



# THE EFFECT OF NUTRITION EDUCATION PROGRAM TO INCREASE AWARENESS ABOUT OBESITY PREVENTION AT SANGKHOM ISLAM WITTAYA SCHOOL THAILAND

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## ABSTRACT

Adolescent obesity has become a global health problem that continues to increase every year, with various long-term impacts on physical and mental health. Community service was conducted at Sangkhom Islam Wittaya School in Thailand from August to September 2024. The pre-study conducted in July 2024 showed a high rate of obesity in adolescents, especially in boys. The solution provided is nutrition education related to obesity prevention to increase knowledge about obesity, healthy lifestyles, and healthy diets for adolescents. This community program is to contribute to SDGs target 3 because this activity focuses on achieving good health and well-being for all age ranges. This method is applied through problem identification, discussion with partners, and program implementation with counseling, practice, and assessment through pre-test and post-test. Participants who participated in this study amounted to 30 elementary school students, the success rate of the program in the implemented community service had a high success rate to achieve the objectives. The effectiveness of this program can be evaluated through the analysis of concrete pre-test and post-test data. The output obtained are in the form of international seminar papers, records share through internet video platforms, final report, and posters.

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## 1. Introduction

Obesity is no longer considered just a condition, it has been recognized as a disease, and positively, it is often preventable. By making healthier lifestyle changes, especially in terms of diet, we can significantly reduce our risk of obesity. Obesity is also an important risk factor associated with increased morbidity and mortality from various non-communicable diseases (NCDs) (Friedenreich et al., 2021). Childhood obesity has emerged as an epidemic, posing a grave public health concern across numerous countries worldwide. This issue

has become a formidable challenge for the 21st century, demanding urgent attention and concerted efforts to address it effectively (Wang & Lim., 2018). The issue of childhood overweight and obesity is deeply concerning, as it is strongly linked to an increased likelihood of carrying excess weight into adulthood. This connection poses significant long-term health implications, underscoring the urgent need to address this problem effectively, which can have a negative impact especially on vulnerable age groups.

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Childhood overweight and obesity pose a significant threat to children's health, as they are associated with an increased risk of developing a range of serious medical conditions. This list highlights some serious health issues, including type 2 diabetes, hypertension, respiratory problems like asthma, sleep disturbances, and liver disease. The implications of childhood obesity extend beyond physical health, as these children may also experience psychological impacts, such as reduced self-confidence, depression, and social isolation. The development of these health problems in children can have far-reaching consequences, both in the immediate and long-term. The psychological impacts of childhood obesity can be equally detrimental, as children may struggle with low self-esteem, social withdrawal, and mental health challenges like depression. These psychological burdens can further exacerbate the physical health problems, creating a vicious cycle that can profoundly affect a child's overall development and well-being. (Friedenreich et al., 2021).

Overweight and obesity has become widespread problems, with trends that impact on both men and women globally. This obesity epidemic is on the increase, affecting different genders, age groups and socioeconomic backgrounds. The United States increased its prevalence from 1999 to 2018, from 30.5% to 42.2% (Boutari, 2020). Recent studies have shed light on the alarming issue of overweight and obesity among school-age children. This public health concern has gained significant attention, as the prevalence of excess weight in this population has reached concerning levels prevalent across European countries, with approximately 20% of these children being overweight or obese, and 5% being obese specifically. The issue of overweight and obesity among school-age children is particularly acute in North America, where the prevalence rates are alarmingly high. In this region, it is estimated that 30% of school-age children are either overweight or obese, with 15% being classified as obese. This situation in North America stands in stark contrast to the global landscape, where the problem is still considered staggering. Worldwide, it is estimated that a staggering 155 million school-aged children, ranging from 5 to 17 years old, which equates to around 1 in 10 children in this age group are grappling with the challenges of overweight or obesity. The scale of this public health crisis is truly overwhelming, with a substantial proportion of the world's young population facing the detrimental consequences of excess weight. This data

highlights the significant scale of the childhood obesity epidemic that is affecting many regions around the world (Wang & Lim., 2018).

