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Research Article

Comparative Study On 'Dietary Education' In Japan And Korea: From The Latest Nutritional Knowledge Perspective

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Abstract

According to the Japan's National Health and Nutrition Survey, trends in the intake of vegetables and fruits (1999-2018), which are considered effective in preventing lifestyle-related diseases, are far below the target value; In the under-50 age group, less than 30% achieved the target vegetable intake of 350 g, and less than 15% achieved the target fruit intake of 200 g [53].

Against such background, it has become a challenge to nurture children's 'self-management ability' that leads to spontaneous and healthy dietary habits [16]. Until now, almost all research on 'Dietary education' has been conducted in the field of nutrition, focusing on accumulating nutritional knowledge by explaining each nutritional component and its function.

However, it is difficult to nurture spontaneous and healthy dietary habits simply through repeated nutrition-based education. It can be said that the pedagogical approach of this paper has made it possible to pursue from a broader perspective that influences food choices.

Research on 'nutrition transition' points out "worldwide obesity dynamics and their determinants" based on "a shift in the broader patterns of dietary habits (Western-style diet) and corresponding nutrition-related diseases" [42]. Nutrition transition research [50; 40] has a broad and holistic perspective on food and health, making it easy to understand nutrition. The purpose of this paper is to pursue how to nurture the 'self-management ability' for spontaneous and healthy dietary habits, based on these latest nutritional knowledges.

Because nutrition transition is a global phenomenon, the author choses to use broader methods of international comparative research. Comparisons lead to discoveries and value creation. This can be said to have the greatest significance in comparative research.

Keywords:
lifestyle-related diseases; Dietary education; self-management ability; healthy dietary habits; nutrition transition

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1. Introduction

Health is a right for everyone, and the World Health Organisation (WHO) Charter stipulates that "the highest attainable standard of health is one of the fundamental rights of every human being."[1] However, a global nutritional issue is that a phenomenon called nutrition transition occurred without overcoming malnutrition, and we are forced to take action to address the double burden of nutrition (undernutrition and overnutrition) [22].

Lifestyle-related diseases are still increasing. According to the 'Status Report on Non-Communicable Diseases (NCDs)' published by the [46], NCDs[2] account for 70% of deaths worldwide, of which more than 80% are premature deaths[3] and are widespread in low- and middle-income countries. The World Health Organization has warned that NCDs are the biggest health issue of the 21st century, including their social and economic impact [48].

1 The WHO Constitution (1946): The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition (WHO 2006)

2 The main NCDs are cardiovascular disease (such as heart attack and stroke), cancer, chronic respiratory disease and diabetes (WHO 2014).

3 Means deaths between 30 and 69 years from NCDs (WHO 2013)

In Japan, the number of people suffering from lifestyle-related diseases continues to increase. One in two people will develop cancer during their lifetime (National Cancer Centre, 2018)[4]. Even in the case of the new coronavirus, there are reports that people with lifestyle-related diseases such as obesity, diabetes and chronic respiratory diseases are more likely to become seriously ill.

In South Korea, too, according to the National Health and Nutrition Examination Survey [34], data on mortality and causes of death (1938~1942) show that food shortages and malnutrition are the main causes, and infectious diseases predominate. In the early 1970s, this pattern reversed, with deaths from cancer and cardiovascular disease predominating. In this way, a phenomenon called nutritional transition is occurring in Japan and South Korea. Therefore, the challenge is to nurture children's 'self-management ability' that leads to spontaneous and healthy dietary habits.

On the other hand, most research on 'dietary education' in schools is based on nutritional approaches. However, it is difficult to nurture the 'self-management ability' that leads to spontaneous and healthy dietary habits by simply accumulating 'nutrient-based knowledge' [5] such as explanations of nutritional components and their functions. Nurturing spontaneity and independence are also a major theme of education. In order to nurture spontaneity in 'dietary education,' it is necessary to know one's own eating habits objectively, and a (pedagogical) approach from a broad perspective is the key [28].

Looking into the latest nutritional knowledges, the [47] 'Action plan for NCDs prevention' states that most NCDs (non-communicable diseases: lifestyle-related diseases) can be prevented through diet and exercise. Research on 'nutrition transition' points out 'worldwide obesity dynamics and their determinants' based on 'a shift in the broader patterns of dietary habits (Western-style diet) and corresponding nutrition-related diseases' [42]. According to the [50], the dietary changes that characterize the nutrition transition are a shift toward higher energy diets, that are fatty (oily) and contain added sugars in foods. That is, a diet with greater saturated fat intake (mostly from animal sources), reduced intake of complex carbohydrates (such as unrefined whole grains), dietary fibre, fruits, and vegetables. "These dietary changes are compounded by lifestyle changes that reflect reduced physical activity at work and in leisure time."

