Prevalence of Nutritional Status and Its Associated Factors among Primary Education Students in Muang District, Chiang Rai Province

Sunattra Nunloi MSc*,
Anursara Pongjanta MSc*, Saifon Kankhaw BSc*

* School of Health Science, Chiang Rai Rajabhat University, Chiang Rai, Thailand

Background: *It is known that the obesity affects physical and mental health. It is also a high-risk factor that leads to other diseases. Therefore, this survey aimed to find the evidences for supporting the more specific planning and monitoring in order to reduce the problem in young children in the future.*

Objective: *The objectives of this research were to study the nutritional status and its associated factors among the students in primary schools in Muang district, Chiang Rai Province, Thailand.*

Material and Method: *In this cross-sectional research, 210 male and 187 female in primary schools in Chiang Rai Province voluntarily participated. The research data were obtained by physical examinations and using questionnaires. Frequency, percentage, and Chi-square were applied in data analysis.*

Results: *2.5% of underweight, 2.3% of stunting were revealed by using weight for age index (W/A) and height of age index (H/A), respectively. In addition, in view of the weight for height index (W/H), the 14.9% of relatively obese and very obese and 4.0% of wasting were illustrated. The factor that related to nutritional status is gender with statistically significant at the 0.05 level.*

Conclusion: *Numbers of obese and very obese students were shown, whereas gender was a factor that related to nutritional status significantly. Therefore, the participation of all sectors of the community including local schools and families should encourage their students to have proper food consumption behaviors, activities, and exercises. These students should receive better care for normal nutritional status and good health for the effective growth in the future.*

Keywords: *Prevalence, Nutritional status, Primary education students*

The prevalence of obesity, one of malnutrition, is increasing dramatically almost throughout the world. In Thailand, there were also a higher prevalence of overweight and obesity among school children compared with the past. The 4th National Health Examination survey in Thailand showed that there were 5.8 percent in 1995 and 9.7 percent in 2008-2009, increasing 3.9 percentage points within 14 years[1]. In addition, approximately 80 percent of obese teenagers will become obese adults[2] and about one-third of obese adult have history overweight when they were young[3].

There are about 9.7 percent the overweight and obesity children in Thailand, which was higher than all study in the past. In addition, in 2013, a study of the 3rd Primary Health Care Centre in Chonburi Province found that 17.72 percent of children were suffering from overweight and obesity[1].

Obesity affects physical and mental health in all age groups of human. It is a high risk factor that leads to other diseases such as diabetes, hypertension, heart disease. The obesity or overweight in children also affects their physical and mental health as well as various complications in the long term. These results come from the development in science and technology, which lead to the change in lifestyle and inappropriate behavior such as consumption behavior and less exercise. In the present world, children spend most of their time in studying, working, and travelling. Moreover, they overlook the importance and benefits of exercise. The result is their bodies have a lower metabolic rate while consuming excessive energy.

From these data, the researchers are interested in nutritional status and the factors associated with

Correspondence to:
Nunloi S, School of Health Science, Chiang Rai Rajabhat University, Chiang Rai 57100, Thailand
Phone: +66-53-776526
E-mail: sunonloi0714@gmail.com

the nutritional status of primary school students in Muang district, Chiang Rai Province. The results of this study are beneficial to sectors involved in planning and monitoring for preventing and developing health care programs to promote the wellbeing of young people in the future.

Material and Method
Study design
　　　This research is a cross-sectional survey study conducted from October 2015 to February 2016.

Population and samples
　　　The participants of the study were 210 male and 187 female in 5 primary schools, grade 4 to 6, in Muang district, Chiang Rai Province.

Process
　　　The study was conducted following the steps below:
　　　1) Coordinate with all five schools to explain the research.
　　　2) Provide information about activities to students in each class.
　　　3) Make an appointment for physical examinations and questionnaires.
　　　4) Analyze data using standard curve based on weight for height of children 1-19 years, Thailand's Ministry of Public Health Nutrition Division[4].