According to the World Health Organization, nearly a third of Thailand's population is now considered overweight, and 9% of the country's population is classified as obese. Within Thailand, rates of overweight and obesity among childhood have been steadily increasing. Data from the 4th Thai Health Survey conducted in 2008-2009 shows the rates of children's overweight and obesity have risen significantly across different age groups. Specifically, the survey found that 8.5% of 1-5 year olds, 8.7% of 6-11 year olds, and 11.9% of 12-14 year olds were overweight or obese, with the highest rates observed in the 12-14 years age group. These figures highlight the growing public health concern of childhood obesity in Thailand, which appears to be more prevalent compared to other age demographics in the country (Nonboonyawat et al., 2019).

Childhood obesity is a significant health concern in Thailand, with a high prevalence across different age groups. Approximately 1 in 10 children in Thailand are classified as overweight. The issue is particularly prevalent among children under the age of 5, with 10.5% of this age group being obese. The situation worsens as children grow older, with the obesity rate rapidly increasing to 13.9% in the 6 to 15 years age range. These alarming statistics underscore the growing childhood obesity epidemic in Thailand, which requires urgent attention and intervention to address this public health challenge. High levels of overweight and obesity among Thai children, especially in the younger age groups, highlights the need for comprehensive strategies to promote healthy lifestyles and prevent the further escalation of this concerning trend (Taylor, 2020). According to the Thai National Health Examination Survey V (NHES V), the prevalence of obesity (defined as BMI  $\geq 25$  kg/m<sup>2</sup>) among the population of Thailand aged 15 years and above has been reported in 2014. The data shows that the overall obesity rate in Thailand was 37.5%. When broken down by gender, the incidence of obesity was 32.9% among men and 41.8% among women. These findings indicate that obesity is a significant public health concern in Thailand, affecting a substantial portion of the adult population. The data highlights high rates of obesity observed among the female population compared to their male counterparts. These statistics underscore the need for targeted interventions and comprehensive



strategies to address the growing obesity epidemic in Thailand, particularly focusing on the high-risk groups identified in the survey (Sakboonyarat et al., 2020).

Obesity has emerged as a global health crisis that requires immediate attention and action. The prevalence of obesity continues to rise worldwide, with the World Health Organization (WHO) reporting that the number of people who are obese has doubled from 1990 to 2022 (WHO, 2024). This medical condition characterized by excessive accumulation of body fat has far-reaching implications for individual and public health. As the global community works towards achieving the Sustainable Development Goals (SDGs) set forth by the United Nations (UN), addressing the obesity epidemic has become a critical component in the pursuit of "Good Health and Wellbeing", as outlined in SDG 3 a (Johnston, 2016). The SDGs, adopted by all member states of the UN in 2015, are a comprehensive and ambitious global agenda that aims to improve the well-being and prosperity of people around the world. SDG 3, which specifically focuses on "Good Health and Wellbeing", sets various targets, including the reduction of premature deaths from non-communicable diseases and the promotion of mental health and well-being. Addressing the obesity crisis is a critical component in achieving these targets, as the negative impact of obesity on health directly undermines the SDGs' overall goals.

Thailand is undergoing a transition in terms of diet, nutrition and health. High-calorie foods have become a problem and are on the rise, posing a threat to a large portion of the adult population who experience height-related issues, making them appear shorter due to childhood malnutrition (Kelly et al., 2010). In addition, obesity is becoming an increasing problem, due to the lack of knowledge about nutrition among the public. The main mistake made is the inability to choose healthy foods that meet their dietary needs. Without proper intervention, it is expected that the rising trend in obesity prevalence will continue in the future. Obesity-related health conditions not only reduce the quality of life of individuals, but also place a significant burden on the healthcare system and the economy.