'Nutrition transition research' [50; 40] has a global and holistic perspective on food and health, and it has characteristics that make nutrition easier to understand. There is a high possibility that spontaneity will be induced because they will objectively understand their dietary habits. (The existing nutrient-based nutrition science will also become more useful knowledge for mental and physical health, and will be used even more if these perspectives are reflected: [26]) Therefore, it is necessary to consider 'dietary education', from the 'nutrition transition' perspective, which is becoming a human issue. The purpose of this paper is to clarify the extent to which the concept of 'nutrition transition' which comprehensively considers food and health, is reflected in dietary education in Japan and South Korea, and based on these latest nutritional knowledges, to pursue how to nurture the 'self-management ability' for spontaneous and healthy dietary habits.

Previous research on 'nutrition transition' has been cited to explain the nutritional status of populations, including the double burden of malnutrition (undernutrition and overnutrition) [24], or research such as individual epidemiological verification aimed at "integrated understanding of health events" [20].

Any literature on nutrition transition research in 'dietary education' could not be found using the 'Nutrition Transition / dietary education' keyword in the 'National Diet Library Search,' and hardly appeared in Google Scholar. In Japan, the concept of 'nutrition transition' is not yet commonly used in 'dietary education.' So, the author decided to Google, Popkin's 'Nutritional Transition Program' to extract about 500 papers and cite four of them. Popkin has published over 600 journal articles and is one of the most cited nutritionists in the world. PLOS (Public Library of Science: a publisher of open access journals and scientific literature in English) ranks him as one of 203 out of 6.8 million scholars in citations (H-index -171).

4 National Cancer Center HP: https://ganjoho.jp/reg_stat/statistics/

5 [21] criticized the nutritionalism (nutrient-based) aspect, which can lead in any way by emphasizing each nutrient.

Thus, in the field of 'dietary education,' there has yet to find any research, which has a global perspective and comprehensively considers food and health based on the concept of 'nutrition transition.'

As a research method, the author first conducted a literature survey on 'changes in dietary habits and disease structure (nutrition transition)' and the current status of dietary education in Japan and South Korea. Next, in order to verify the content obtained from the literature survey, the author conducted a questionnaire survey, among teachers and school nutrition staffs responsible for 'dietary education' in Japan and South Korea. The survey was conducted in mid-April 2019 in Japan and in late the same month in South Korea. The author obtained responses from 92 Japanese and 104 Koreans, and analysed them using a chi-square test. The author declares that consent has been obtained from the respondents that the data will be used for academic purposes only.

2. Decline of Traditional Diets and Nutrition Transition

Over the past half-century, diets have shifted toward the 'Western diet', broadly defined by high intakes of refined simple carbohydrates,[6] sugars, fats and animal products. Due to changes in dietary habits, obesity and lifestyle-related diseases (chronic diseases) are increasing worldwide. [40] describes nutrition transition as follows: "The concept of the nutrition transition focuses on large shifts in diet and activity patterns, especially their structure and overall composition (major changes in health status; This shift toward increased obesity and non-communicable diseases <NCDs>)." It is defined as "broad

patterns of food use and corresponding nutrition-related diseases." He pointed out that the fundamental cause of nutrition transition is urbanisation. And argued that, changes in the food system associated with food marketing and sales due to globalization (access to cheap, processed, high-fat, high-sugar, and salty foods), and the decrease in physical activity due to technological innovation has had a major impact on lifestyles.

Thus, a rapid increase in global overweight and obesity was demonstrated, associated rapid changes in diet and activity were documented, and despite being a major health challenge facing the world, the current situation is that few countries are seriously committed to preventing the dietary challenges that facing [41].

2.1. Case studies on Nutrition Transition

2.1.1. NCDs in South Pacific Island Countries

As the background of the world's worst NCDs health index in the 'South Pacific Island Countries', [23] point out that "in recent years, opportunities to eat traditional meals have decreased, and the so-called Western-style diet, in which fast food and processed foods are common has rapidly penetrated," and "decrease in physical activity due to the shift from traditional agricultural lifestyle to urban lifestyle."

In Micronesia, the nutrition transition has occurred in a short period, making it easy to understand the relationship between dietary habits and rapidly increasing obesity / lifestyle-related diseases. [36] integrated many studies, and reported details on the changing dietary habits in this region, and the role of modernization (loss of traditional eating habits) on obesity.

In this way, a nutrition transition has occurred with the declining traditional diets and the shift to Western diets [30].

