Nutrition Education at Schools in Brunei Darussalam : Current Status and Challenges

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Abstract

This paper assesses the current situation and challenges of nutrition education in primary schools in Brunei Darussalam, taking a comparative perspective with nutrition education in Japan. Home economics education, which teaches knowledge regarding food and nutrition in Japan, is not part of the country's primary school curriculum in Brunei Darussalam. Nutrition and other lifestyle-related topics are taught instead in science classes at primary school. Also, there is no cooking practice performed by students themselves. Students nevertheless have opportunities to familiarize themselves with food and its nutritious values in special health-related programs such as the "Food Traffic Light System," which specifies recommended food and beverages that should be sold at school canteens in order to promote healthy eating habits among children. After reviewing the current nutrition education at schools in Brunei Darussalam, this paper presents a few recommended measures: 1) actual cooking practice to enhance nutritious

knowledge that students learn during lectures, 2)establishing home economics as an independent subject in the school curriculum to provide the next generation with comprehensive knowledge and practices for healthy living, and 3)modifying or supplementing the current Food Traffic Light System in order to give students positive ideas about practicing nutritiously balanced food intake.

Keywords: nutrition education, overweight and obesity, health, school curriculum, Brunei Darussalam

Introduction

Childhood obesity is an alarming public health issue in Brunei Darussalam. The epidemiology and preventative measures of childhood obesity remain understudied in the country. The potential contributing factors may include lifestyles, value systems, and a socioeconomic environment that can hinder the promotion of healthy lifestyles, particularly among children. One of the key public health measures to prevent and control childhood obesity is to empower families and children to adopt healthier eating behaviors as part of overall healthier lifestyles. Therefore, it is critical to examine the contents of the school education curriculum as school education has a deep impact on the formation of children's values, attitudes, and habits (Malik et al., 2012).

A recent study showed that a school environment that promotes healthier nutrition and physical activities is key to healthier living. Healthier school canteen guidelines given through the "Food Traffic Light System" are essential in enabling students to eat healthily (see below for details). Nevertheless, this approach has limitations, for example, canteen operators' refusing to follow the guidelines and the existence of food stalls selling unhealthy snacks in the school neighborhood (Ahmad, Schubert, and Bush, 2013). The gaps that can be explored are what and how nutrition education can be effectively implemented in primary schools.

This paper assessed the current situation and challenges of nutrition education in primary schools in Brunei Darussalam. The main focus is to examine the current content of nutrition education in the primary education system and establish an understanding of how it is being imparted. For the analysis and policy recommendation, we shall refer to the school curriculum and programs implemented in Japan. Similar to Brunei Darussalam, Japan has been experiencing changes in dietary habits and the environment surrounding food and nutrition due to rapid socioeconomic changes following

World War II (Office for Shokuiku Promotion, Cabinet Office, Government of Japan, 2010). The government and concerned citizens have initiated various efforts to include new educational contents to be taught in home economics class as well as outside the classroom.[1] In 2012, only 3.5% of the Japanese population was classified as obese, making Japan the lowest ranked country among the 34 OECD member countries to suffer from the obesity pandemic (Organisation for Economic Co-operation and Development, 2012). The Japanese nutrition education model may contribute to the alleviation of childhood obesity in Brunei Darussalam as the two countries have similar characteristics including race (Mongoloid) and food culture (e.g., rice as a staple food). Due to the limited number of assessable written materials on this topic in Brunei Darussalam, the methods used here constitute a triangular approach, namely, document (i.e., textbook) analysis, direct observation, and interviews with key stakeholders in 2013 and 2014.

1. Brunei Darussalam: Overview

Brunei Darussalam is a country located on the north coast of the island of Borneo in Southeast Asia.It is a monarchical state governed by His Majesty, Sultan Haji Hassanal Bolkiah Mu'izzaddin Waddaulah, Sultan and Yang Di-Pertuan of Brunei Darussalam, and composed of four main districts: Brunei-Muara, Tutong, Belait, and Temburong. The capital is Bandar Seri Begawan, which is located along the Brunei River in the Brunei-Muara district.