Dealing with the problem of obesity requires a multifaceted approach that addresses the various contributing factors, contributing factors include

unhealthy diets, sedentary lifestyles, and environments that encourage the consumption of calorie-dense foods (Nonboonyawat et al., 2019). To effectively and sustainably address the root causes of obesity, various interventions are required. Interventions to address obesity can be multifaceted, such as digital technology, community, policy-based, clinical-based, and various research and innovation-based approaches. Among these, community interventions are a promising and effective option (Mo-suwan et al., 2014). Community-based interventions have been identified as an effective approach in addressing childhood obesity in particular. By involving all components of the community, including schools, parents, and neighbourhoods, these interventions aim to create an environment that supports the formation of healthy eating habits and lifestyles in children. Activities undertaken as part of these community-based interventions often include nutrition education programs in schools, which provide counselling and demonstrations on balanced nutrition, healthy food choices and appropriate meal portions. Most importantly, this nutrition education initiatives involve teachers and school staff, and use engaging learning media, such as videos, games, picture books and posters, to increase children's interest and participation in activities. This holistic approach that targets various stakeholders and uses interactive learning methods is expected to contribute to creating a supportive environment for the development of healthy conduct among children.

The implementation of this community service program involves the introduction of the basics of nutrition science. This program is targeted to achieve the 3rd SDGs as this education aims to provide a healthy and prosperous life for all age groups. The SDGs target can be realized with basic nutrition-related education including proper food selection, age-appropriate nutritional needs, lifestyle, physical activity, and a healthy diet based on Thai nutritious foods. University of Muhammadiyah Jakarta, and collaborators from Integrated School Network Thailand (IISN). The main objectives of this program are the following: 1) Increase knowledge and understanding of balanced nutrition and the importance of eating healthy foods and avoiding unhealthy foods; 2) Changing unhealthy eating habit; 3) Increasing physical activity and active lifestyles to foster awareness of the importance of regular physical activity and exercise; 4) Involving parents and the

school environment to encourage the implementation of this conduct at home and create an environment that supports a healthy lifestyle at school; and 5) Building confidence and motivation in children in their abilities.

## 2. Method

The community service initiative with the theme "Nutrition education to improve knowledge about basic nutrition in primary school children at Sangkhom Islam Wittaya School Thailand" was carried out in Sadao, Songkhla, Thailand from August to September 2024. Sangkhom Islam Wittaya School has 6 levels of primary education, ranging from grade 1 to grade 6, referred to as Phratom in the Thai education system. This study will involve grade 5 students, 30 students in total, because at this age children begin to have better cognitive abilities to understand basic nutrition concepts. Nutrition education at this stage can be more in-depth, covering knowledge about nutrition, the food pyramid and healthy food selection. Learning methods can be more diverse, such as discussions, projects, and healthy cooking practices. Good habits can be formed in grade 5 students so that they can get used to it in the future.

Considering that children at this age like a combination of play and learning, the right solution is nutrition education with attractive media, demonstration of cooking healthy food, and program evaluation in the form of pre-test and post-test. The initial stage carried out in this service is the introduction stage as a sign of the start of program implementation. This stage begins with a pre-test, which aims to measure knowledge before education. Next is to provide education in the form of choosing the right food and its type, nutritional needs according to age, lifestyle, physical activity, and a healthy diet that refers to the Thai Nutrition Flag (Sirichakwal et al., 2011). The activities in this initiative were designed to be as interesting and fun as possible to attract the enthusiasm of the students. The aim was to create fun and interactive nutrition education sessions, recognizing the importance of creating an accessible and engaging learning environment for young students. By incorporating play and interactive elements into the nutrition education program, the organizers sought to foster a positive and memorable learning experience for the participants. This approach is based on children's developmental needs and preferences, ensuring that educational content is delivered in a way that is appropriate and engaging for primary school-age children.

In the practical stage, all students are given basic equipment for cooking demonstrations. Before starting, all students will be given instructions related to the cooking process, after which students will imitate the instructor in the process of making healthy food. This stage consists of (a) Lecturers or instructors from Muhammadiyah University of Jakarta; (b) the presence of all participants, namely elementary school students; (c) the delivery of learning consisting of student knowledge and skills; and (d) the availability of all needs for training in the form of materials, cooking tools, cooking ingredients, skills and others.

The last stage is evaluation, carried out with the aim that this community service provides benefits and positive impacts for each student to understand the entire series of activities. After all activities are completed, a post-test will be carried out, which aims to assess knowledge after carrying out the entire series of activities. The pre-test and post-test each contain 5 questions with a score point of 20 for each question.

