN's activities by Prof. Yamamoto and TDA.

## Personal Reflections

In Thailand, we experienced the warmth and hospitality of the Thai people, along with our appreciation for Thai cuisine, street food, and food culture. The diverse and delicious food is not only enjoyable but also a significant part of the culture, reflecting the creativity and warmth of the Thai people.

The TDA conference had a profound impact on us. The inspiring presentations from esteemed figures such as Prof. Yamamoto, Madam Mary Easaw, and Dr. Teiji Nakamura highlighted their careers, which serve as motivation for dietitians and AYDN members to continue pursuing excellence in the field of nutrition.

Interactions with fellow AYDN members were highly beneficial. These exchanges not only help with our individual work upon returning home but also provide valuable insights into the education and working systems of different countries.

## Bachelor of Nutrition

Taiwan's Bachelor of Nutrition provides diverse employment opportunities but also faces challenges. Here are the strengths and weaknesses of career paths for graduates:

### Strengths:

1. Diverse career options: Graduates can work in hospitals, schools, public health agencies, fitness centers, and food companies, holding positions like clinical dietitians, community dietitians, and researchers.

2. Professional certification: National exams grant nutritionist licenses, enhancing competitiveness and professional reputation.
3. Variety of internships: Emphasizing practical experience, the program offers internships in hospitals, schools, and communities.
4. Continuous education: Professional associations offer workshops and courses for skill enhancement.

### Weaknesses:

1. Many Certifications but Not Specialized: Dietitians often need to get extra certifications to stay competitive. This broadens their knowledge but doesn't deepen expertise. They spend a lot of time and money on these certifications but struggle to gain trust in their consulting services, leading to negative effects.
2. Insufficient Internship Hours: Although internships are emphasized, there aren't enough hours, and the quality varies. Some hospitals offer internships just to meet requirements without providing real clinical experience, leaving students unprepared for the job market.
3. Low Salary Levels: Dietitians in Taiwan generally earn low salaries, forcing many to seek extra income through writing, consulting, or speaking engagements. While this helps raise income, it can commodify services and harm the professional image.

## Action Plan to Foster AYDN in the Future

From TDA and other AYDN members, we have learned many valuable lessons that will help improve the situation in our country. AYDN can enhance the Bachelor of Nutrition program in Taiwan by promoting international exchange and sharing best practices. Our future development plans include establishing more international collaboration projects, encouraging resource sharing, and regularly organizing professional training and seminars to enhance members' professional skills and knowledge.

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# Report (Thailand) on the Asian Young Dietitians Network Meeting in Thailand

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## Introduction

Asian Dietitian Network's was established for sharing information and experience toward Asian country, and developed research and publication to enhance future direction of dietetic framework. The Asian Young Dietitian Network (AYDN) activities go on to Thailand for sharing knowledge in the Thailand Dietetic Association Conference 2024. This activity was supported by Prof. Shigeru Yamamoto (Jumonji University), Ajinomoto Co., Inc. Global Communication, and Thailand Dietetic Association (TDA). This report may aim to provide personal reflection of experience gathering in conference as well as to express appreciation of all hospitality and generous support received from all those who cooperated.

## Asian Young Dietitian Network Symposium

On TDA conference 30 April 2024, AYDN Symposium was established to demonstrate collaboration and network working group. The purpose of the symposium was to propagate AYDN initiative group and share the knowledge and dietetic information among each country. The speaker of symposium including Mr. Samitti Chotsriluecha, Chairman (Thailand), Ms. Andrea Wakita, Co-chairman (Japan), Ms. Trang Thu Nguyen (Vietnam), Mr. Georgen Thye

(Malaysia), Mr. Markus Chu (Taiwan), Mr. Prem Kumar (Bhutan).