Tools and the quality of the tools validity
　　　This study has 2 instruments:
　　　1) The questionnaire was divided into two parts. The first part contains general information of samples such as gender, age, living with, number of brother or sister (including students), birth order, height and weight. The second part is the part of questions involving consumption behavior. There are 3 levels of answers; always, sometimes and never. It has both positive and negative questions. The content validity was analyzed by three experts through the use of the Index of Item Objective Congruence (IOC). The result showed a Cronbach's alpha coefficient of 0.73.
　　　2) The 2 nutritional assessment tools:
　　　2.1) Digital weight scales offer 130 kg maximum weighing capacity, using a 20 kg pendulum through the calibration.
　　　2.2) Stadiometer height scale offers 200 cm maximum capacity, tested by using another tape measure to compare before starting.
　　　The nutritional assessment was analyzed by

calculating the weight (kg) and the height (cm) compared with the standard curve of children 1-19 years, Nutrition Division Ministry of Public Health, Thailand[4].

Certified ethical research
　　　This paper certified by the Office of Ethics Review Committee for Research Involving Human Research of Chiang Rai Rajabhat University on September 21, 2015 (document number: 007/58).

Statistical analysis
　　　Qualitative data (gender, age, living with, birth order, weights, and heights) were analyzed and demonstrated by frequencies and percentages. Chi-square was used for analyzing the relationship between factors and nutritional status with the statistical level less than or equal to 0.05 is considered statistically significant.

Results
　　　The number of students surveyed in this study is 397 people; 52.9% were males and 47.1% females. Most of them were in grade 4 (39.0%), followed by grade 5 (33.2%), and the lowest were students in grade 6 (27.7%). The number of brothers or sisters, including students, this study found that most of them got 2 people (43.8%), followed by an only one child (22.9%) and minimum proportion was 7 people (1.0%). For the birth order, it was found that most of them were the first child (50.9%), followed by being a second child (33.8%) and the lowest was included 6th, 7th, and 9th child which there was only one (0.3%). Most of them live with their fathers and mothers (85%), followed by their grandparents, uncles, and aunts (14%), and the lowest proportion was in others, such as foundation (0.5%).

Nutritional status of primary school student in Muang district, Chiang Rai
　　　This study used the weight for age index (W/A) as a tool to evaluate to the nutritional status. Furthermore, the study found that most of the students were in normal level (68.3%), followed by the overweight (18.6%), and the lowest proportion is the underweight (2.5%). As well as using the height for age index (H/A), the result showed most of them were at normal levels (73.0%), followed by very high (11.3%) and stunting (2.3%). Besides, the results of using the weight for height index (W/H), most of them had normal levels (66.0%), followed by relatively wasting (8.1%) and the lowest proportion is wasting (4.0%)

Table 1. Number and percentage of grade 4-6 student in primary schools in Muang district, Chiang Rai categorized by nutritional status (n = 397)

Nutritional status	Number and percentage of students		
	Male	Female	Total
Weight for age index(W/A)			
Overweight	50 (23.8)	24 (12.8)	74 (18.6)
Relatively overweight	12 (5.7)	13 (7.0)	25 (6.3)
Normal	134 (63.8)	137 (73.3)	271 (68.3)
Relatively underweight	8 (3.8)	9 (4.8)	17 (4.3)
Underweight	6 (2.9)	4 (2.1)	10 (2.5)
Height for age index (H/A)			
Very high	34 (16.2)	11 (5.9)	45 (11.3)
Relatively high	19 (9.0)	17 (9.1)	37 (9.3)
Normal	142 (67.6)	148 (79.1)	290 (73.0)
Relatively stunting	11 (5.2)	5 (2.7)	16 (4.0)
Stunting	4 (1.9)	6 (3.2)	9 (2.3)
Weight for height index (W/H)			
Very obese	20 (9.5)	7 (3.8)	27 (6.8)
Relatively obese	24 (11.4)	8 (4.3)	32 (8.1)
overweight	16 (7.6)	13 (7.0)	29 (7.3)
Normal	125 (59.5)	136 (73.1)	262 (66.0)
Relatively wasting	17 (8.1)	14 (7.5)	31 (7.8)
Wasting	8 (3.8)	8 (4.3)	16 (4.0)

Table 2. Relationship between general information and nutritional status using the weight for age index (W/A) (n = 397)