The delegation of tasks within the team is determined by each member's specific expertise. The implementation process unfolded in stages, commencing with an initial survey, followed by a survey during the implementation phase, and culminating in an evaluation to conclude the process. The program implementation methodology encompasses problem identification, collaborative meetings with partners, and the execution of the program itself.

1. **Problem Identification:**  
This phase involves a comprehensive analysis of the target population, considering demographics, socio-economic factors (especially access to healthy food), and geographical influences. This analysis will guide the prioritization of program activities.
2. **Stakeholder Collaboration:**  
Leveraging online platforms like Zoom, this phase focuses on building consensus and garnering support for the program. Partners will review activity plans, provide approvals, and collaboratively address potential challenges.
3. **Program Implementation:**  
This phase involves delivering nutrition education through engaging media, including cooking demonstrations featuring traditional Indonesian dishes. Highlighting fruit skewers as a healthy snack with a variety of different



fruit flavours and a balanced taste aims to match children's preferences. Fruit skewers are not just skewered pieces of fruit, they can be colourful and the naturally fresh fruit flavours are sure to be loved by children. In addition, fruit skewers are also rich in vitamins, minerals and fiber that are essential for their growth and development.

The evaluation process begins with pre- and post-tests. Before the nutrition education program starts, students will take a 5-question pre-test, each question worth 20 points (total score range: 20-100). This pre-test serves two primary purposes:

1. **Baseline Assessment:** It gauges students' existing knowledge and attitudes towards nutrition, establishing a baseline for comparison.
2. **Needs Identification:** It helps identify areas where students may have limited understanding, allowing for targeted instruction.

After completing all program activities, a post-test will be conducted to evaluate the effectiveness of the program to measure changes in knowledge and attitudes after participating in the nutrition education program, and the post-test results will also provide feedback for program organizers and partners of the program to determine the effectiveness of teaching methods and materials that have been used.

Table 1. Knowledge Score Criteria

Score Range	Criterion
<60	Not Good
60-69	Fair
70-79	Good
80-89	Very Good
90-100	Excellent

The questionnaire was used as a second stage evaluation to evaluate the effectiveness of the course provided by the UMJ team to Sangkhom Islam Wittaya School partners, by assessing partner satisfaction with the relevance and scientific of the activities, the application of OHS, the suitability of the results with the expected plans and solutions, the utilization of the results, the ability of the program to solve problems, the usefulness and motivation of the use of science and technology, the sustainability of cooperation, and the availability of facilities and infrastructure,

including also space for open suggestions and recommendations for the program.

### 3. Results And Discussion

The service carried out in the form of education or counselling, pre-test post-test and cooking demonstrations. Descriptions that can describe the work program carried out are:

- 1) Provide education that is easy to understand and interesting, in the form of:  
 Instructor: Melyana Septiani  
 Material: Let's stay fit and healthy! Obesity education for elementary school students.

Obesity refers to a condition where a person is overweight, mainly due to a very high proportion of body fat (Sowers, 2009). Obesity is an excessive or abnormal accumulation of fat or adipose tissue in the body that can interfere with health. Obesity has become a worsening epidemic over the past 50 years (Thaikruea & Thammasarot., 2016). The World Health Organization estimates that in 2013 there were more than 42 million children under the age of five who were overweight, and nearly 31 millions of them lived in developing countries. In Thailand, the national prevalence estimate of children who are overweight or obese is reported to be around 20%, which has the same increasing trend as the regional and global prevalence (Rerksuppaphol, 2017).

