

Food Consumption Behavior among Ethnic Minority Pre-School Children in Mae Chaem District, Chiang Mai Province, Thailand

Dararat Sroywong¹, Jukkrit Wungrath², Aksara Thongprachum²

Abstract



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Correspondence:

Jukkrit Wungrath, Faculty of Public Health, Chiang Mai University, Chiang Mai 50200, THAILAND.

E-mail: jukkrit.w@cmu.ac.th

¹ Master of Public Health Student, Faculty of Public Health, Chiang Mai University, THAILAND

² Faculty of Public Health, Chiang Mai University, THAILAND

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This descriptive cross-sectional study aimed to determine food consumption behavior among ethnic minority pre-school children in Mae Chaem district, Chiang Mai Province, Thailand, and was conducted from July to October 2020. The sample was 170 children aged between 3 to 5 years from 3 subdistricts of Mae Chaem district. The research instrument was an interview form with a closed-ended question structure for interviews with parents of children. Data were analyzed using descriptive statistics. The majority (74.4%) of respondents ate three main meals a day (breakfast, lunch, dinner). However, it was found that there were inappropriate food consumption behaviors from eating convenience food such as instant noodles, canned fish, sweet snacks, sweetened beverages, and other snacks, etc. It was found that most of the sample (82.9%) drank cow's milk, consuming an average of one cup of cow's milk per day, which was less than the recommended amount. The results of this study can be used to address consumption behavior in ethnic minority pre-school children jointly among nursery teachers, parents, and other stakeholders in order to further encourage pre-school children to have proper dietary behaviors.

Keywords: Pre-school children, Ethnic minority, Consumption behavior

What was Known

- Few studies on preschooler consumption behavior and eating habits in ethnic groups, Chiang Mai

What's New and Next

- There were inappropriate dietary practices and the majority of children drank less than recommended amounts of cow's milk
- Education and strategies on useful food consumption should be implemented for parents, teachers and pre-school children

Introduction

Pre-school children are at an age where they develop physically, emotionally, intellectually, and in terms of their personality. Therefore, in order to promote the good health of pre-school children, it is essential for them to get appropriate food intake, with regards to the proportion of all five food groups, and in the correct quantities needed to strengthen the body's growth and to use in various activities. Children need to be taken care of by parents or guardians who choose and prepare food for them to eat. Organizing a meal for a child at this age is essential¹. If the food intake is inappropriate in quantity and quality for an extensive period of time, it will cause nutritional problems, resulting in illness such as physical, mental, intellectual, and developmental abnormalities. More than 40% of children in developing countries have nutritional problems².

The World Health Organization (WHO) reported that 6.7% and 1.5% of pre-school children in Thailand were moderately to severely underweight and severely underweight, respectively². While 10.5% and 2.6% were moderately to severely and severely under WHO standards, 5.4% and 1.4% were moderately to severely underweight and under the WHO standard for height and 8.2% were obese, respectively. The above data shows that a number of Thai children still suffer from malnutrition, which is a major cause of health problems and affects intelligence and learning. From the report of the Thai Health Promotion Foundation³, it was stated that the average intelligence levels of Thai children aged between 0 to 5 years had dropped from 91.0 to 88.0, well below the WHO average of 90-110 from 1997 to 2009. Also, it was found that Thai children's age-appropriate development declined from 72.0% to 67.0%. Whereas the report still mentioned that 45.0% of Thai children were fed inappropriately according to their age, and their consumption of crunchy snacks and soft drinks increased 1.8 and 1.5 times, respectively^{4,5}. 90% of crunchy snacks are non-nutritious and contain excessive fat that is above recognized standards. It was found that the consumption of these snacks by Thai children amounts to an average 9,800 Baht per child per year, compared to only 3,024 Baht per child per year for education expenses^{4,5}. Such consumption behaviors result in Thai children experiencing both nutritional deficiencies and excesses, which put them at risk of growing up to become adults with poor health and poor quality of life^{4,6}.