Demographic factors	Nutritional Status					Chi-square	p-value
	Overweight	Relatively overweight	Normal	Relatively underweight	Underweight		
Sex							
Male	6 (1.5)	8 (2.0)	134 (33.8)	12 (3.0)	50 (12.6)	8.363	0.079
Female	4 (1.0)	9 (2.3)	137 (34.5)	13 (3.3)	24 (6.0)		
Total	10 (2.5)	17 (4.3)	271 (68.3)	25 (6.3)	74 (18.6)		
Living with							
Parents	8 (2.0)	14 (3.5)	228 (57.4)	25 (6.3)	63 (15.9)	5.722	0.678
Relative	2 (0.5)	3 (0.8)	41 (10.3)	0 (0.0)	11 (2.8)		
Others such as foundation	0 (0.0)	0 (0.0)	2 (0.5)	0 (0.0)	0 (0.0)		
Total	10 (2.5)	17 (4.3)	271 (68.3)	25 (6.3)	74 (18.6)		
Number of brother and sister (including students)							
1	3 (0.8)	2 (0.5)	56 (14.1)	9 (2.3)	21 (5.3)	7.931	0.440
2-3	6 (1.5)	13 (3.3)	160 (40.3)	12 (3.0)	42 (10.6)		
≥4	1 (0.3)	2 (0.5)	55 (13.9)	4 (1.0)	11 (2.8)		
Total	10 (2.5)	17 (4.3)	271 (68.3)	25 (6.3)	74 (18.6)		
Birth order							
1st	5 (1.3)	8 (2.0)	132 (33.2)	14 (3.5)	43 (10.8)	4.667	0.793
2nd and 3rd	5 (1.3)	8 (2.0)	119 (30.0)	10 (2.5)	29 (7.3)		
≥4th	0 (0.0)	1 (0.3)	20 (5.0)	1 (0.3)	2 (0.5)		
Total	10 (2.5)	17 (4.3)	271 (68.3)	25 (6.3)	74 (18.6)		

Table 3. The relationship between general information and nutritional statususing the height for age index (H/A) (n = 397)

Demographic factors	Nutritional status					Chi-square	*p*-value
	Very high	Relatively high	Normal	Relatively stunting	Stunting		
Sex							
Male	4 (1.0)	11 (2.8)	142 (35.8)	19 (4.8)	34 (8.6)	13.353	0.010*
Female	6 (1.5)	5 (1.3)	148 (37.3)	17 (4.3)	11 (2.8)		
Total	10 (2.5)	16 (4.0)	290 (73.0)	36 (9.1)	45 (11.3)		
Living with							
Parents	10 (2.5)	14 (3.5)	243 (61.2)	32 (8.1)	39 (9.8)	3.184	0.922
Relative	0 (0.0)	2 (0.5)	45 (11.3)	4 (1.0)	6 (1.5)		
Others such as foundation	0 (0.0)	0 (0.0)	2 (0.5)	0 (0.0)	0 (0.0)		
Total	10 (2.5)	16 (4.0)	290 (73.0)	36 (9.1)	45 (11.3)		
Number of brother and sister (including students)							
1	2 (0.5)	3 (0.8)	64 (16.1)	11 (2.8)	11 (2.8)	4.180	0.841
2-3	7 (1.8)	8 (2.0)	171 (43.1)	20 (5.0)	27 (6.8)		
≥4	1 (0.3)	5 (1.3)	55 (13.9)	5 (1.3)	7 (1.8)		
Total	10 (2.5)	16 (4.0)	290 (73.0)	36 (9.1)	45 (11.3)		
Birth Order							
1st	4 (1.0)	6 (1.5)	146 (36.8)	22 (5.5)	24 (6.0)	4.313	0.828
2nd and 3rd	5 (1.3)	8 (2.0)	127 (32.0)	12 (3.0)	19 (4.8)		
≥4th	1 (0.3)	2 (0.5)	17 (4.3)	2 (0.5)	2 (0.5)		
Total	10 (2.5)	16 (4.0)	290 (73.0)	36 (9.1)	45 (11.3)		

(Table 1).

Factors related nutritional statusof primary school students in Muang district, Chiang Rai

The result was shown after using the weight for height index (W/H). The study demonstrated that gender was related to nutritional status statistically significant level of 0.05 (Table 2-4).

Discussion

The study found that the prevalence of malnutrition based on the weight for height index were relatively obese and very obese (14.9%); most of them were males (20.9%) and follow by females (7.11%). The percent of wasting was 4.0%, females more than males, 4.3% and 3.8%, respectively. Moreover, the study demonstrated that gender was related to statistically significant, nutritional status at the level of 0.05 (using a weighted value for height index). These are consistent with the results of research which studied the relationship between food consumption, exercise and nutritional status of early adolescent in Bangkok, Bangkok. The research found the prevalence of obesity in males and females, 36.3 and 22.8%, respectively.