Obesity is a complex condition that is influenced by various factors, not just an imbalance between energy intake and expenditure. Understanding the causes of obesity holistically is essential for effective prevention and treatment. The main contributing factors are diet and lifestyle, consumption of processed foods high in calories, sugar, unhealthy fats, and salt, but low in fiber and nutrients, contributes greatly to weight gain, large portions of food such as more carbohydrates than other side dishes, and lack of physical activity such as too much sitting in front of the television and playing games. The second contributing factor is genetic and biological, family history of obesity has a higher risk of obesity, some genes affect how the body burns energy and regulates appetite, and imbalances in hormones that regulate hunger such as leptin and ghrelin (Hebebrand, 2009). The third factor is the environment, the availability of easy and cheap access to fast food and sugary drinks that can have an impact on unhealthy eating patterns, socioeconomics can limit access to healthy foods and opportunities for physical activity (Lopez,

2012). The fourth factor is psychological factors such as stress and emotions and eating disorders can affect a person's intake and diet. The last factor that can contribute to obesity is lack of sleep and drug side effects that can interfere with appetite-regulating hormones and cause weight gain as a side effect (Patel, 2009)

The process of providing education begins with a pre-test which aims to measure the baseline or initial level of knowledge, ability, or attitude of the audience before being given education related to obesity. After that, it continues with the provision of material with the aim of increasing the audience's knowledge related to obesity, after the two processes are completed, a post-test is given with the aim of measuring the effectiveness of education and evaluating progress by comparing the results of the pre-test and post-test.



Fig. 1. Nutrition education

## 2) Demonstration of cooking healthy snacks

This activity begins with the introduction of various kinds of fruit as a substitute for healthy snacks that contain many nutrients and various benefits needed by the body. After that, an explanation of the cooking demonstration that will be carried out and the introduction of various tools and materials that will be used. Figure ... shows the activity of students while practicing making fruit satay as an alternative healthy snack. The stages of this activity include preparing components and ingredients for making fruit satay, selecting activities to making fruit satay with the following details:

### a. Preparing components and ingredients for

#### making fruit satay

- 1) Wash all fruits with running water and make sure they are clean.
- 2) Preparing a stainless steel baking sheet to hold the fruit
- 3) Peeling fruits that need to be peeled such as dragon fruit, bananas and oranges and cutting them into cubes prepare skewers, plastic plates and sauce for the fruit skewers.



Fig. 2. Preparing Ingredients for making fruit satay

### a. Washing hands

- 1) Before the practice of making fruit satay begins, children wash their hands first.
- 2) Wetting both palms with water
- 3) Pouring hand washing soap
- 4) Rubbing both palms
- 5) Rinsing both palms with running water
- 6) Drying hands with the tissue that has been provided

### b. Practical activities to make satay from various types of fruit

- 1) Before this practice began to facilitate the distribution of fruit and the necessary equipment, a team of 2 people was divided, so that 8 groups were formed with a total of 30 students.
- 2) Each group came forward to take the equipment needed and choose the type of fruit they wanted with a total of 6 types of fruit for 2 skewers.
- 3) After all groups took the equipment and needs, the practice of making healthy snacks, namely fruit satay, began together, they were free to be creative according to



their imagination.

- 4) The finished fruit skewers will be topped with low-fat chocolate and vanilla sauce, with the aim of attracting children's attention and making the taste more delicious.



Fig. 3. Practical activities to make satay from various types of fruit

Community service is carried out smoothly and effectively and effectively meets the predetermined objectives. Indicators of success can be seen from various factors, such as the real results produced, the achievement of predetermined benchmarks, such as the results of the pre-test and post-test of students before and after the provision of education, and good ratings obtained from partner satisfaction evaluations. The results of this service activity are increased knowledge about obesity and nutrition such as the importance of balanced nutrition, the contents of my plate, and the benefits of various fruits used. In addition, this activity can also improve practical skills such as making fruit satay by preparing various kinds of ingredients and equipment needed, creativity by being creative by combining various types and colours of fruit. The pre-test post-test assessment categories have their own criteria for each level of the numbers. The category of the score range is <60 is categorized as 'not good', 60-69 is categorized as 'average', 70-79 is categorized as 'good', 80-89 is categorized as 'very good', the last with a score range of 90-100 is categorized as 'excellent'. Table 2 presents the average pre-test and post-test scores of English program 5/1 students.

