



# Best Practices and Challenges in Implementing Healthy Food Environment at School Setting toward Prevention of Obesity in Indonesia and Malaysia

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## Abstract

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**BACKGROUND:** Consumption habits and nutritional status during adolescence can affect nutrition and health status in the future related to the risk of degenerative or non-communicable diseases. Good environmental support can make teenagers also do a good habit as well. A school environment that pays attention to a healthy food environment can support changes in patterns or types of consumption of healthier food in adolescents.

**AIM:** This study aims to analyze best practices and challenges in implementing healthy food environment. This study aims to analyze best practices and challenges in implementing healthy food environment.

**METHODS:** Online focus group discussion was held consisting of 15 high school teachers from Indonesia and five high school teachers from Malaysia. Data were triangulated to enhance validity and to create a more comprehensive understanding of healthy food environments in schools in Indonesia and Malaysia and were analyzed using a content analysis research technique.

**RESULTS:** The results highlighted the current status of the food environment at schools in Indonesia and Malaysia, challenges to implementing healthy food environment, best practices, and future, including propose concept and solution to initiate too.

**CONCLUSION:** The results emphasize the need to dig deeper to understand why the school food environment in Indonesia and Malaysia is still far from an ideal healthy food environment. Concepts and suggestions on how schools in Indonesia and Malaysia should move forward to build a healthy school food environment are also presented in this paper.

## Introduction

Obesity is an imbalance between energy intake and expenditure, which has an impact on increasing excess body weight [1]. Health problems due to obesity are not only related to the accumulation of excess fat but also the distribution of fat in the body [2]. Overweight and obesity are major risk factors for several chronic diseases, including diabetes, heart disease, and cancer. In Indonesia, especially in large cities, lifestyle changes lead to westernization and sedentary (lazy lifestyle), resulting in changes in people's diet or consumption which refers to a high-calorie, high-fat, and cholesterol diet, especially to fast food offerings, fast food) which have an impact on increasing the risk of obesity [3]. Overweight and obesity are noted to have higher mortality rates than underweight.

Adolescence is a period when nutritional needs are very important to pay attention to because they will experience an increased need to maximize growth and development. In addition, the psychological side

of adolescents who are still quite unstable can affect lifestyle and eating habits due to environmental factors, especially peers. The eating habits of teenagers include reducing the frequency of eating, like to eat snacks, and like to eat fast food [4]. Consumption habits and nutritional status during adolescence can affect nutrition and health status in the future related to the risk of degenerative or non-communicable diseases. About 70%–80% of obese adolescents remain to be obese during adulthood [5].

Based on data of the World Health Organization, the prevalence of overweight and obesity in children and adolescents aged 5–19 years increased significantly from 4% in 1975 to more than 18% in 2016. This increase was experienced by both male and female children and adolescents as noted that 18% of women and 19% of men are obese [6]. In Indonesia, the national health survey shows that the prevalence of overweight and obesity in Indonesia is 16.0% in adolescents aged 13–15 years and 13.5% in adolescents aged 16–18 years [7]. The same thing was experienced by Malaysia which recorded an exponential increase in the

prevalence of obesity in children and adolescents from 5.4% in 2006 to 6.1% in 2011. In 2017, reports at the national and local levels recorded 27–30% of children in primary school are overweight or obese [8].

In adolescence, children have begun to make many decisions for themselves. Therefore, good environmental support can make teenagers also do a good habit as well. Most teenagers spend more time in school. A school environment that pays attention to a healthy food environment can support changes in patterns or types of consumption of healthier food in adolescents. A healthy food environment is a condition in which healthy foods are available and affordable, and where the setting enables individuals to make healthier food choices. When healthy foods are not available, people may settle for foods that are higher in calories and lower in nutritional value. Thus, creating and supporting healthy food environments are an important part of public health work [9].

## Methods

This was a qualitative research comparing the challenges faced by high schools in Indonesia and Malaysia in implementing a healthy food environment. An online focus group discussion (FGD) was held with a total of 20 participants, consisting of 15 high school teachers from Indonesia and five high school teachers from Malaysia. Data collection was carried out from October to November 2021. Data were triangulated to enhance validity and to create a more comprehensive understanding of healthy food environments in schools in Indonesia and Malaysia and were analyzed using a content analysis research technique. This study was approved by the Ethics Committee of the Faculty of Dentistry, Airlangga University, Indonesia.