Furthermore, there were underweight males and females 15.2 and 25.2%, respectively. These demonstrated that the males had higher prevalence of obesity than the females. On the other hand, males had lower prevalence of underweight than females. The results were also consistent with another study which surveyed nutritional status among 5,773 adolescent in Chiang Mai[6]. The study found that males were overweight 19.70% and obese 10.52%. In addition, there were females who were overweight and obese 9.82% and 4.69%, respectively. The result was similar to the study of the health promotion model with the participation in body weight control of overweight students in urban school in Nakhon Sawan[7]. This study showed that there were overweight in the group of 10-12 years old; 71% of males and 29% of females. According to the result, there was less female than male obesity, because females were concerned more with beauty and body image than males. Moreover, there was a research of Thitawee Keawpornsawan study about attitudes and food consumption behaviors of adolescent females, aged 10-19 years old in Bangkok. This research found that 20% of female adolescents wanted to be thinner, feared obesity and eat less to

Table 4. The relationship between general information and nutritional status using the weight for height index (W/H) (n = 397)

Demographic factors	Nutritional status						Chi-square	p-value
	Wasting	Relatively wasting	Normal	Overweight	Relatively obese	Very obese		
Sex								
Male	8 (2.0)	17 (4.3)	125 (31.5)	16 (4.0)	24 (6.0)	20 (5.0)	14.124	0.015*
Female	8 (2.0)	14 (3.5)	137 (34.5)	13 (3.3)	8 (2.0)	7 (1.8)		
Total	16 (4.0)	31 (7.8)	262 (66.0)	29 (7.3)	32 (8.1)	27 (6.8)		
Living with								
Parents	12 (3.0)	25 (6.3)	228 (57.4)	25 (6.3)	24 (6.0)	24 (6.0)	7.210	0.705
Relative	4 (1.0)	6 (1.5)	32 (8.1)	4 (1.0)	8 (2.0)	3 (0.8)		
Others such as foundation	0 (0.0)	0 (0.0)	2 (0.5)	0 (0.0)	0 (0.0)	0 (0.0)		
Total	16 (4.0)	31 (7.8)	262 (66.0)	29 (7.3)	32 (8.1)	27 (6.8)		
Number of brother and sister (including students)								
1	3 (0.8)	4 (1.0)	64 (16.1)	5 (1.3)	7 (1.8)	8 (2.0)	6.846	0.740
2-3	11 (2.8)	22 (5.5)	146 (36.8)	18 (4.5)	19 (4.8)	17 (4.3)		
$\geq$4	2 (0.5)	5 (1.3)	52 (13.1)	6 (1.5)	6 (1.5)	2 (0.5)		
Total	16 (4.0)	31 (7.8)	262 (66.0)	29 (7.3)	32 (8.1)	27 (6.8)		
Birth order								
1st	7 (1.8)	16 (4.0)	133 (33.5)	11 (2.8)	19 (4.8)	16 (4.0)	7.235	0.703
2nd and 3rd	7 (1.8)	12 (3.0)	113 (28.5)	16 (4.0)	12 (3.0)	11 (2.8)		
$\geq$4th	2 (0.5)	3 (0.8)	16 (4.0)	2 (0.5)	1 (0.3)	0 (0.0)		
Total	16 (4.0)	31 (7.8)	262 (66.0)	29 (7.3)	32 (8.1)	27 (6.8)		

* Statistically significant level of 0.05

lose weight even though their weight was normal[8]. In accordance with Serdula's study, there were 44 percent female adolescents who observed food restrictions because they were not satisfied their bodies and wanted to be thinner[9,10]. It is already known that obesity or overweight in children affects physical and mental health of children. As well as these problems, they can bring about various complications in the long-term and become a risk factor for other diseases such as diabetes, hypertension, osteoporosis, dyslipidemia, respiratory disease, and heart disease. Moreover, obesity and overweight were related to psychological problems such as depression in children[11]. Therefore, obesity is considered as a silent killer which parents or adults overlook. The reported results of the fourth survey through the Thailand national health examination found 540,000 children aged 1-14 years old were overweight and obese, 135,000 children were at risk of type 2 diabetes. Additionally, the problem of overweight in children can result in increasing the risk of chronic non-communicable diseases when grow up in the future. These affect the physical, mental and social aspects in children[11].