4) Activity Results

Table 2. Paired Samples Statistics

		Mean	N	Std. Deviation	Std Error Mean
Pair 1	Pre-test	62,67	30	20,160	3,682
	Post-test	96,67	30	7,581	1,384

Based on the data presented in table 2, it can be seen that the mean value obtained from the pre-test results is 62,67 which is categorized as 'sufficient' and the post-test value is 96,67 with the category 'extraordinary'. Before the provision of education, students were considered to still not understand because of the lack of knowledge and information obtained. After providing education related to nutrition, the results of the post-test scores obtained increased rapidly, this indicates that students are adept at understanding the education session and

can choose activities and good food to prevent obesity in adolescence and the future.

Although there is a language barrier, this is not a problem because students who receive education are special class students, namely EP 5/1 (English Program), by providing explanations using language that is easy to understand and body language that supports and is easily understood by students so that the material made is conveyed well.

Table 3. Paired Sample Test

		Paired Differences			95% Confidence Interval of the Diference				
		Mean	Std. Deviaton	Std. Error Mean	Lower	Upper	t	df	Sig (2-tailed)
Pair 1	Pre-test & Post-test	-34,00	21,751	3,971	-42,122	-25,878	-8,562	29	,001

Based on the data presented in table 4, nutrition education conducted on 5/1 EP students showed success, this is evidenced by the results of the post-test which showed an increase in knowledge scores and a significant value of  $p < 0.05$ , therefore it can be stated that there is a significant change in pre-test and post-test results.

#### 5) Activity Evaluation

Obesity is a major threat to public health. Eating behaviours and food intake, especially energy-dense foods with low nutrition, contribute a lot to the current epidemic of childhood obesity. There are many effects caused by obesity, such as various diseases, psychological effects and long-term effects (Panichsillaphakit, 2021). The nutrition education program provided went well and had positive results. Seen from the post-test value of 96,67 which was very soaring compared to the pretest which was 62,67 and seen from the paired samples test table with  $p < 0.05$  which means that there is a significant change and based on descriptive statistics of pre-test and post-test it is proven that the post-test value is higher.

Partner evaluation of the training program conducted by the UMJ implementation team showed very positive results. Partners expressed a high level of satisfaction with the program.

#### 4. Conclusion

Community service with the theme 'The Effect of Nutrition Education Program to Increase Awareness about Obesity Prevention at Sangkhom Islam Wittaya School Thailand' was successfully carried out and the activity went well and effectively, the positive impact of this activity is that Phratom students in English Program class 5/1 get knowledge about nutrition, especially obesity in infancy, so they have a higher level of knowledge and understanding to prevent obesity compared to their other friends. The scores obtained from the pre-test and post-test results show satisfactory scores, because the scores produced exceed the minimum passing threshold. This shows that the objectives of this program were effectively achieved. The pre-test and post-test questions contained the definition of obesity, prevention of obesity, good habits to prevent obesity, examples of healthy foods and effective physical activities to lose fat. The mean value obtained from the pre-test results was 62,67 with the category 'fair' category while the post-test value was much higher at 96,67 with the 'excellent' category.

The partners express their sincere gratitude and optimism for the long-term potential of this initiative. They recommend continuous practice of this approach. In addition to fostering interpersonal relationships among peers, incorporating planting activities within the school environment provides children with new experiences and reduces boredom often associated with traditional learning. Engaging in experiential learning activities encourages student participation and involvement. This student-centered approach to learning is expected to enhance student learning effectiveness.

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#### References

- [1] Wang Y, Lim H (2018). The global childhood obesity epidemic and the association between socio-economic status and childhood obesity. *Physiology & Behavior*, Int Rev Psychiatry. 2012 Jun;24(3):176-88. doi: 10.3109/09540261.2012.688195. PMID: 22724639; PMCID: PMC4561623
- [2] Chrysoula Boutari, C. S. M. (2020). Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information. *Metabolism*, 103(January).
- [3] Ekkarit Panichsillaphakit, 1 Yuda Chongpison, 2 Puthita Saengpanit, 1 Tanisa Kwanbunbumpen, 1 Jaraspong
- [4] Uaariyapanichkul, 1, 3 Sirinuch Chomtho, 3 Chitsanu Pancharoen, 4 and Chonnikant Visuthranukul corresponding author 3. (2021). Children's Eating Behavior Questionnaire Correlated with Body Compositions of Thai Children and Adolescents with Obesity: A Pilot Study. *Journal of Nutrition and Metabolism*.