The first session composed of Establishment of Asian Young Dietitian Network, which presented by Ms. Trang Thu Nguyen, including the contents of gap between dietitian across Asian country, the establishment of AYDN, and future direction of AYDN. The second session displayed "Exploring the Landscape of Nutrition and Dietetics Training Program: A Comparative Study among Asian Young Dietitian Network (AYDN) Member Countries. This session was presented aim to presented three objectives. First, to assess curriculum diversity and educational pathways in AYDN member countries. Second, to examine practical training opportunities for nutrition and dietetics students in AYDN member countries. Third to identify strengths and areas for improvement in AYDN member countries' degree programs. This session provides great value of informative learning programs among nutrition and dietetic course from each country, which lead us to enhance the competencies of dietetic students and make the new frontier of specific nutrition integrate with oriental intellectual such as phytonutrient from herbs and spices, Chinese traditional medicine, Ayurveda medicine, and also traditional Thai traditional medicine.



Fig 1. Asian Young Dietitian Network Symposium

In my point of view, dietitian should integrate and collect nutrition and dietetic knowledge according to evidenced-based and scientific methodology with the

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traditional intellectual. However, research in field of integrate medicine need to be further warrant of require more publication among nutrition and dietetic approach. This could be a strong point among Asian dietetic in future direction, which collaborate scientific

methodology with traditional intellectual toward sustainable development and nutrition for all.

### **Bachelor of Nutrition and Dietetic Program in Thailand**

In Thailand, nutrition and dietetic programs composed of 19 courses as certified becoming registered dietitian. By the regulation of Dietetic Professional Council, the course syllabus of nutrition and dietetics program should be more than 120 credits incorporated with general education (> 24 credits), specific course on nutrition and dietetic (>72 credits), internship in nutrition and dietetic (>18 credits, > 900 hours), and elective course (> 6 credits).

The specific courses of nutrition and dietetic including introduction of food science and nutrition, food safety and sanitation, principles and culinary science, human nutrition, community nutrition, nutrition in life cycle, principle of nutrition and dietetics, nutrition assessment, medical nutrition therapy, nutrition counseling and behavior modification, seminar in nutrition and dietetics, research in nutrition and dietetics, and ethical and legal issues in dietetics, which are the fundamental course to enhance the core competency of dietitian. The additional course are special programs depend on university arrangement and requirement of professional dietetics such as personalized nutrition, sports nutrition, integrated nutrition, nutrition and pharmacology, innovation healthy food and disease-specific food, or sustainable food security.

The internship in nutrition and dietetic was regulated by law at least 900 hours, which including nutrition management and food service (>150 hours), clinical nutrition and dietetic (>300 hours), community

nutrition (>150 hours), and interesting internship (>300 hours). The regulation of internship hour in Thailand was higher than the International Confederation of Dietetic Associations (ICDA) standard at 500 hours, in additional some university able to provide 1,200 hours to dietetic student.

The strong point of Thai nutrition and dietetic curriculum was high internship hours, variety of special nutrition and dietetic course, which able to enhance in each field of nutrition e.g. public and community nutrition, food service and management, and clinical nutrition. However, there are also have the gap to fill with the improvement in specialist in each field such as certified specialist nutrition support board in specific disease, and also to improve the career pathways and employability.

### **Action Plan to Foster AYDN in the Future**

The network leads us to opportunities for learning and sharing. AYDN provides a platform to exchange nutrition and dietetic knowledge, enhancing our competencies based on the course curriculum. My suggestions for future development include standardizing and expediting dietitian competencies within multidisciplinary teams, sharing nutrition knowledge not only within Thailand but also across Asia, and conducting research on personalized and localized nutrition to ensure sustainable food and nutrition practices in Asia. Each Asian country faces unique nutrition challenges, but these can be transformed into exciting opportunities that call for ongoing collaboration and support. AYDN, as a proactive group of young dietitians, guides us towards growth and fortifying the dietetic field for the future.



Fig 2. AYDN members with Prof. Shigeru Yamamoto (center), Dr. Chanida Pachotikarn: the president of TDA (left of center) and Dr. Sunard Taechangam: advisory committee of TDA (right of center)

# Report (Vietnam) on the Asian Young Dietitians Network Meeting in Thailand

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Following the success of the Asia Young Dietitian Network (AYDN) kick-off meeting in person was held for the first time in Tokyo, Japan, in November 2023, this year, thanks to the generous support from Professor Yamamoto Shigeru of Jumonji University, the Thailand Dietetic Association (TDA), and Ajinomoto Co., Inc. Global Communication Division, Japan, members of AYDN from 12 Asian countries had the golden opportunity to gather and discuss the curriculum of bachelor of nutrition programs at the undergraduate level. This meeting took place in Thailand alongside the 50th-anniversary celebrations of TDA Thailand.