2.1.2. Research on the longevity Village

gives the following example: Rice is not available at the Village of longevity YUZURIHARA, located in the eastern part of Yamanashi Prefecture. And grains such as barley, millet, sorghum, and buckwheat, and beans, potatoes, vegetables, edible wild plants, etc. that follow 'indivisibility of the body and the land' were the habitual foods. They ate dried fish, chicken, eggs, river fish, wild rabbits, etc. on special days. The following is said to be common to 'death[7]': "His death comes suddenly, without the slightest anguish or terror, and he seems to be passing through the realm of religious exultation."

6 Simple carbs are the opposite of complex carbs, highly processed and refined, stripped of dietary fiber, vitamins and minerals. Sugar is the typical 'simple carbohydrate.' [3]

7 100-year-old Haru Ishii been said that her granddaughter-in-law, who had been talking to her cheerfully just now, went outside to pick up dried fish and when she came back, she was dead. 97-year-old Tomi Miura had been feeling cold for the past few days, but one morning her 70-year-old daughter-in-law offered her tea, she tried to drink, but she felt sick, and as soon as she returned to the next room she ascended to heaven.

In addition, although the elderly are healthy, many of the middle-aged people born in Taisho era became paralysed on one side due to cerebral vascular disease and are living as crippled or half-ill. The author (Komori) has often seen the unfortunate sight of an old father holding his son's funeral (while lamenting what curse it is).

Furthermore, it is reported that the intestinal environment of the elderly in the longevity village was richer in beneficial bacteria, Bifidobacterium, compared to the elderly in urban nursing homes. Regarding the sudden shift from traditional to modern diets, [7] stated, "Lack of dietary fiber causes obesity and adult diseases, seriously threatening the health and lives of middle-aged and elderly people."

These are contents that it is possible to live a healthy life within traditional food culture.

2.2. Nutrition Transition Research and Large-scale Epidemiological Studies/Meta-nutritional Science/ Population Dynamics

Unhealthy eating habits, which are risk factors for NCDs (non-communicable diseases: lifestyle-related diseases), shown in nutrition transition research [50; 40] are almost consistent with the content of large-scale epidemiological studies.

Furthermore, it is also almost consistent with [38] study on population dynamics (A study consisting of statistics showing that the pattern of causes of death is shifting from infectious diseases to 'Man-made Diseases: lifestyle-related disease'). [42] argue that 'nutrition transition' is a concept closely related to Omran's 'epidemiological transition.'

'Epidemiological transition' has been theorized as the study that explores the determinants of population change from the distribution of disease patterns and mortality rates. Research on population dynamics has been conducted in detail, using a wide variety of statistical materials such as the 'Population Bulletin of the United Nations 6 (UN1962: in [38]).' According to this report, in Japan, the increase in the number of deaths from cardiovascular diseases was particularly remarkable after 1945, and a 'nutrition transition' was already recognized.

The first large-scale epidemiological study that clarified the relationship between diet and health was the 'Dietary Goals for the United States', known as the McGovern Report (United States Senate Special Committee on Nutrition Issues Report: UNITED STATES SENATE, 1977) [33]. This is a global study that took 7 years, invested tens of millions of dollars in government funding and received the cooperation of more than 3,000 medical doctors and nutritionists from around the world, and a 5,000-page report on the relationship between diet and health problems. It reported that cancer and heart disease were rare diseases in the United States in the early 20th century, and cancer and diabetes are almost non-existent even in developing countries. It has been emphasised that the rapid increase in diseases such as cancer, heart disease and stroke in developed countries is caused by high-calories, high-fat meat and dairy products [31].

8 Meta-nutritional science is published in three reports [30; 27; 29] from the National Scientific Information Database: CiNii.

The largest-ever epidemiological study was the China Study [3] conducted in China. It involved 650,000 workers in a survey of 880 million people on dietary habits and cancer mortality. The late Chinese premier Zhou Enlai was diagnosed with cancer, and shortly before he died, he thoroughly investigated cancer (People selected for the study were restricted to ages 35 to 64). The final result of this study is that cancer is almost non-existent in dietary habits (very high in plant foods) in rural areas of China, whereas it occurred frequently in economically developed areas such as urban areas (Western diets, where animal products are very abundant). He asserts cancer to be a 'disease of abundance' and 'disease of overnutrition', and recommends eating unrefined grains (such as brown rice and whole grains), vegetables, and fruits. (In recent years, urbanisation and market globalization have increased the consumption of total and animal fat even in low-income populations: [40])

There is [25] as a study that comprehensively considers food and health in Japan, and its content is similar to large-scale epidemiological studies. This study was conducted by extracting 6,830 research papers based on all meta-analyses on diet and disease up to 2014 from PubMed, a U.S. government agency that collects medical papers from all over the world.