The Sultanate is a small country with a total land size of 5,769 sq. km (approximately the size of Mie Prefecture) and a population of 414,000 (approximately the population of Takamatsu City, Kagawa Prefecture), including foreign residents, as of 2010 (Prime Minister's Office, 2011).[2] It is a wealthy state in the world, ranking 22nd in terms of GDP per capita in 2013 (Japan was ranked 24th), with USD 39,942 (IMF, 2014). The country's wealth is generated largely from the oil and liquefied natural gas industries.

Brunei Darussalam's population is growing at an average rate of 2.0% per annum (Prime Minister's Office, 2011). It is also of importance to note that Brunei Darussalam has a considerable proportion of young people in its overall population: 57% are in the 20-54 working age groups, and another 34% are below the age of 19, while only 9% are 55 and above. The country's median age is 26.8. Even so, the rate of aging is rising in Brunei Darussalam, as in other Asian countries. The national health policy places great emphasis on promoting a healthy lifestyle among Bruneians.

2. Overweight and Obesity Problem

In Brunei Darussalam today, weight disorder,especially obesity,among the population is regarded as a serious national public health problem. Overweight or obesity is a modifiable risk factor for non-communicable diseases, including diabetes mellitus, hypertension, ischaemic heart disease, and hyperlipidemia. Further, obesity can be a risk factor for many cancers, notably breast, ovarian, esophageal, colorectal, liver, pancreas, gallbladder, stomach, endometrial, cervical, prostate, and kidney cancer, as well as non-Hodgkin's lymphoma and multiple myeloma. Currently, the most common causes of deaths in the country are cancer, heart diseases, and diabetes mellitus (Prime Minister's Office, 2011). Obesity prevention is now listed one of the ten research cluster themes of Universiti Brunei Darussalam(UBD) (Research Clusters, 2011 : 68-9).

The incidence of overweight (BMI of 25 to 29.9 kg/m^2) and obesity (BMI of 30 kg/m^2 and above) is already considerably high among both adults and children. According to the Ministry of Health's booklet for the prevention and control of non-communicable diseases (hereafter "BruMAP-NCD"), which contains relevant statistical data,[3] among adults (aged 20 and above), the prevalence of obesity more than doubled from 12% in 1997 to 27.2% in 2011, while the prevalence of overweight moderately increased from 32.4 % in 1997 to 33.4% in 2011. Among children (aged 5 to 19), the prevalence of overweight or obesity in 1997 and 2011 was 33.5 and 18.3, respectively (Ministry of Health, 2013 : 17-9).

BruMAP-NCD reported that, aside from inadequate physical activities, unhealthy diet and undesirable dietary habits have been associated with the high incidence of overweight and obesity (Ministry of Health, 2013 : 20-1). First, a large number of people, especially the young population, do not eat enough fruits and vegetables. While the National Dietary Guidelines recommend 2-3 servings of fruits as well as 2-3 servings of vegetables per day to prevent chronic diseases, males aged below 40 and females aged below 30 do not meet the recommended intake. The least intake of fruits and vegetables was observed among children and adolescents. As a result, dietary fiber intake is extremely low among Bruneians. Only 7.8% of males and 3.4% of females meet the recommended amount of fiber intake of 18-30 grams per day. In contrast to the low intake of fruits and vegetables, Bruneian children aged 0-5 were found to consume high amounts of saturated fats and sugary drinks.

Second, eating patterns are also regarded as problematic. Males aged 15-29 and females aged 15-19 show the tendency to miss breakfast two times per week (Ministry of

Health, 2013 : 21). In addition, our field observation and interviews revealed that some Bruneians' eating habits are contributory to the rising incidences of overweight and obesity. For example, frequent social and family gatherings are most likely accompanied by high-fat, high-calorie foods, drinks, and desserts. Because take-away foods are relatively cheap, easily available and accessible, many families rely on such take-away meals rather than prepare and cook their own meals. At the very low price of one Brunei dollar, a typical take-away meal may contain rice and one relish such as a piece of fried chicken, accompanied with sweetened, chili-based gravy.[4]

3. Nutrition Education in the School Curriculum

The education system in Brunei Darussalam is modeled on the British system (Oxford Business Group, 2009 : 161). It fundamentally comprises six years of primary school, two years of lower secondary education, two or three years of upper secondary school, two years of pre-university institution, and two years of college or three to four years of university (Southeast Asian Ministers of Education Organization, 2015). Brunei Darussalam has a good quality and free of charge education system right from the primary level to the end of college/university (International Bureau of Education, 2010/11). Following one year at pre-primary school, children enroll in primary school for six more years. The education system is largely content driven, with an emphasis on students' passing the examinations for the Primary School Assessment or Penilaian Sekolah Rendah (PSR) (International Council for Open and Distance Education, 2015). At the end of Year 6, students take the PSR, which assess their suitability for secondary education and place them in the appropriate secondary school course.