With this honored opportunity, we had a great chance to present our country's data and engage in a fruitful exchange of ideas, focusing on the strengths and weaknesses of bachelor of nutrition training programs. Furthermore, we built strong connections among all members and committed ourselves to dedicating our time and efforts to thriving the future of AYDN.

**Personal Reflections on Widening the International Dietitian Circle** (From Ms. Yen's perspective as a new member)

"I have been a new member of AYDN since February 2024. Over the past three months, I participated in numerous online meetings to discuss our concerns about the nutrition education system and how to improve it through the AYDNetwork. I was worried about our first meeting in Thailand because it was my first time meeting many international dietitians. Moreover, as a newbie, I was concerned about how to make friends with my new colleagues, even though we usually had monthly online meetings. However, all my worries disappeared immediately when I attended the first in-person meeting in Thailand. I felt that everyone was amiable and energetic, and I also sensed the enthusiasm for nutrition from my colleagues. Through multiple conversations, I gained a better understanding of the nutrition system in my friends' home countries. I am very grateful for the support from all our sponsors, including Professor Yamamoto Shigeru, Ajinomoto Co., Inc., Global Communication, and the Thailand Dietetic

Association. Without their generous support, we AYDN members would not have had the opportunity to meet each other in person.

AYDN serves as a vital network for connecting young dietitians, facilitating the exchange of insights and experiences among members from different countries, which we sometimes cannot find in academic papers. It is not only enhancing our understanding of the education system but also improving our professional performance.

During the conference, I had the privilege of meeting international colleagues specializing in diverse areas through AYDN. For instance, RD Zi Xuan Lin (Joy) from Taiwan specializes in pediatric dietetics, while RD Palmy from Thailand specializes in dysphagia management. I vividly recall the words that Joy told me when I asked her, "*Can I contact you if I face some challenges while taking care of my children's patients?*" Without any hesitation, she told me, "*Sure! I will help you as much as I can. Let's improve our dietitian community.*" I was delighted at the time, and I am confident that one of the best choices I made this year was to join AYDN. The AYDN gives me the impression that I have arrived at a hub of dietitians, something I would not have been able to easily find in my own country due to disparities in the nutrition workforce.

In Vietnam, our nutrition training programs are generally broad, lacking specialization in specific clinical areas such as pediatrics, endocrinology, ICU care, and dysphagia management. Therefore, interactions with colleagues specializing in these areas offer invaluable learning opportunities. I can seek advice from these experts when encountering challenging cases involving children or dysphagia patients. Moreover, I can share this knowledge with my colleagues and nutrition students during their internships at my hospital.

For me, AYDN is a priceless resource that will enable me to broaden my perspective and also go beyond my limited understanding of the nutrition education system."

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Fig 1. Friendship among AYDN's members



Fig 2. Vietnam AYDN's members and Prof. Chanida (the President of TDA)

### **Bachelor of Nutrition program**

Up until 2024, Vietnam being one of the latest countries to establish dietetic courses did not have a standard curriculum for the Bachelor of Nutrition program. It has been only more than 10 years since Hanoi Medical University with the Ministry of Education and Training's permission started the first enrollment and specialized training of Bachelor of Nutrition (BN) students, with the job code 7720401 in 2013 (1). On the bright side, this means that Vietnam can inherit the comprehensive curriculum from Japan and other countries (Australia and America) that have many years of experience. Another strength of the Vietnamese training program is that with the increasing awareness of the importance of nutrition, numerous hospitals offer opportunities for students to gain clinical and hands-on experience by learning directly from patients, starting from their bachelor's degree studies. However, as mentioned before, Vietnam's nutrition field is still relatively new, and the number of human resources is still lacking; thus, almost all the professors and instructors are not from the background of dietitians but rather from doctors, and public health personnel. Therefore, when we looked at the fact that 100% of instructors are dietitians in other countries like Japan, Malaysia, and Taiwan..., we hope that in the future the opportunity for this career position will be more open to all Vietnamese dietitians.