This paper was conducted by selecting 608 articles and integrating from among them. Looking at its integrated content, all extracted articles are categorized and visualized for easy comparison and objective identification for readers. For example, 'Table 1-1 Meta-analysis list of meat/protein and colorectal cancer', in Chapter 2-1 'Meat and Vegetables: The truth about these extremes of food,' includes a 2014 paper (PubMed ID: 24842864) on Japanese subjects, which is the result of integrating four cohort studies (high-precision epidemiological studies), and analysing data from 260,000 people. It is shown that 'those who eat a lot of red meat have a 20% higher risk of colon cancer.'

The meta-nutritional science [8] proposed in this study is scientifically proven nutritional science for healthy diets based on meta-analysis of food and health. And showed a correlation that a diet centred on

excessive animal foods is a cause of lifestyle-related diseases, concluding that vegetables are effective in preventing many diseases.

Nutrition transition is mainly explained by the imbalance between dietary intake and energy expenditure and the related obesity dynamics, and large-scale epidemiological studies are approached from food and health. However, NCDs risk factors indicated are almost identical. Both cited a diet high in saturated fat (animal foods), and low in complex carbohydrates (unrefined whole grains) and dietary fibre as the main risk factors.

Although meta-nutritional science and nutrition transition research are different studies, their scientifically derived conclusions regarding the relationship between diet and disease are completely consistent. By incorporating the concept of nutrition transition which has such a global and holistic perspective of health, the relationship between food and health becomes easier to understand. Therefore, these studies have the potential to nurture a holistic perspective on food and health, leading to the nurture of self-management ability such as food choice, necessary for forming healthy dietary habits.

2.3. Characteristics of Traditional Foods

According to the [18], although no conclusion has been reached regarding the basis for a 'healthy diet,' it is necessary to organize what a 'healthy diet' should be in view of future social and health issues, and "clarify what it should be." It also written, "The term 'healthy diet' does not refer to specific nutrients or specific ingredients, nor does it refer to specific foods that are marketed as having health benefits. When considering what a 'healthy diet' should be, it is necessary to take into account people's lifestyles, their environments and the food culture behind them."

According to the [13], 'Washoku: Japanese food' is defined as "traditional food culture that our country should protect, which has been nurtured against the backdrop of the natural environment surrounding us and the unique culture of our country/region." The Ministry of Education, Culture, Sports, [16] states that local cuisine and event foods are representative of traditional food culture.

In this way, traditional foods have been nurtured as a food culture through dietary education in school lunches, but this paper focuses on traditional foods that have maintained people's health. From this perspective, the author believes that the characteristics of traditional foods can be approached by looking back at traditional diets that have declined due to nutrition transition.

9 It is said that the finest blue cheese is produced in the world heritage village of Roquefort-sur-Soulzon in southern France, the blue mold of Roquefort cheese is the only one in the world that exists only in this cave. What is the finest cheese made in a world heritage village? (TBSTV "World Heritage" 2020/10/18) https://topics.tbs.co.jp/article/detail/?id = 10,941

Traditional foods may have to be understood in the context of whole life. In other words, it consists of foodstuffs, fungi, etc. that are rooted in the land. For example, fermented foods that involve microorganisms are produced by lactic acid bacteria in pickles, cheese[9], and yogurt, etc., acetic acid bacteria in vinegar, and Bacillus natto in natto [8]. The author believes that foods that have been eaten in forms that suit people's lifestyles as eating habits that have continued with people's lives over a long history, including the methods of obtaining them through hardship are close to 'traditional foods.' It is also truly a food culture nurtured from the relationship with all aspects of life.

In this section, the author explored the characteristics of traditional foods from traditional diets that have declined due to nutrition transition. Studies, such as [36], have identified the relationship between changes in dietary habits (loss of traditional diets) due to modernisation and market globalisation, and obesity/NCDs. What can be said from research on modernisation and changes in dietary habits is represented by the following words of [19]: "In the past, traditional diets may have led to malnutrition or nutrient deficiencies, and natural selection may have played a role, but they were fairly healthy, with little tooth decay or obesity. In recent years, modernisation has progressed and the staple food has begun to shift from potatoes to grains (rice and bread)."

The consequences are similar to an increase in inappropriate and unhealthy diets [50], leading to rising obesity rates and lifestyle-related diseases.