Nutritional problems among rural pre-school children are more common than in urban areas⁷. However, the

severity of the problem varies. Chiang Mai is one of the provinces in the upper northern region of Thailand which is diverse in geography and demographics. Parts of the province are rural and mountainous. There are many ethnic minority populations living there. Mae Chaem is a district located in Chiang Mai Province and 80% of the area is plateau and mountain. The area is inconvenient for transportation. There is a large ethnic minority population, with the main ethnic groups being S'gaw (Karen), Hmong (Meo) and Lua (Lawa), representing 81.3, 13.7 and 4.9% of the ethnic minority population there, respectively⁸. Mostly, their occupations are in agriculture, planting, raising animals and hunting for forest ingredients. Their economic status is relatively poor, and many have no formal education. According to a 2019 report from Mae Chaem district public health office, 30.6% of pre-school children had malnutrition and stunting, which was higher than the national benchmark and the highest in Chiang Mai. The figure may increase in the future.

Malnutrition affects children's health, as they are susceptible to low immunity, infection, frequent illness, risk of chronic disease, and possibly death, and malnutrition affects quality of life in both the short and long term⁴. The WHO has determined that children with moderate and severe malnutrition have a five-fold and eight-fold risk of death, respectively, compared to children with normal growth⁵. Malnutrition affects intelligence levels and can lead to learning disabilities⁹. Malnourished children grow up to be poor quality adults when working and they earn less, affecting the development of the country, which causes economic and social losses both directly and indirectly^{10,11}. Malnutrition in pre-school children is caused by a number of factors, among which consumption behaviors including the type and quality of food consumed are important factors. In addition, the way of life of ethnic minority groups involves cultural traditions and beliefs, thus greatly affecting food consumption behavior and growth of pre-school children¹². Therefore, this research aimed to investigate the dietary consumption behavior of pre-school children from ethnic minority groups in Mae Chaem district, Chiang Mai province, Thailand, in order to pinpoint the food consumption patterns, which could assist planning to promote nutrition among these children in the future.

Materials and Methods

Ethical considerations

This study was approved by the Research Ethics Committee of the Faculty of Public Health, Chiang Mai

University (ET018/2020). Informed consent was obtained from the parents of the preschool children or a person legally responsible for each participant.

Population and sample

The study was a descriptive cross-sectional study conducted from July to October 2020. The research participants were children aged between 3 to 5 years from 3 subdistricts of Mae Chaem district. The sample size was calculated using the formula¹³ as follows:

$$n = \frac{NZ^2 \alpha/2p(1-p)}{(N-1)d^2+Z^2 \alpha/2p(1-p)}$$

by n = Sample size

N = Population size

p = The proportion value of stunted children from 482 children aged 3–5 years

($p = 0.32$)

d = The approximation accuracy is 0.07

$Z\alpha/2$ = The standard value under the normal curve is 1.96

An additional 10% was added to account for missing data. The calculated sample size was 170. Purposive sampling was used to select 3 subdistricts with a high prevalence of undernourished children, including Pang Hin Fon subdistrict, Mae Nachon subdistrict, and Ban Thap subdistrict of in Mae Chaem district, Chiang Mai province, Thailand. All households with pre-school children (based on the list obtained from each subdistrict health promotion hospital at the time of the survey) were eligible for recruitment. The households with young children were randomly sampled from the 3 subdistricts (Table 1).

Inclusion criteria

1. Ethnic minority pre-school children aged 3 to 5 years old who had a parent that could provide detailed information about them and who had stayed in Mae Chaem district for 1 year or more.

2. The child had parents who were sound-minded, and able to communicate and understand Thai language and voluntarily participate.

Table 1 Population and sample

<i>Subdistrict</i>	<i>Population N</i>	<i>n</i>
Pang Hin Fon	268	52
Mae Nachon	384	74
Ban Thap	226	44
Total	878	170

Exclusion criteria

Ethnic minority pre-school children with chronic malnutrition, bone diseases, pituitary gland disease and pituitary tumors and have genetic stunting, including Turner syndrome and skeletal dysplasia.

their child consumed on a 4-point scale (i.e., daily, 4–6 times/week, 1–3 times/week, and never). The content validity index was calculated as 1.00. The reliability was tested with the Cronbach's coefficient and delivered a total reliability score of 0.85.

Research instruments

Demographic information

The following demographic information was obtained for the children: sex, age, weight, height, birth weight, and underlying disease.