Not only the background of lectures but the content of the current curriculum also needs to be constructed. In Vietnam, the curriculum does not help students specialize in three different areas of nutrition: food safety and hygiene, community nutrition, and clinical nutrition. It is highly recommended to reorganize the program, allocating two and a half years to train students in fundamental nutrition knowledge and one and a half years for specific areas in which students are interested (practice and internship-specific knowledge). This restructuring could help students navigate their career pathways later in life. Moreover, there is a critical need to augment on-site practice hours to meet at least the ICDA standard (500 hours). Although, during the 4-year program, the students get to spend many hours training at the on-site hospitals, they only focus on learning about diseases but not nutrition, which makes the actual number of internship hours in Vietnam lower than in other countries. The lack of

variety in on-site training facilities related to food technology, school nutrition, and food services is also a problem. Integrating nutrition into subjects taught at hospitals and expanding practical facilities can effectively address this issue.

### **Action Plan to Foster AYDN in the Future**

Upon hearing different courses from various Asian countries during the presentation of AYDN at the Thailand Dietetics Association, we learned many intriguing and helpful ideas that can help improve our program in Vietnam. For example, we hope that we can adapt some of the unique subjects that are being offered in others such as, Japan has a lot of subjects that aid the understanding of cooking science, which can enable dietitians to improve their menu planning abilities and enhance communication with cooks. Or in the era of advanced technology and mass media, it is necessary to introduce the students to the advanced technology that can assist the dietitian's job. This can be achieved by introducing subjects related to software applications and having some subjects such as social marketing, mass communication, and information technology like in Sri Lanka. Vietnam can also learn how to distribute the number of internship hours to cover all the areas of dietitians' expertise from countries like the Philippines with their training regulation with one must have 600 hours of training at the hospitals, 300 hours at community nutrition, and 300 hours at food companies.

There are still many things that Vietnamese dietitians can learn from all their Asian colleagues in the Asia Young Dietitian Network, not only in enhancing the bachelor's training program but also in vast aspects such as the law system, registration system... With the pool data from all the member countries of AYDN, we can publish many meaningful articles that can serve as references for the recently established system like Vietnam, Cambodia... This can be a notable support for young dietitians when they want to approach the officials and the government to propose enhancement in the structure or procedures. We firmly believe that AYDN can be the new voice of all dietitians with their burning passion for making a change in the nutrition field and lifting the image of dietitians so that they can get their deserved recognition. Along with the tight-knit friendship from all our fellow members in the network, we, Vietnamese dietitians, will also devote our best to improving our country's

dietetics and are eager to contribute to the development of the network.

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**Special Report: The Cambodian food culture****The Observation of Eating Habits between Cambodian and Japanese**

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**ABSTRACT :** The delicacy of food is a representation of each nation. Deeply rooted from generation to generation, people's eating habits evolved and resulted in a reflection of food cultures and family dynamics. This report aims to detail the eating habits between Cambodia and Japan. While both countries, located in Asia with rich cultures and traditions, are fascinated by many other countries, the diversity between eating habits and food cultures within family and society can be seen.