From these studies, we can learn what has decreased and what has increased during the "major changes in dietary habits that have occurred over the past 50 years" in Japan. It is the same as what [50] states on diets contributing to NCDs; That is greater saturated fat intake (mostly from animal sources), reduced intake of complex carbohydrates (unrefined whole grains), dietary fibre, fruits and vegetables.

10 Holism is explained in contrast to reductionism (sub-divisionalism). The purpose of reductionism is to know the cause and effect of a certain element, so it adopts a method of detailed analysis by excluding other elements. For this reason, modern nutritional science is based on the premise that each nutrient acts mechanically and independently. Holism, conversely, deals with the "infinite interactions of food, nutrients, and body that are related to health. It is also explained by bioavailability, which states that there is no proportional relationship between the nutrient intake and amount used for metabolism.

Therefore, the characteristics of the traditional diet seems to be a diet based on plant foods, eaten since ancient times, and is close to whole foods, making extensive use of low-refined grains, potatoes, etc. These foods, when consumed in their unrefined, unprocessed, natural context (whole and unpeeled), "most of the carbohydrates are in the form of 'complex'" [3]. Additionally, [2] also proposed a new nutritional science 'PBWF (plant-based whole food)' with the perspective of holism (whole and inclusive) [10], based on his own 'large-scale epidemiological study.' It is important to consider dietary education from such a broad perspective. The author believes that by reflecting such a holistic perspective on food and health in dietary education, children will be able to understand the relationship between dietary habits and obesity, and lifestyle-related diseases, which will help them nurture the self-management ability, necessary for forming healthy dietary habits.

Also, the following research can be cited that may help understand the role of complex carbohydrates, abundant in traditional foods.

[2] argues that when nutrients are absorbed, there are "infinite interactions between food, nutrients and the body," so there is no direct relationship between nutrient intake and metabolic usage. And, based on experiments on the antioxidant effect of apples [37], he explains: 100 g of raw whole (half) apple was tested for vitamin C antioxidant activity, equivalent to 1,500 mg of vitamin C. However, a chemical analysis of 100 g of the same apple revealed only 5.7 milligrams of vitamin C. The antioxidant activity of vitamin C found in 100 g of a whole apple was equivalent to whopping 263 times the power of the isolated chemical. Unless you consume the whole apple, the potential of vitamin C alone is not as effective. The findings of this study were published in the prestigious scientific journal Nature.

The excellent nutritional components of vegetables and fruits are not well known yet. Research on plant-based foods, which have a great impact on human health, is just beginning, and it can be said that there may be many unknown excellent nutritional components of vegetables and fruits. [3] state 'there are no nutrients found in animal foods that cannot be obtained in sufficient quantities from plants.'

2.4. Recommended Meals from the Perspective of Nutrition Transition Research / Meta-nutritional Science

Without concrete suggestions about what kind and amount of food intake in a day, it will be an empty theory.

Therefore, first, it is necessary to understand the contents of the nutrition transition indicated by [50]. The dietary changes that characterize the nutrition transition are a shift toward higher energy diets, that are fatty (oily) and contain added sugars in foods. That is, a diet with greater saturated fat intake (mostly from animal sources), reduced intake of complex carbohydrates (such as unrefined whole grains), dietary fibre, fruits, and vegetables. It has been pointed out that "such dietary patterns and changes in lifestyle due to urbanization" interact in complex ways to cause NCDs (non-communicable diseases/ lifestyle-related diseases).

11 World Health Organization (2020) Nutrition and COVID-19 https://www.emro.who.int/nutrition/covid-19/index.html

Based on this, the author can suggest the following (one serving is 70–100 g): Diet recommended by WHO 2020[11] for adults:

Grains (including unrefined whole grains) as the staple food

4 servings of fruit (280–400 g/day)

5 servings of vegetables (350–500 g/day)

Meat and beans (together) 160 g/day

(Nutrition advice for adults during the COVID-19 outbreak)

For children:

3–4 servings of fruit, 4–5 servings of vegetables

(Feeding young children during the COVID-19 outbreak)

The meat (protein) in this case may be replaced with fish. According to a meta-analysis study by [32], "if you eat 60 g of fish per day, there is little additional merit (almost none) from eating more."

[11] states that you can eat as many vegetables and fruits as you like. She pointed out that meat does not contain any dietary fiber, antioxidants, and phytochemicals at all (of which there are said to be more than 10,000 types), etc. which are essential for preventing and improving disease. Furthermore, the [14] states that 'sweet fruits do not make you fat'; Same as starch carbohydrates (complex carbohydrates), 1 g contains 4 kilocalories.