In Brunei Darussalam, home economics is included in the curriculum at the secondary school level (International Institute of Educational Planning, 2015 : 5-8), although it is not given great emphasis as a school subject.[5] The current Sistem Pendidikan Negara Abad Ke-21 (SPN 21)[6] educational system specifies that, for the lower secondary education, home economics is taught as one part of "Business, Art, and Technology" (BAT) subject. For the upper secondary education, home economics is no longer a subject for all students, though there is an elective subject called "Food and Nutrition."

As for the primary school level, the subject of home economics has not yet been introduced. Nevertheless, there are several related topics taught in science education at primary schools. In this section, therefore, the contents concerning food and nutrition were analyzed and compared between the sole primary school textbook used in Brunei

Darussalam, namely, Star Science, and the contents concerning food in the most popularly used textbook in Japanese elementary schools, *Atarashii Rika* (New Science) (see the table in Appendix 1 for details).[7]

Science at primary schools in Brunei Darussalam is divided into three stages. Years 1 to 3 consist of an introduction to the basic science of the body; then, from Years 4 to 6, there is a focus on sources of energy and subjects about organisms.

From Years 1 to 3, students start learning about their own bodies (Year 1, Unit 1, "Your Body"). Then, the focus broadens away from the students to things around them, such as to the taxonomies of animals in Year 2 (Unit 1, "Grouping Objects"). In Year 3, there is a focus on the environment around the students (e.g., Unit 2, "A Clean Environment"). Topics dealing with healthy food are covered in Year 2 and then again in more detail in Year 4. More specifically, in Year 2, the textbook states that rice, noodles, fruits, and vegetables are examples of healthy food, as are meats such as chicken and fish. It also says food such as French fries, doughnuts, chocolates, etc. are unhealthy because they have too much oil and fat. Moreover, to keep your body strong and healthy, you need to eat healthy food. Also, unhealthy food that is not good for your body and eating too many snacks can make your body unhealthy. The textbook does not explain at length why eating too much fatty food can make a person overweight. By contrast, in Year 4, children learn the contents of carbohydrates, proteins, vitamins, minerals, fats and sugar, water, and roughage. They also learn about the effects of these compounds. For example, they learn that vitamin A helps to keep one's skin and eyes healthy. Moreover, they learn how energy is produced and how the body digests food, so they can discuss food and diet logically. In Year 5, they learn the importance of eating healthy foods for preventing the spread of diseases. In Year 6, children learn the effects of medicinal and harmful medicines but the textbook makes no mention of home economics topics.

Unfortunately, however, despite learning how to make salads for healthy meals in the textbook for Year 2, there are no cooking practice classes in Brunei Darussalam. The real knowledge comes through practice. Furthermore, in Year 4, because students learn useful nutritious components of food and related knowledge as well as established cooking based on nutritional science, they should be ready for cooking practice for the first time.

Furthermore, from a comparative perspective with Japan, it may be beneficial that the school curriculum includes home economics that emphasizes a combination of theory and practice as one subject so as to promote a healthy lifestyle among children. For example, in home economics classes in Japan, students have many opportunities to learn

food selection and cooking methods, which are not taught in Brunei Darussalam's science classes. As a result, when Japanese students eat out or bring take-away food home, they may be equipped with the knowledge associated with the choice of food. Therefore, it is necessary to provide an opportunity for citizens, in particular, children, to learn how to select and cook food properly. It is important for the school curriculum in Brunei Darussalam to begin incorporating special topics and classes on home economics tailored to the needs of the society.