Data collection

Data were collected in interviews with parents during household visits by the researcher and trained and experienced data collectors who were fluent in the local language, using the interview – administered questionnaire. Data was collected between July and October 2021.

Feeding practice and consumption behavior of children

A feeding practice questionnaire was used to assess child feeding practices. The questionnaire was created by the researchers after a thorough assessment of the relevant literature and textbooks. Parents indicated how often children consumed various foods in the past seven days using the food frequency questionnaire (FFQ). Parents reported how much of each of five foods

Statistical analysis

The data were cleaned, checked for completeness, and all data were analyzed using STATA V.16 software. The data were presented using descriptive statistics including frequency, percentage, mean, and standard deviation.

Results

General characteristics

The 170 children were 50.6% male and 49.4% female (Table 2). Almost half (46.5%) were 4 years old. Maximum weight was 20.8 kg, minimum weight was 10.0 kg, and the average weight was 13.8 kg. The tallest child was 110.0 cm, and the shortest child was 80.0 cm, and the average height was 95.9 cm.

At birth, most of the children (88.8%) weighed more than or equal to 2,500 g. 95.9% had no underlying disease, whereas 4.1% had underlying disease, including G6PD, asthma, etc.

Most children (78.2%) were breastfed for more than 6 months. Less than half (43.5%) of the children received breastmilk plus formula milk plus complimentary food from 6 months to 2 years of age (Table 3).

Table 2 Participants' general characteristics (n =170)

Variables	n (%)
Sex	
Male	86 (50.6)
Female	84 (49.4)
Age (years)	
3	73 (42.9)
4	79 (46.5)
5	18 (10.6)
Weight (kg)	
Mean ± SD	3.8 ± 1.8
Minimum, maximum	10.0, 20.8
Height (cm)	
Mean ± SD	95.9 ± 5.6
Minimum, maximum	80.0, 110
Birth weight (g)	
<2,500	19 (11.2)
≥2,500	151 (88.8)
Underlying disease	
No	163 (95.9)
Yes	7 (4.1)

SD, standard deviation

Table 3 Child feeding practices (n =170)

Variables	n (%)
Breastfeeding practice	
< 6 months	23 (13.5)
6 months	14 (8.2)
> 6 months	133 (78.2)
Children's consumption behavior, 6 months to 2 years	
Only breastmilk	18 (10.6)
Only formula milk	4 (2.4)
Only complementary food	3 (1.8)
Breastmilk + formula milk	7 (4.1)
Breastmilk + complementary food	50 (29.4)
Formula milk + complementary food	14 (8.2)
Breastmilk + formula milk + complementary food	74 (43.5)

Consumption behavior of the children

In the past week, almost two-thirds of the children had eaten breakfast containing at least two food groups: rice-flour and meat, or rice-flour and milk. 74.4% ate three main meals a day (breakfast, lunch, dinner). 37.6% ate meals twice a day (late morning and afternoon). 54.7% ate 3-5 ladles of rice-flour daily. 36.5% ate at least 3 spoonsful of meat every day, while 40.0% ate at least one egg a day on 1-3 days per week. 34.1% ate 2-3 ladles vegetables per day on 1-3 days per week, and 39.4% ate 3 portions of fruit per day on 1-3 days per week.

Only half (52.4%) of the children ate iron-rich food, (liver, pork blood, red meat), 1-3 days per week.

Just below half (49.4%) of the children never ate fast food such as pizza, hamburgers, and sausages. A greater proportion (62.4%) ate ready meals such as instant noodles and canned fish, etc., and 54.1% ate sweet snacks such as ice cream, sweet dessert, chocolate, gum, candy, and jellies, etc. on 1-3 days a week. 51.8% drank sweetened beverages such as soft drinks, sweetened beverages, cocoa, iced tea, smoothies, fruit juices, and drinking yogurts, etc. on 1-3 days a week. In contrast, 44.1% of the children never ate bakery items such as cakes, pies, and donuts, etc., and 46.5% ate snacks such as potato chips, crispy snacks, and seasoned fish strips, etc. for 1-3 days a week, as shown in Table 4.