**INTRODUCTION**

In Cambodia, the tradition of eating together is a standard that has been practiced for many centuries. These traditional habits emphasize the importance of community and family bonds. Meals are often prepared and enjoyed by family members and sometimes extended to neighbors and friends. Cambodians normally gather around a table, or sometimes they eat directly on the floor, on a layer of Cambodian style's mat. We can often see that Cambodian meals consist of a few dishes per meal that are served in a big bowl to be shared with family members or friends. On the other hand, Japanese eating habits present a dining culture that is equally communal but marked by a distinct feature on etiquette and healthy balanced nutrition. The act of sharing food in Japan is also a way to reinforce social bonds but it is characterized by a tradition that is known as "Teishoku". "Teishoku" or set-meal is often enjoyed by many Japanese. It has been rooted for a very long time, which can be seen in many daily common meals such as home meals, school lunches, hospital meals, and also restaurants. It is often come in a one-person portion, that is not need to be shared between family members. On the other hand, Japanese eating habits present a dining culture that is equally communal but marked by a distinct feature on etiquette and healthy balanced nutrition. The act of sharing food in Japan is also a way to reinforce social bonds but it is characterized by a tradition that is known as "Teishoku". "Teishoku" or set-meal is often enjoyed by many Japanese. It has been rooted for a very long time, which can be seen in many daily common meals such as home meals, school lunches, hospital meals, and also restaurants. It is often come in a one-person portion, that is not need to be shared between family members.



Picture 1. Cambodian's eating habit



Picture 2. Japanese's eating habit

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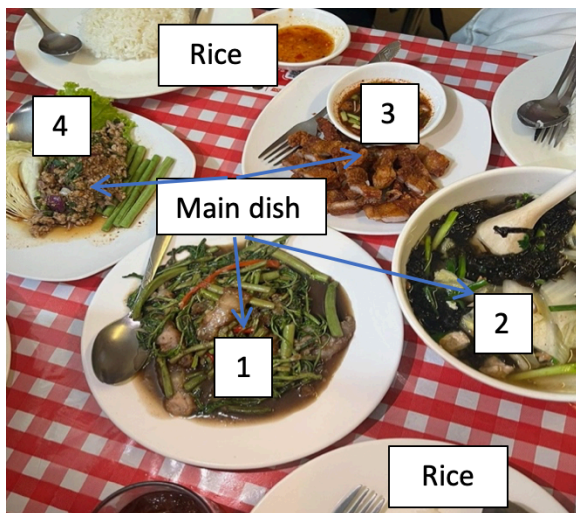
The contrast between these two cultures leads to a curiosity about how they differ from one another, moreover, this report will deeply analyze the food plating and preparation between each country and so as the pros and cons that come with it. It will be a guide to understanding a perspective of both Japanese and Cambodian cultures.

## 1. Meal and plate preparation

### 1.1 Cambodia

In Cambodia, we believe that the quality of the family can be seen at every mealtime. Traditionally, mothers prepared meals with love and care. Time and effort are needed to receive a plate of delicious dishes. Cambodian meals normally consist of rice and a main dish. Talking about the main dish, there are normally two to three dishes, various from soup, fried, stirred-fried, or even boiled meal. The main meal can consist of different foods, since Cambodia has a variety of meals that can be chosen from, it also depends on the family's economic status. The main dish is served in a big bowl or plate, then it is shared among the whole family.

The picture below (Picture 3) shows how Cambodian people enjoyed their food. There are 4 main dishes, including stirred-fried vegetables (1), seaweed soup (2), deep-fried pork (3), and minced pork salad (4) that are shared between 3 to four people.

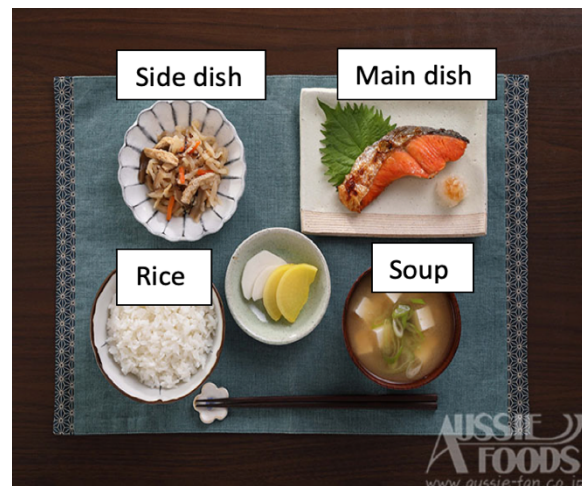


Picture 3: Cambodian's style meal

### 1.2 Japan

While Cambodians like to share their food, it is less common for Japanese people to do so. Even so, Japanese meals are also made with effort and techniques. The visuals of food are very important to the Japanese, to make it look more appealing and attractive, they often serve one main dish and several side dishes per person. Regarding plating in Japan, they typically place the rice on the left and the soup on the right. The main dish is positioned at the top right, while the side dishes are placed on the lower right. It is believed that Japanese food presentation emphasizes visual appeal, with attention to the arrangement, colors, and shapes of the food. Dishes are often designed to evoke natural landscapes and seasonal themes.