4. Nutrition Education in Special Programs

Faced with the rising public awareness of healthy lifestyle, an increasing number of schools in Brunei Darussalam are incorporating non-curriculum-based, health-related programs. Some public schools have nurse education officers who regularly carry out programs to promote a healthy lifestyle in assigned schools, particularly on overweight and obesity control, enhancing physical activities, cleanliness and monitoring of toilets and canteens, and anti-smoking. To cite an example, Sekolah Rendah Pulaie, a public primary school in Bandar Seri Begawan, conducts a program to promote the selling of healthy food at the school canteen, along with other health programs (i.e., fitness club, health talks and activities, and tooth-brushing activities). The program, which is known as the Food Traffic Light System, was developed after the Guidelines on the Sales of Foods and Drinks in School Canteens was issued by the Ministry of Health and has been monitored by the Ministry of Education since 2009.[8]

In Brunei Darussalam, where children attend primary school in either the morning or the afternoon,[9] there is no school lunch system as in Japan.[10] Students have only a snack during the break time. They can bring a snack from home or buy it at the canteen located inside the school compound. School canteens are commercially operated with a government license. Each school has a canteen committee to monitor its sales of food and drinks.

The Food Traffic Light System specifies recommended food and beverages that should be sold at school canteens in order to promote healthy eating and safety among schoolchildren. In 2009, at the start of the program, the guidelines explaining the Food Traffic Light System were distributed to the representatives of all schools in Brunei Darussalam, including private and religious schools.[11]

The guidelines use three color codes—yellow, green, and red—to simplify which food and drinks should or should not be sold at school canteens. Yellow denotes food

that can only be sold twice a week, such as plain rice with vegetables, burgers and chicken nuggets, chips (air fryer), waffles, buttermilk chicken and spaghetti, sugarless dried foods, shepherd's pie with pasta, and popcorn. Green is assigned to foods such as sandwiches with eggs, tuna, sardines or vegetables, fresh fruits and mushroom soup, low fat milk, and thin crust pizza, which can be sold every day. Red, on the other hand, signifies food and beverages that are not allowed to be sold, such as chewing gum, chocolates, fried cakes, and any food that contains high calories (see the photos in Appendix 2).[12] The guidelines also suggest not to use processed food products and recommend instead using self-prepared, fresh products. For this purpose, cooking demonstration classes have been held by chefs for school canteen operators, followed by demonstrations on the safe use of gas cylinders and regulators.[13]

According to our interviewees, the outcome of the implementation of the guidelines had been reported to show mixed reactions. The interviewees made a positive comment that the program is an effective way to introduce children to a healthy diet (e.g., steamed potatoes instead of fried potatoes) and make them aware of what "healthy food" items are.[14] However, there are also those who have found its implementation rather difficult, as some canteen operators are unwilling to sell "healthy" snacks because they are sometimes unpopular with children and the guidelines have no enforcement power.[15]

From a comparative perspective with Japan, we may point out an alternative way of labeling food with colors. Japan also uses three different colors to classify various foods according to their nutritious value. According to the color-coded classification in Japan, red, which is associated with the image of blood and meat, indicates food that containing a good amount of protein. Likewise, yellow with the image of energy refers to food rich in carbohydrates and lipids, whereas green with the image of vegetables includes food containing a lot of vitamins and minerals. On the other hand, the Brunei method suggests that, similar to the idea of the traffic sign, green is the healthiest choice, while yellow, which contains many types of food, including energy food, also has a meaning similar to the meaning attached to yellow in Japan. The connotation of red is quite different between the two countries. In Brunei Darussalam, food items listed in the red category are those that are not allowed to be sold in school canteens, which include non-halal foods, energy-dense and nutrient-poor foods and drinks, and caffeinated beverages, while in Japan, food in the red category indicates, as stated earlier, a source of protein. The Bruneian way of associating "unhealthy" food with the image of red as in the traffic light system ("Stop!") may be a useful way to keep children away from it, espe-

cially considering that Brunei Darussalam has a high incidence of obesity and diabetes among its citizens. Nonetheless, it may be worth reconsidering methods to teach children the importance of balancing the diet according to nutritious content.