Table 4 Consumption behavior of children in the past week (n=170)

Eating behavior	Consumption frequency n (%)				
	Daily	4 – 6 days/week	1 – 3 days/week	Never	Mean ± SD
1. Eat breakfast with at least two food groups: rice-flour and meat or rice-flour and milk	102 (60.0)	28 (16.5)	34 (20.0)	2 (1.2)	2.38 ± 0.84
2. Eat 3 main meals per day (breakfast, lunch, dinner)	127 (74.7)	28 (16.5)	13 (7.6)	2 (1.2)	1.99 ± 0.93
3. Eat meals twice a day (late morning and afternoon)	64 (37.6)	50 (29.4)	47 (27.6)	9 (5.3)	1.99 ± 0.93
4. Eat rice-flour (3-5 ladles)	93 (54.7)	44 (25.9)	29 (17.1)	4 (2.4)	2.33 ± 0.84
5. Eat at least 3 spoonsful of meat	62 (36.5)	43 (25.3)	60 (35.3)	5 (2.9)	1.95 ± 0.92
6. Eat at least one egg a day	51 (30.0)	44 (25.9)	68 (40.0)	7 (4.1)	1.82 ± 0.91
7. Eat vegetables (2-3 ladles per day)	43 (25.3)	54 (31.8)	58 (34.1)	15 (8.8)	1.74 ± 0.94
8. Eat 3 portions of fruit per day including small fruits such as at least 24 longans and grapes, medium-sized fruit such as at least 3 oranges and apples, and large fruits such as pineapples and watermelons, at least 24 pieces, etc.	42 (24.7)	56 (32.9)	67 (39.4)	5 (2.9)	1.79 ± 0.85
9. Eat an iron-rich food, such as liver, pork blood, red meat, etc.	13 (7.6)	48 (28.2)	89 (52.4)	20 (11.8)	1.32 ± 0.78
10. Eat fast food such as pizza, hamburgers, and sausages	1 (0.6)	16 (9.4)	69 (40.6)	84 (49.4)	2.39 ± 0.68
11. Eat ready meals such as instant noodles and canned fish, etc.	5 (2.9)	39 (22.9)	106 (62.4)	20 (11.8)	1.83 ± 0.66
12. Eat sweet snacks such as ice cream, sweet dessert, chocolate, gum, candy, and jellies, etc.	24 (14.1)	43 (25.3)	92 (54.1)	11 (6.5)	1.53 ± 0.82
13. Drink sweetened beverages such as soft drinks, sweetened beverages, cocoa, iced tea, smoothies, fruit juices, and drinking yogurts, etc.	14 (8.2)	48 (28.2)	88 (51.8)	20 (11.8)	1.67 ± 0.79

Table 4 Consumption behavior of children in the past week (n=170) (Continued)

Eating behavior	Consumption frequency n (%)				
	Daily	4 – 6 days/week	1 – 3 days/week	Never	Mean ± SD
14. Eat bakery items such as cakes, pies, and donuts, etc.	4 (2.4)	22 (12.9)	69 (40.6)	75 (44.1)	2.26 ± 0.77
15. Eat snacks such as potato chips, crispy snacks, and seasoned fish strips, etc.	30 (17.6)	41 (24.1)	79 (46.5)	20 (11.8)	1.52 ± 0.92

SD, standard deviation

Table 5 Consumption of milk and beverages besides

Variables	n (%)
Servings of milk (n=167)	
≤ 2 glasses/day	137 (80.6)
3 – 4 glasses/day	23 (13.5)
> 5 glasses/day	7 (4.1)
Mean ± SD glass/day	1.22 ± 0.507
Drinking other milk (other than breast milk)	
No other type of milk	3 (1.8)
Drinking other types of milk until present time	167 (98.2)
Type of milk	
Cow's milk	141 (82.9)
Drinking yogurt	26 (15.3)
Soy milk	27 (15.9)
Powdered milk	4 (2.4)

Consumption of milk and other beverages

As for milk and beverage consumption, 60.0% drank an average of one cup of cow's milk per day (Table 5).