What is already known on this topic?

Many areas of Thailand have been reporting on children's nutritional status by using standard curve based on weight for height of children 1-19 years, Nutrition Division, Ministry of Public Health, Thailand. However, with primary education students in Muang, Chiang Rai information remained unknown.

What this study adds?

The present study was performed to assess nutritional status in primary education students in Muang, Chiang Rai. It was shown that the prevalence of malnutrition based on weight for height index were obese and wasting, and gender was related to statistically significant, nutritional status (p-value = 0.05).

Potential conflicts of interest

None.

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ความชุกและปัจจัยที่มีความสัมพันธ์กับภาวะโภชนาการของนักเรียนระดับประถมศึกษาใน อำเภอเมือง จังหวัดเชียงราย

สุเนตรา นุ่นลอย, อนุสรา พงค์จันตา, สายฝน กันแก้ว

ภูมิหลัง: ภาวะอ้วน เป็นสิ่งที่บั่นทอนสุขภาพร่างกายและจิตใจ รวมทั้งยังเป็นปัจจัยเสี่ยงที่ส่งผลให้เกิดโรคอื่นๆ ตามมา ดังนั้นผลจากการศึกษาครั้งนี้สามารถนำไปใช้วางแผนการเฝ้าระวัง ติดตามและปรับปรุงแนวทางการดูแล เพื่อลดปัญหาที่จะเกิดกับเด็กซึ่งเป็นเยาวชนที่สำคัญต่อไปในอนาคตได้

วัตถุประสงค์: เพื่อศึกษาภาวะโภชนาการและปัจจัยที่มีความสัมพันธ์กับภาวะโภชนาการในนักเรียนประถมศึกษา อำเภอเมือง จังหวัดเชียงราย

วัสดุและวิธีการ: การวิจัยนี้เป็นการวิจัยเชิงสำรวจภาคตัดขวาง (Cross-sectional Survey Study) ประชากรคือ นักเรียนในโรงเรียนระดับประถมศึกษาที่ 4-6 ในเขตอำเภอเมือง จังหวัดเชียงราย เป็นนักเรียนชาย 210 คน และนักเรียนหญิง 187 คน วิเคราะห์ข้อมูลโดยการแจกแจงความถี่ ร้อยละ และไคสแควร์

ผลการศึกษา: ความชุกของภาวะทุพโภชนาการจากการใช้ดัชนีของน้ำหนักตามเกณฑ์อายุ (W/A) พบน้อยกว่าเกณฑ์ร้อยละ 2.5 ส่วนสูงตามเกณฑ์อายุ (H/A) พบภาวะเตี้ยร้อยละ 2.3 และน้ำหนักตามเกณฑ์ส่วนสูง (W/H) พบเริ่มอ้วนและภาวะอ้วนร้อยละ 14.9 และภาวะผอมร้อยละ 4.0 และปัจจัยที่มีความสัมพันธ์กับภาวะโภชนาการพบว่าเพศมีความสัมพันธ์กับภาวะโภชนาการอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05

สรุป: จากการวิจัยพบภาวะเริ่มอ้วนและภาวะอ้วนร้อยละ 14.9 และตัวแปรด้านปัจจัยส่วนบุคคลที่มีความสัมพันธ์กับภาวะโภชนาการของนักเรียนระดับประถมศึกษาใน อำเภอเมือง จังหวัดเชียงราย คือ เพศ โดยพบเพศชายมากกว่าเพศหญิงดังนั้น การให้ความสำคัญด้านความร่วมมือของทุกภาคส่วนในชุมชน ทั้งโรงเรียน ท้องถิ่น ครอบครัว ต่อการดูแลและส่งเสริมให้นักเรียนมีพฤติกรรมการบริโภคอาหารที่ถูกต้อง เหมาะสม ตามหลักโภชนาการ รวมทั้งการใช้พลังงานและการออกกำลังกายที่พอเพียง เพื่อให้นักเรียนได้รับการดูแลที่ดี นำไปสู่การมีภาวะโภชนาการและสุขภาพที่ดี ลดการเกิดโรคและปัญหาสุขภาพในอนาคต