Conclusion

This paper presented the current situation of nutrition education in primary schools of Brunei Darussalam. Home economics education, which teaches knowledge regarding food and nutrition in Japan, is not part of the primary school curriculum in Brunei Darussalam. Nutrition and other lifestyle-related topics are taught instead in science classes at primary school. For example, in Year 4, students learn the contents of carbohydrates, proteins, vitamins, minerals, fats and sugar, water, and roughage and their effects on our bodies. There is no cooking practice performed by students themselves. Students nevertheless have opportunities to familiarize themselves with food and its nutritious values in special health-related programs. The recently introduced guidelines in Brunei Darussalam called the Food Traffic Light System specify recommended food and beverages that should be sold at school canteens in order to promote healthy eating habits among children. The guidelines use three different color codes—yellow, green, and red—to simplify which food and drinks should or should not be sold at school canteens, depending on each item's nutritious content, through which students are expected to cultivate habits to eat more "healthy" food items.

In order to strengthen nutrition education for the future, the following points were recommended to policy makers and researchers. First, actual cooking practice is expected to enhance nutritious knowledge that students learn during lectures. Second, establishing home economics as an independent subject in the school curriculum many strengthen the foundation of nutrition education in Brunei Darussalam and make it possible to provide the next generation with comprehensive knowledge and practices for healthy living. Third, with regards to the current Food Traffic Light System, it is worthwhile to revamp the color-coding system, in particular, red, which emphasizes the sense of danger to health by labeling unhealthy snacks, and instead offer positive concepts about practicing balanced food intake, as in the Japanese color-coding system. Although the two different ways of coding food with colors can each be effective in their own ways, it is fundamental that the idea of balancing one's own diet in terms of nutrition needs to be emphasized in the current Brunei educational system.

This study has a key limitation in that the data were self-reported and based on

documentation reviews. Therefore, the results may be subjected to reporting biases and variations in the documentation on the grounds of the implementation of the included programs and services. This study is a descriptive study that only provides a narrative review of the evidence. The triangulation approaches used in the method provide a holistic view in examining nutrition education at schools in Brunei Darussalam and Japan, as well as in making the comparison between the two countries. Future research in this area can focus on conducting quantitative and qualitative studies next to examine the impacts of the nutrition education curriculum on changes in knowledge, practice, and anthropometrics parameters among the students to reduce the prevalence of childhood obesity and promote a healthy diet, particularly for Brunei Darussalam and Japan. The key findings can be used by policy makers, managers, and professionals to plan, implement, and evaluate policies, services, and programs related to child health and curriculum-based nutrition education at school settings.

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1 One outcome of such efforts is the enactment of the dietary education Basic Law of 2005. It advocates the importance of food and nutrition education in and out of schools, known as *shokuiku* in Japanese. The content of food and nutrition education, however, varies by school, and accordingly, so do the effects of *shokuiku* programs. See the Office for Shokuiku Promotion, Cabinet Office, Government of Japan (2010) for details on the essence of shokuiku.

2 Brunei Darussalam is a multiracial society, comprising 66% Malays and 11% Chinese (Prime Minister's Office, 2011). People of other races such as Indians, indigenous ethnic groups, and expatriate workers make up the rest of the country's population.

3 The statistical figures on overweight and obesity are from the 1st National Nutritional

Status Survey (NNSS) 1997, Ministry of Health, and 2nd National Health and Nutritional Status Survey (NHANSS) 2009-2011, Ministry of Health.

4 Field observation and interviews on Bruneian diet and habits on February 13, 2014.

5 According to a former principal of one secondary school in Brunei Darussalam, a subject called "Needlework, Cookery & Housecraft" was introduced in the Brunei education system back in the 1970's. The subject was taught for students in the secondary level (secondary 1—secondary 3). In the late 90's, it was changed to "Food and Nutrition." In 2000, home economics (Needlework and Cookery) was introduced in 2000 but was gradually phased out when SPN 21 was introduced.

6 SPN 21, which stands for "Sistem Pendidikan Negara Abad Ke-21" (The National Education System for the 21st Century), is an educational policy approved by the Ministry of Education, Brunei Darussalam. The Brunei government started implementing this policy since 2009 (Southeast Asian Ministers of Education Organization, 2015).