Discussion

According to the results of the study on appropriate food intake of children over a 1 week period, it was found that most of the pre-school children ate 3 meals a day, including breakfast, lunch and dinner, which was consistent with the study of Jintana et al¹⁴. Jintana et al¹⁴ found that children who ate main meals were 40.2% more likely to develop according to their age, relative to those who did not eat main meals. 99.1% of children ate main meals; most (97.1%) ate dinner, 96.8% ate breakfast, and 88.0% ate lunch. In general, rural people's way of life pays attention to eating every meal. The mother will prepare meals for the members of the family. They typically eat the same food, rather than separate food for children and adults, and eat every day before going to work. In addition, many preschoolers will stay at home all day, and when it comes to meals like lunch or

dinner, the mother or caregiver will eat together with the child. As a result, it was discovered that rural children, including children of villagers, ate the majority of their meals².

Unsurprisingly, it was found that 88.2% of the children ate snacks between meals. Ongart and Pinyoanantapong¹⁵ reported that consumption of all kinds of snacks and beverage 3-4 times a week was commonplace in children who were pre-school age. The present results were in keeping with several reported results from previous studies^{2,16,17}. Wungrath reported that grocery stores are scattered throughout rural communities. Each shop sells a variety of goods, including a variety of snacks. Each type of snack has characteristics that make children want to eat it². It was also found that most of the children's parents were out of work. During the day, the children will be cared for by grandparents, who are elderly people who have a tendency to indulge children to purchase and consume snacks as they request without regard for the suitability (quality or quantity) of snacks consumed by the children^{2,18}. A previous study in Thailand suggested that

86% of primary school children chose snacks by themselves and 82% of their snack choices were mainly puffs and candies from shops in villages with an average consumption about 2 times per day¹⁹. Regularly consuming snacks with a high fat and carbohydrate (starch and sugar) content can have a negative impact on health²⁰. Such snacks provide energy but not nutrients^{20,21}. The concern is that younger children will eat less at regular mealtimes if they frequently consume large amounts of low nutrient high energy snacks prior to their meals²¹. Malnutrition, including undernutrition, is the long-term result of substituting low-nutritional value snacks for main meals^{20,21}.

Moreover, our study also found that pre-school children had inappropriate dietary behavior, such as eating ready-to-eat foods, instant noodles, canned fish, etc. In addition, Wanisa and Sirima²² found out that 39% of young children consumed instant noodles without vegetables or meat, which was in agreement with a comparative study of Yuenyong et al²³ who reported that 79.2% of pre-school children ate instant noodles every day or almost every day. In addition to the current environment of advertising and public relations, these foods are easily accessible, resulting in children being prone to consuming fast food and ready-to-eat meals, and eventually causing the child to weigh less than normal. To date, most research has focused on the relationship between fast food consumption and children's health status²⁴. However, recent research has indicated that fast food consumption may have an impact on other developmental domains, such as academic achievement and cognitive development^{24,25,26}. Consumption of fewer specific nutrients is one possible mechanism for a link between fast food and academic development^{24,26}.

Children who eat fast food several times per week may be at risk of not receiving enough nutrients to develop optimally because fast food meals are frequently deficient in a variety of nutrients^{24,25}. This finding was consistent with those reported by Okoroigwe²⁷, who stated that getting insufficient amounts of energy and nutrients for daily needs, including protein, iron, calcium, and B vitamins, but high intake of vitamin A can lead to malnutrition, affecting growth efficiency, intelligence and learning. Furthermore, long-term inappropriate consumption behavior and inadequate food intake resulted in children suffering from chronic malnutrition and subsequent stunting²⁸⁻³⁰.

With regards to milk consumption, most of the sample (82.9%) drank cow's milk, while 15.9% consumed soy milk and 15.3% consumed fermented milk. This outcome was similar to that reported by Wanisa and Sirima²², who reported that 40% of children drank fresh milk, 35% drank sweetened milk, and 33% drank drinking yogurt. The study found that the children drank an average of one cup of cow's milk per day. This is less than the amount recommended by the Thai Health Promotion Foundation, which stipulates that pre-school children should drink at least 400 ml or two glasses of milk a day³¹. Milk is a great source of protein and calcium, helps build bone mass, strengthens bones, and influences height³². Numerous research studies have found that milk intake is associated with a child's height^{32,33}. Drinking 245 ml of milk a day combined with age-appropriate consumption led to a significant increase in height of at least 0.4 cm per year³¹. Inadequate milk intake is one of the leading factors for malnutrition in children. Kikafunda et al found that a large minority of the children in rural and semi-urban environments had poor health; 3.8% were classified as suffering from kwashiorkor and 5.7% had marasmus³⁴. A high proportion of children were stunted (23.8%), underweight (24.1%), or had low mid-upper arm circumference (21.6%). Although rural living, poor health, lack of milk consumption, and lack of personal hygiene were shown as risk factors for marasmus and underweight, different factors were found to be associated with risk of stunting and low mid-upper arm circumference, despite these parameters being significantly correlated.