Based on the latest nutritional knowledges by [50], [40], etc., the following suggestions also can be got: Japanese traditional food Washoku (one soup and three side dishes) can become a universally healthy diet by incorporating various grains including brown rice (unrefined whole grains), and limiting the intake of animal products and oils.

3. Comparison of Dietary Education in Japan and Korea from the perspective of Nutrition Transition Research / Meta-nutritional Science

In this chapter, the author will re-examine the issues that emerged from the dietary education literature survey, and clarify the extent to which the concept of nutrition transition reflected in dietary education in Japan and South Korea, using a questionnaire survey of nutrition teachers and school nutrition staffs. And then, the author will pursue what is important in dietary education and how to nurture self-management ability that leads to spontaneous, independent and healthy dietary habits. The questionnaire survey received responses from 92 Japanese and 104 Koreans.

12 "Registered Dietitian Curriculum (Outline: Ministry of Health 2001)," [6]

13 Nutritionist Toumi (Aid Association) https://www.kdclub.com/menu/license1.php

3.1. Comparison of Nutritionist Training Curriculum

South Korea has the Dietary Life Education Support Act [35], which is equivalent to Japan's Basic Act on Shokuiku (Food and Nutrition Education), and there is a common basis for promoting school lunches through law-based policies. In both countries, dietary education is expected to play an extremely effective educational role. First, let's take a look at the nutritionist training curriculum.

Japan: Nutrition teachers are expected to be educators with expertise in nutrition and educational qualities [15]. To investigate the subjects required to obtain a nutrition teacher licence, looking at the training curriculum [12] for dieticians and registered dietitians, six specialized subjects and educational goals are listed. Looking at the descriptions of nutrition in specialised subjects, basic nutrition science is based on the metabolism of energy, and nutrients and their physiological roles.

As a result, for example, calcium-rich school lunches (Chinese cabbage boiled in cream, yellow peach covered with yogurt, milk and bread) [54] emphasizing the abundance of dairy products, have been created by pursuing only a specific nutrient, calcium.

As far as looking at this 'Summary,' the issue has become clear that the training curriculum for nutrition teachers does not reflect the latest nutritional knowledge, such as the concept of nutrition transition [50] which provides a holistic perspective on food and health.

South Korea: Looking at the current status of dietician (nutrition teacher) training (National Dietitian Exam Subjects and Course Standards: National Nutrition Management Act Enforcement Regulations, Article 9) [13], similar to Japan, no subject groups were found that reflected the concept of nutrition transition which provides a holistic perspective on food and health, in the dietician training curriculum.

3.2. Survey comparison

In both Japan and South Korea, school lunches are largely left to the discretion of nutrition teachers and school nutrition staffs [5; 4]. Therefore, nutrition teachers and school nutrition staffs are required to take charge with confidence. To achieve this, it is important for teachers to have confidence in their own eating habits and health management.

Therefore, the author investigated the 'subjective health level' of nutrition teachers and school nutrition staffs regarding their health, which can be considered their 'self-management ability.'

Those who answered that they consumed 350 g or more of vegetables, and seaweed, etc. per day, and those who answered that they exercised such as physical activity or walking for about 20 minutes a day (almost) every day were categorised to be in 'healthy group = Japan: 50 (54%) / South Korea: 64(62%).' Others were categorised as 'anxiety group (with health concerns) = Japan: 42 (46%) / South Korea: 40 (38%).' The categorisation was based on dietary habits and lifestyles considered to be responsible for the 'nutrition transition' described by [50].

14 I started this research as a member of the NPO 'Food and Health Information Evaluation Association' several years ago, which advocates 'Meta-nutritional Science' based on 'meta-analysis of food and health.' I experimented and put the findings of 'nutrition transition research / large-scale epidemiological studies / meta-nutritional science' into practice and became healthier. Moving my body frequently, spend time in the sunlight for approximately 15~20 min/day, and I finish eating about 3–4 hours before bedtime. The intestinal environment has also been improved by eating a plant-based diet consisting mainly of whole foods such as a staple food containing whole grains, and intakes of lots of vegetables and fruits (vegetarian who eats everything: [25]). I regained the health that I was about to lose, and my health anxiety disappeared.

a) Comparison of lifestyle habits / health status

i Vegetable intake:

Almost/350 g or more [17], answered that they would eat, were 48% in Japan and 53% in South Korea.

ii Fruit intake:

According to this survey, based on the [14], 17% in Japan and 41% in South Korea of the respondents respectively answered that they consumed about 200 g or more, which was higher in South Korea.

iii Staple food:

People who consumed grains (including unrefined whole grains) were 24% in Japan and 52% in South Korea, respectively.

iv Sleep:

45% of the respondents in both Japan and South Korea answered that they were tired/fatigued after waking up. Considering that Respondents in their 20s and 30s are included 37% in Japan and 24% in South Korea, the situation cannot be said to be sufficiently healthy.

b) Comparison of school lunch contents

i Comparison of rice/traditional meals and bread meals

Japan: Rice accounted for 52.8% of the year, and rice and bread were served almost equally.