7 In Japan, there is no science subject for Year 1 or 2 students; instead, they learn a subject called *seikatsu* (life environment studies), which includes the following contents that emphasize the students' own experiences: 1) school and life, 2) home and life, 3) community and life, 4) use of public property and public facilities, 5) seasonal changes and life, 6) school and life, 7) nature and play, 8) looking after plants and animals, 9) life and events (new contents), and 10) your own growth. From Year 3, students take science.

8 Interview with Cikgu Surayati binti Haji Abdul Samat, nurse education officer, Sekolah Rendah Pulaie, on November 6, 2013.

9 Generally, primary school hours in Brunei Darussalam are 7.45 am to 12.30 noon for the morning session, and 1.00 pm to 5.30 pm for the afternoon session.

10 The authors heard informal information from local Bruneians that the Brunei Government used to have the school feeding scheme targeting children in the rural area in the 1950's. Now the school feeding is only given to the primary school in the rural area. The information has not been confirmed by public documents.

11 Ubaidillah Masli and Rachel Thien, "Healthier choices to go on new school menus," *Brunei Times*, November 25, 2009.

12 ibid.

13 Achong Tanjong, "Serve only nutritious food in schools, canteen operators told," *Borneo Bulletin*, July 4, 2013.

14 Interview with school teachers at Sekolah Rendah Pantai Berakas, on February 12, 2014.

15 Interview with school teachers at Sekolah Rendah Pantai Berakas, on February 12, 2014.

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Southeast Asian Ministers of Education Organization. 2015. Brunei Darussalam. Available at http://seameo.org/index.php?option=com_content&view=article&id=107&Itemid=524 (accessed on March 10, 2015).

[Appendix 1]

Table : Contents of the Star Science primary school textbook dealing with lifestyle-related subjects in Brunei Darussalam

Year	Unit or Theme	'Let's learn about' or 'key questions'	Contents
1	Your Body	The parts of your body Our five senses Ways we are similar Ways are different	Your nose / Your tongue
	Living and Non-living Things.	Living things Non-living things	What do living things need?
2	Healthy Living	The things we need to stay alive What makes up healthy meals How to make some healthy meals	Staying healthy/Healthy food/Unhealthy food/Good eating habits/A healthy breakfast/A healthy lunch/A healthy dinner/Making healthy food
3	A Clean Environment	Keeping our home, classroom, school and public places clean	A clean home /A clean school /clean surroundings
	Reuse, Recycle	Ways to reuse objects Recycling	Rubbish, rubbish everywhere!
4	Variety and Classifications	What are living things? What are sense organs? Why do we classify thing into groups? How can we classify plants? How can we classify animals? How can we classify materials? What are the properties of materials?	Living and non-living things. Living things need air, food and water.
	Energy and Forces	What is energy? What are some forms of energy? How does energy change form one form to another? What are sources of heat? How does heat flow in solids?	Living things need energy. /Forms of energy/Stored energy/Heat conduction in everyday life
	Cycles	What is a cycle? What are some life cycles of plants? What are the different states of water? How can water change form one state to another? What changes in state take place during the water cycle?	Changing states of water in everyday life
	Personal Health and the Environment	How does food help your body? Why is it important to eat balanced diet? What are 'Go, Grow, Glow' foods? Why is it important to care your teeth? Why is it important to keep your body clean and healthy? How can you care for your sense organs? Why is it important to get enough rest and sleep?	Healthy food Food and your body /Carbohydrates/Proteins /Vitamins/Minerals/Fats and Sugar/Water and roughage/A balanced diet/GO, Grow, Glow Caring for your body Strong and healthy teeth
5	Personal Health and the Environment	What is an infection disease? What are germs? How are diseases spread from person to person? How can we prevent the spread of diseases?	Prevent the spread of diseases.

Note : Year 6 was excluded in this chart, because the textbook for Year 6 makes no mention of home economics topics.

Source : *Star Science* (primary school science textbooks used in Brunei Darussalam)

［Appendix 2 ］

Posters to promote the Food Traffic Light System to school children

Left：Green-colored snack items

Right：Red-colored snack items

（Photos taken by Naomi Hosoda, at Sekolah Rendah Pantai Berkas,February 12, 2014）