Among ethnic minority children, however, acculturation and low socioeconomic status are significantly associated with health-related behaviors³⁵. Additionally, characteristics of the social environment, including various sociocultural factors such as parents' education, time constraints, and ethnicity influence the types of foods children eat³⁶. Relatively little research has been done on the dietary habits of ethnic minorities³⁵. However, existing research suggests that ethnic minorities consume smaller amounts of total energy, and that the composition of diets differ from that of a majority group³⁵. Moreover, several studies show that access to high quality food sources is linked to the degree to which individuals and groups are able to achieve appropriate consumption behavior. Numerous studies have documented that ethnic minorities lack sufficient access to high quality food sources for a number of reasons, such as financial barriers, structural barriers, personal barriers, and poor

poor geographic location³⁵.

We carried out a study of ethnic minority preschool children living in remote rural settings in Thailand, and there have been few studies conducted in these groups. We were able to select a sample group which included the main ethnic groups living in Mae Chaem district, which consisted of Karen, Hmong and Lua. As a result, the information obtained from our study will be useful as a reference for other research on ethnic minority groups living in Thailand, in terms of health promotion and developing nutrition policy for ethnic minority preschool children in remote areas of the country. It is the strength of our study.

On the other hand, our study has a number of limitations. First, we used a feeding practice questionnaire as a method of dietary assessment. The researcher developed it from a questionnaire used to assess dietary intake of non-ethnic preschool children, which may not accurately reflect the hill tribes' context and

consumption culture. Therefore, future studies should design questionnaires based solely on the lifestyle and cultural characteristics of hill tribe people or related ethnicities. In addition, the feeding practices questionnaire that was used was a simple FFQ, which does not capture all of the information required to calculate nutrient intake. A general limitation of simple FFQ is that it only measures the frequency of consumption instead of the absolute amount consumed. Food frequency surveys are often substituted by alternative methods with extensive individual records of the amount consumed, including calorie count and serving size. The latter was not feasible in our study. Second, there was an absence of biochemical measurements of nutritional status, due to restrictions on the study duration and budget. Third, with regards to the sampling technique, the researcher chose samples from three villages out of a total of seven. These were the three villages which had the highest number of undernourished children in Mae Chaem district. However, the sample of almost 170 pre-school children cannot be considered to be representative of all ethnic minority children in this area.

Conclusion

Pre-school children are at an age where they develop physically, emotionally, intellectually, and in terms of their personality. Therefore, in order to promote the good health of pre-school children, it is essential for them to receive appropriate food. If food intake is inappropriate in quantity and quality for an extensive

period of time, it will cause nutritional problems, resulting in illness such as physical, mental, intellectual, and developmental abnormalities. Our study group had inappropriate consumption behaviors, which could be improved with regards to lowering their consumption of instant noodles, canned fish, sweet snacks, sugary drinks, and other snacks, etc. In terms of their milk consumption, it was found that this was less than the amount recommended by the Thai Health Promotion Foundation. The results of this study can be used to address malnutrition in pre-school children jointly among nursery teachers, parents, and other stakeholders in order to further encourage pre-school children to have proper dietary behaviors. Participatory action research should be conducted, in order to solve problems together according to the needs of the stakeholders and in the context of the area.

Author Contributions

DS (first author): introduction writer, main researcher, statistical analyst (40%); JW (second author): methodology, main researcher, statistical analyst, discussion writer (35%); AT (third author): assistant researcher, discussion writer (25%).

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Conflicts of Interest

The authors have no conflicts of interest to declare.

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