South Korea: Rice was provided almost 100%, and bread was provided only a few times a year. Additionally, rice was not served alone but with grains such as barley, millet, and beans [55].

Similarly, in this survey, those who answered bread was provided twice or more times a week were 70% in Japan and 4% in South Korea.

ii Comparison of leftover food rates:

In this survey, the highest percentage of leftover was vegetables, 61% of Japanese respondents and 51% of Koreans.

c) Survey results

The concept of nutrition transition was hardly reflected in literature and field surveys, in both Japan and South Korea. In both countries, the vegetable intake rate of nutrition teachers and school nutrition staffs in charge of school lunches was low. In both countries, nearly 30% of the respondents were in their 20s and 30s, however many were concerned about their health; 45% of respondents answered they had problems with sleep quality and remained tired even after sleeping. In both countries, nutrition teachers and school nutrition staffs in charge of school lunches were not highly aware of the importance of whole grains, vegetables, and fruits. The rate of leftover vegetables exceeded 50% in the school lunches they instructed.

If nutrition teachers and school nutrition staffs understand the concept of nutrition transition and have a holistic perspective on food and health, it will become the cornerstone of dietary education, possibly leading to respond with confidence.

Furthermore, according to the [56], approximately one-third or about 1.3 billion tonnes of food produced for human consumption in the world is either lost or abandoned annually. We cannot turn our eyes away from these facts. By learning from a broader perspective about what is happening now, such as the current state of the global food environment and food loss issues, children can learn more deeply about the meaning of leftover food. This will lead to nurturing the spontaneity and independence in choosing healthy foods, necessary for self-management ability.

3.3. Chi-square Testing

The chi-square test was conducted on the relationship between dietary habits and 'subjective health level' of nutrition teachers and school nutrition staffs, using 0.1 as the value of the significance probability p.

In relation to the 'anxiety group (with health concerns),' with low intake of vegetables and fruits was significant in Japan, and with low intake of vegetables was significant in Korea.

3.4. Discussion

A limitation of this paper is that, because it approaches dietary education from a broad framework of food and health, the details of the content were not sufficiently discussed. A serious discussion is still needed. However, it can be said that it showed the possibility of nurturing self-management ability for spontaneous and healthy dietary habits, having a large contribution.

A survey by the United Nations World Food Programme (2020) reported that 73 million elementary school students in extreme poverty in 60 countries are experiencing difficult circumstances, such as being excluded from the national school lunch programme. On the other hand, various problems such as

Table 1. Comparison of 'dietary habits' and 'subjective health' by $\chi 2$ test

Japan/South Korea	Healthy G (n = 50/64)	Anxiety G (n = 42/40)	Test result
vegetable intake status			
Nearly / 350 g or more	36/49	8/6	p = 0.0000 / p = 0.0000
Somewhat / less	14/15	34/34	** (p < 0.01) / ** (p < 0.01)
fruit intake status			
Nearly / 200 g or more	14/30	2/13	p = 0.0029 / p = 0.1064
Somewhat / less	36/34	40/27	** (p < 0.01) / ns (p > 0.10)

obesity and allergies have been pointed out in school lunches in high-income countries. Therefore, the author clarified the extent to which the concept of nutrition transition, which has a holistic perspective on food and health and influences one's own eating habits, is reflected in dietary education in Japan and South Korea, and pursued how self-management ability for spontaneous and healthy eating habits be nurtured.

In both countries, the concept of nutrition transition was hardly reflected in the literature and questionnaire-based surveys. It has become clear that curriculum of the registered dietitian training course required for obtaining a nutrition teacher licence does not incorporate the latest nutritional knowledge, which has a holistic perspective on food and health, such as nutrition transition research. The main results of the actual survey revealed that the dietary habits of nutrition teachers and school nutrition staffs in charge of school lunches, had low intake rates of whole grains, vegetables, and fruits recommended in nutrition transition research. Chi-square test results showed that in relation to the health concern group, with low intake of vegetables and fruits was significant in Japan, and with low intake of vegetables was significant in Korea. In both countries, nearly 30% of the respondents were in their 20s and 30s, however many were concerned about their health; 45% of respondents said they had problems with sleep quality and remained tired even after sleeping.