The picture below shows a Japanese set-meal "Teishoku". It includes rice, salad dish, fried fish, and soup. It is a meal prepared for one person that does not need to be shared.



Picture 4: Japanese's style meal

The eating habits of both countries, even though it has their uniqueness and style that make their respective population follow and have been practicing for so many years, have some strengths and weaknesses that can be seen within both cultures. The table below shows the advantages and disadvantages that can be withdrawn from how Cambodian and Japanese eating habits are like. To further discuss this matter, details about each point will be analyzed

**Table 1: Comparison of eating habits between Japanese and Cambodian**

	Advantages	Disadvantages
Cambodia	<ul style="list-style-type: none"> <li>• Sharing mentality</li> <li>• Satisfaction</li> <li>• Time sufficient</li> </ul>	<ul style="list-style-type: none"> <li>• Unbalance nutrition</li> <li>• Insanitation</li> <li>• Unappealing</li> </ul>
Japan	<ul style="list-style-type: none"> <li>• Balance nutrition</li> <li>• Sanitation</li> <li>• Appealing</li> </ul>	<ul style="list-style-type: none"> <li>• Non-sharing mentality</li> <li>• Dissatisfaction</li> <li>• Time insufficient</li> </ul>

## 2. Comparison

### 2.1 Cambodia (Advantages)

- **Sharing mentality**

In Cambodia, we believe that love can be shown by sharing. Unexceptionally, food sharing is a norm that can be seen in Cambodian people. This kind of action is thought to be a family bonding moment. In this recent society, family members tend to have different schedules depending on their careers, however, during meal time all members are gathered which means that they can share about what is going on in their life and so as catch on with what the family members are up to. This small action is a reason that leads to the bonds and connections that represent the family dynamic. To a certain point, in some families, it feels like is a duty to eat with your family members for every meal.

- **Satisfaction**

Meal-sharing cultures often embrace joy and fulfillment among family members. Most Asian country, including Cambodia, tends to have a variety of dishes that include diverse and nourishing ingredients. Ranking from vegetables to many types of protein. Food sharing allows everyone to indulge in their favorite dishes, which means even the pickiest eaters do not need to adjust their preferences. For

instance, children can just pick whatever ingredients they like from the dishes without worrying about leaving any leftovers on their plates. This can be seen as a satisfaction to their mentality since it is believed that being able to eat what you like will be an improvement to your mood.

- **Time sufficient**

In this modern society, time is the most valuable thing that humans cherish. It means that everything had to be done efficiently. But how did meal-sharing can be such an important method of saving time? It is so convenient to just cook a meal for once and then share it with your family or partner. This helps reduce the amount of time that is needed to put into preparation. Moreover, it is also such a help when it comes to cleaning. Meal-sharing required less cooking and plating utensils, which led to a reduction in time and labor.

## 2.2 Cambodia (Disadvantages)

- **Unbalance nutrition**

Despite having all the benefits, some flaws can be seen within the eating habits of Cambodian people. Directly picking whatever you prefer from the table, tends to lead to an unbalanced nutrition intake. For example, during a family meal a child who is picky about their food only picks up their ingredients such as meat from the dish, this can lead to the problem of unbalanced nutrition. Even if the meal is made as a nutritious meal, it still can be an issue if it is not eaten correctly.

- **Insanitation**

In some cases, eating a meal from the same plate as other people can be seen as an unsanitary form of action. Germs and cross-contamination can be transferred from one person's saliva. It is easy for a disease to spread, especially a cold or flu that can be transmitted easily. In addition, it is also very common in Cambodia to eat directly on the floor. However, it is not hygienic to do so, since a lot of dust and dirt are mostly gathering on the floor. These norms could be a reason that leads to a health hazard. This type of habit has been normalized without much consideration in Cambodian culture. More attention should be given to this kind of habit by being more careful and hygienic to prevent more issues.