- [5] Friedenreich, C. M., Stone, C. R., & McNeil, J. (2021). Physical Activity, Sedentary Behavior, and Cancer. *Psycho-Oncology*. <https://doi.org/10.1093/med/9780190097653.003.0004>
- [6] Hebebrand, Johannes and H. Anke. (2009). Environmental and Genetic Risk Factors in Obesity Child and Adolescent Psychiatric Clinics of North America. Elsevier, 18(1), 83–94.
- [7] James R Sowers MD, F. F. a. (2003). Obesity as a cardiovascular risk factor. Elsevier, 115(8), 37–41.
- [8] Johnston, R. B. (2016). Arsenic and the 2030 Agenda for sustainable development. Arsenic Research and Global Sustainability - Proceedings of the 6th International Congress on Arsenic in the Environment, AS 2016, 12–14. <https://doi.org/10.1201/b20466-7>
- [9] Kelly, M., Banwell, C., Dixon, J., Seubsman, S.-A., Yiengprugsawan, V., & Sleigh, A. (2010). Nutrition transition, food retailing and health equity in Thailand. *Australasian Epidemiologist*, 17(3), 4–7.
- [10] Lakkana Thaikruea & Jiraporn Thammasarot. (2016). Prevalence of normal weight central obesity among Thai healthcare providers and their association with CVD risk: a cross-sectional study. *Scientific Reports*, 6.
- [11] Mo-suwan, L., Nontarak, J., Aekplakorn, W., & Satheannoppakao, W. (2014). Computer Game Use and Television Viewing Increased Risk for Overweight among Low Activity Girls: Fourth Thai National Health Examination Survey 2008-2009. *International Journal of Pediatrics*, 2014, 1–6. <https://doi.org/10.1155/2014/364702>
- [12] Nonboonyawat, T., Pusanasuwanasri, W., Chanrat, N., Wongthanavimok, N., Tubngern, D., Panutrakul, P., ... Piyaraj, P. (2019). Prevalence and associates of obesity and overweight among school-age children in a rural community of Thailand. *Korean Journal of Pediatrics*, 62(5), 179–186. <https://doi.org/10.3345/kjp.2018.06499>
- [13] Rerksuppaphol, L., & Rerksuppaphol, S. (2017). Internet based obesity prevention program for Thai school children-a randomized control trial. *Journal of Clinical and Diagnostic Research*, 11(3), SC07-SC11. <https://doi.org/10.7860/JCDR/2017/21423.9368>
- [14] Russ P.Lopez. (2012). Neighborhood Risk Factors for Obesity. *Obesity a Research Journal*, 15(8), 2111–2119.
- [15] Sakboonyarat, B., Pornpongsawad, C., Sangkool, T., Phanmanas, C., Kesonphaet, N., Tangthongtawi, N., ... Rangsin, R. (2020). Trends, prevalence and associated factors of obesity among adults in a rural community in Thailand: Serial cross-sectional surveys, 2012 and 2018. *BMC Public Health*, 20(1), 1–9. <https://doi.org/10.1186/s12889-020-09004-w>
- [16] Sirichakwal, P. P., Sranacharoenpong, K., & Tontisirin, K. (2011). Food based dietary guidelines (FBDGs) development and promotion in Thailand. *Asia Pacific Journal of Clinical Nutrition*.
- [17] Sr Patel. (2009). Reduced sleep as an obesity risk factor. *Wiley Online Library*, 10S(s2), 61–68.
- [18] Taylor, M. (2020). Obesity on the rise in the Land of Smiles. Retrieved 06/19/2024 from <https://thethaiger.com/guides/best-of/health/obesity-on-the-rise-in-the-land-of-smiles>
- [19] WHO. (2024). Obesity and overweight. Retrieved 06/20/2024 from <https://www.who.int/news-room/factsheets/detail/obesity-and-overweight>
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