In both countries, vegetables had the highest rate of leftovers in the school lunches they taught. It cannot be said that the instructors are highly aware of the importance of whole grains, vegetables and fruits. This suggests that dietary education based on nutritional science focuses on each nutritional component and its function, losing sight of the overall perspective of food and health, and making it difficult to realise the importance of vegetables. It became clear that there were concerns about their instruction.

states that ‘education’ is not the transmission of knowledge, but must be ‘enlightenment’ that grows from within. The author believes: Through the knowledge acquired and highly aware of the importance by nutrition teachers and school nutrition staffs in charge of school lunches, children will also be enlightened and their intrinsic motivation will be aroused (motivated), and able to nurture self-management ability for spontaneous and healthy dietary habits. If they can understand the concept of nutrition transition and have a holistic perspective on food and health, it will become the cornerstone of ‘diet guidance’ and ‘school lunch management,’ it's possible leading to self-confidence in ‘own health’ [14] and ‘dietary education.’

The nutrition transition is primarily due to the Western diet broadly defined as a high intake of refined simple carbohydrates, sugars, fats and animal products. While many people have pointed out the environmental impact of livestock farming and the negative health effects of eating meat, Garrett (2015) warns that the raising livestock method, such as breed-improved cattle, chickens and pigs in small barns, can easily lead to the emergence of drug-resistant viral infections. Also, through eating meat from childhood, leads to exposure to many antibiotics, developing antibiotic resistance[15], and becoming ineffective. It can be said that it is difficult achieving only human health without development that considers the earth’s ecosystem (environmental capacity). Thus, to understand the relationship between food and one’s health through food which is the most familiar in childhood, and understand the environment surrounding food and its connections with people, have an important meaning.

15 NHK (2015/11/17). “Illnesses that can be cured cannot be cured: Crisis of antibiotics; Close-up Modern Age”: Antibiotics are no longer effective in children with otitis media. About half of the antibiotics showed resistance. WHO warned against developing resistance, such as not using antibiotics for colds and other illnesses, saying, “Modern medicine will not work as it is.” https://www.nhk.or.jp/gendai/articles/3733/

UNESCO’s Declaration of the Right to Learning (1985) states that ‘The act of learning’ is “at the heart of all educational activity, changes human beings from objects at the mercy of events to subjects who create their own history.” It is important to educate children so that they can become the subject of their history creation. The author believes that nurturing children's holistic perspective on food and health will influence their ‘food choices,’ help them develop independent and creative way of life which is important in education, and will nurture their self-management ability for spontaneous and healthy dietary habits.

4. Conclusion

A drastic (fundamental) change related to human life and survival are the 'nutrition transition', and "a shift in the broader patterns of dietary habits and corresponding nutrition-related diseases" has become a major indicator for food and health issues.

Over the past 50 years, dietary habits have changed significantly due to the effects of globalization and urbanization. The result has been an increase in inappropriate and unhealthy diets, that is increased intake of saturated fat (mostly from animal sources), and decreased intake of complex carbohydrates (such as whole grains), dietary fiber, fruits, and vegetables [50]. Research on 'nutrition transition' has linked these dietary changes to rising rates of obesity.

In this paper, the author argued that nutrition teachers and school nutrition staffs need to know the global trends regarding nutrition transition and have a holistic perspective on food and health, in order to influence children's 'food choice' and nurture 'self-management ability' that leads to spontaneous and healthy dietary habits. However, nutrition transition research in dietary education is hardly taken up as a research theme in Japan, and its contents are largely unknown. In both countries, research on the holistic perspective on food and health based on the concept of nutrition transition was hardly reflected in the researched literature or questionnaire survey. It is also possible that the concept of nutrition transition is not properly understood and reflected, 'dietary education' has become vague, making it difficult for children spontaneous healthy dietary habits.

If a holistic perspective on food and health based on the concept of nutrition transition is reflected in dietary education, children will be able to objectively understand their own eating habits, and make 'food choice' related to their own health, which may lead to the nurture of the 'self-management ability,' necessary for spontaneous, independent and healthy dietary habits. This kind of comprehensive knowledge about food and health will also play an important role in maintaining mental and physical health, and preventing lifestyle-related diseases.

The Ministry of Agriculture, [12] states that 'healthy diets are friendly to the global environment'. This is also a research theme that the author consistently pursues.

It is important to promote dietary education that comprehensively considers food and health, based on the latest nutritional knowledge such as nutrition transition research/meta-nutritional science, and tackle it as a challenge. It can be said that this has the potential to lead to solving the problem of nurturing 'self-management ability.'

Further empirical research to strengthen the claims of this paper is the author's future task.

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