- **Unappealing**

Taste is the most important factor in food, however, appearance is another factor that boosts the remanence in food. In Cambodian household culture, they do not care about the outside appearance of the food but more focus on the flavor. In restaurants, it might be necessary to make the food more appealing to the consumer, on the other hand, in family households is less common to spend some time on making the meal look more eye-pleasant.

## 2.3 Japan (Advantages)

- **Balance nutrition**

It is known worldwide that Japan is a country that has one of the longest life expectancies. Many reasons are behind this phenomenon but one of the main reasons is due to the eating habits and portion control of the Japanese. The culture in their household of having a main dish, side dish, and soup plays an important in balancing out the nutrition intake of an average Japanese. The habits of eating "Teishoku" make the family members feel responsible for finishing what they have in front of them. The sense of responsibility will lead to a cycle of consuming a nutritious meal every day.

- **Sanitation**

From cooking to plating, Japanese people are very conscious about the hygiene. Since raw fish is one of the most eaten sources of protein in most households, it is very common for food poisoning to occur. As a

result, they always cooked in a manner that show cleanliness and sanitary. Also, the separation of meals

between families makes the spread of germs even more impossible. This is one of the customs that everyone should learn, especially from a country that has a healthy eating routine such as Japan.

- **Appealing**

There is always some form of art within Japanese family meals. To be exact, it is very appealing to separate each meal as a one-person portion size. It can also boost the appetite of the consumer as it looks more delicious and well-organized. Japanese food always consists of different ingredients that have different colors, and the detailed attention that is given to the dishes brings out the arts and deliciousness that stay within the already nutritious meal. In addition, Japan's seasonal change also influenced the ingredients and theme of the meal this thought had been ideal in many families, schools, and restaurants.

## 2.4 Japan (Disadvantages)

- **Non-sharing mentality**

It is less common for Japanese to share what they eat with the other family members since it is already decided with portion control as a one-person meal. Sometimes, the mentality of sharing and eating meals with your family members is not necessary. It is also noticed that eating alone is more practiced in Japan rather than in Cambodia. Although family dynamics can be composed in many other ways, sharing meals with them can be one of the efficient ways to make the bond stronger.

- **Dissatisfaction**

When a portion size is controlled, it is difficult to satisfy the need and freedom of choosing what they eat. For example, when a picky eater is served ingredients that they do not like, they have no choice but to eat it or in another way, they can leave it which will result in food waste. In Japanese culture, it is rude to have leftovers because it is a sign of disrespect toward the people who cooked for them. That is why many people have to force themselves to finish everything that had been served on the plate. This had become a sense of responsibility for many Japanese people.

- **Time insufficient**

Effort and time are one of the core factors that cause into making Japanese food. Every home meal is very delicatied and time-consuming. "Teishoku" also known as set meals is a component of many dishes that take up much more time than normal meals. Even if it

is pleasant to have the privilege of enjoying a variety of dishes during a family meal it is also a trouble to do the preparation and cleaning

### **3. Conclusion**

All eating cultures around the world are treasured in many ways, not so different from each other Japanese and Cambodian eating habits portray the culture that represents most of the daily activities among the people. This article shows the traits of both countries and also a comparison of how the two countries from the same continent can be so different from one another. Both good and flaws can be seen in every country, though it is fruitful to deeply analyze and understand this study, it is also fascinating to learn and adapt from each other especially, in this modern and diverse society where continuous improvement and adaptability are emphasized. It is like an eye-opening experience to be conscious of the Japanese and so are the Cambodians' eating cultures and habits leading to a future of better acknowledgement between both countries.

### **Reference:**

Picture 1: <https://shorturl.at/jqTJT>

Picture 2: <https://shorturl.at/E9LBp>

Picture 4: <https://shorturl.at/u9rd9>