## Results

### **Current status of the food environment in schools in Indonesia and Malaysia**

Teachers in Indonesia and Malaysia already have a good understanding of healthy food. Most of the teachers defined healthy food as balanced nutrition, not containing too many food additives and food that is beneficial to the human body. A healthy food environment is further defined as a condition where students can make healthier food choices by serving enjoyable and affordable healthy food with clean food utensils and good service by the food retailers. Most of the teachers then stated that the current food

environment is still far from being called a healthy food environment. It can be seen that foods sold in schools are mainly foods that are high in salt, sugar, and fats content (e.g., snacks, junk food, processed food, sugar-sweetened beverages or soft drinks, etc.). One of the teachers from Indonesia stated that:

*“Kebanyakan makanan yang dijual itu kebutuhan pokok siswa, mungkin karena banyak yang belum sarapan. Selain itu yaitu air mineral, makanan basah (lemper, tahu, dll), dan makanan yang disukai remaja yaitu makanan ringan. [Most of the food sold is the basic needs of students, maybe because many students do not have breakfast yet. Besides that, there are mineral water, traditional food (lemper, tofu, etc.), and foods that the students like such as snacks.]”*

Other teachers from Indonesia added and said:

*“Biasa dijual ada gorengan seperti, tahu, mendoan, risol. Nasi juga dijual murah Rp2.000, - lauknya hanya berupa sambal. Selain itu ada snack, air mineral, air kemasan berasa, aneka jus dengan dengan berbagai tingkat kemanisan tetapi buahnya sedikit. [Common foods that are sold such as fried foods (tofu, mendoan, risol). Rice is also sold cheaply for IDR 2000 with the side dish only chili sauce. Besides that, there are snacks, mineral water, flavored water, and various juices with different levels of sweetness but only content a little fruit.]”*

Similar answer given by teacher from Malaysia who said that:

*“Canteen sekolah kebanyakan ada processed food macam sosej, nugget, itulah yang banyak dekat canteen sekolah. Yang lain sama lah, makanan bergoreng, dan paling utama nasi lemak, air kebanyakan air manis, air sirap, semua air manis ada, macam snack, yang lain-lain semua sama. buah-buahan pun ada. [Most of the school canteens have processed food such as sausages, nuggets. Everything else is the same, fried foods, and most common is nasi lemak, water is mostly sweet water, syrup water, all sweet water is available, kinds of snacks, everything else is the same. There are also fruits.]”*

### **Challenges in implementing a healthy food environment in schools in Indonesia and Malaysia**

Teachers in both Indonesia and Malaysia stated similar challenges in implementing a healthy food environment in schools in Indonesia and Malaysia. Most students are not aware of healthy eating habits since healthy food never seems to be a choice. During FGD, teachers from Indonesia and Malaysia stated that:

*“Di kantin kami ada aneka minuman kemasan*

*yang berasa-rasa, ada juga snack yang mungkin dapat kita kategorikan tidak sehat, tapi dilemanya kita tidak bisa memasukkan makanan sehat karena rata-rata makanan itu sudah membudaya bagi anak-anak. dan ketika kita buat makanan basah malah mereka tidak suka dan tidak mau beli. Jadi makanan-makanan seperti itulah (makanan tidak sehat) yang laku di kantin kami. [In our canteen, there are various flavored drinks, there are also snacks that might be categorized as unhealthy food, but the dilemma is that we can't sell healthy food because these foods had become a culture. When we sell wet food, they don't like it and don't want to buy it. So those kinds of foods (unhealthy foods) are having a good selling in our canteen.]”*

In addition, healthy foods (e.g., fruits, self-made juice, etc.) tend to have higher prices that make junk food, processed food, and snacks are more affordable for the students. High demand for unhealthy foods emerges the challenges that come from the side of food retailers. Food retailers find it more profitable to sell unhealthy food due to the cheaper ingredients and high demand from the students. Both Indonesian and Malaysian teachers speculated that food retailers only concern about profit as eloquently described by one of the teachers as follows:

*“Masalahnya ada pada tender yang menyediakan café atau kantin yang melebihi keuntungan. Pelajar lebih bebas untuk memilih tapi tender lebih suka untuk membaaur masuk makanan yang memang menjadi kegemaran dan kebiasaan jadi masih memikirkan keuntungan tanpa pikir lagi berkhasiat atau tidak. [The problem lies in the tender that provides a cafe or canteen that prioritizes the profits. Students are freer to choose but tender prefer to entering what foods that the student like and only think about profits without thinking about whether they are healthy or not.]”*

### **Best practices of the healthy food environment in schools in Indonesia and Malaysia**

Best practices of a healthy food environment in school are always a nice topic. In Indonesia, there is a program called Adiwiyata School (refers to schools that care about a healthy, clean, and environment) which makes many schools reduce plastic waste, so it automatically reduces packaged food, especially snacks. However, unfortunately, not all schools apply this program. Education about healthy food has also been carried out for students, teachers, and sellers, but sellers in the canteen sometimes refuse it. On the other hand, the effect of online food order development, students can buy food online when food in the canteen cannot provide what they want, and so on.

In Malaysia, the government is more concerned about food. Restaurants or canteens with lots of flies

will be penalized and must be closed for about 2 weeks. The Malaysian Ministry of Health always monitors food in restaurants or canteens so that sellers are now afraid and more careful in selling food. In Malaysia, there is also an RMT (Supplementary Meal Plan) program in schools. This program exists to help underprivileged students in the B40 category by providing a healthy breakfast from their school canteen. In addition, food in Malaysia's school canteens is having a standard by setting a percentage allowance of the type of food that can be sold. One of the teachers from Malaysia stated that:

*“Kerajaan sangat menitikberatkan berkaitan dengan makanan sihat dalam kalangan pelajar, tapi segi masalah utama adalah keuangan sebab bukan semua pelajar mampu membeli makanan yang mahal. Di kantin pula, dia terikat untuk menjual makanan yang lebih murah jadi dia akan cari sumber yang agak murah so dia akan choose makanan yang lebih banyak perasa, lebih banyak elemen lain yang ada. Selain tu, yang tak boleh atasi sebab penjual masih lebih mengejar keuntungan. [The government lays a big intention on healthy food among students, but the main problem is financial. Because not all students can afford expensive and good quality meals. In the canteen, the seller pushed to sell cheaper food so they will look for sources that are cheaper which have more food additives. Besides that, the seller is still more care about profit.]”*

Another teacher from Malaysia also said:

*“Tapi di Malaysia ada program RMT (Rancangan Makanan Tambahan). Nah ini untuk membantu pelajar yang tidak mampu yang kategori B40 sesuai range pendapatan. Kementerian bantu pelajar ini untuk menyediakan sarapan berkhasiat melalui kantin sekolah. Dia kate dalam usaha untuk membantu meningkatkan makanan yang sehat. Saat ini di kantin sekolah dah disyaratkan untuk masuk persent makanan yang boleh dijual. Makanan bergoreng kena kurangkan, dia punya arahan, dia kena lebihkan makanan yang sihat contoh natural food macam buah. bergoreng pun tak banyak lah sekarang. Kerajaan berusaha mengurangkan makanan yang tidak elok inilah. [But, in Malaysia, there is a RMT (Supplementary Food Plan) program. This helps underprivileged students in the B40 category according to their income range. The Ministry helps these students by providing nutritious breakfast through the school canteen. It's in an effort to help promote healthy eating behavior. Currently, in the school canteen, it has been settled the percentage of food that can be sold in the school canteen. Fried foods have to be reduced and also have to increase healthy*

food, for example, natural food like fruits. Fried food is not much now. The government is trying to reduce this unhealthy food.]”

From the answers above, we can make an intention that a cultural change to make healthier food choices is the first and foremost thing to ensure the implementation of a healthy food environment. A collaboration between stakeholders, both internal (i.e., school principal, teachers, school committee, food retailers, and students) and external (i.e., education and health agencies) play great importance in giving the future perspectives of best practices of the healthy food environment in schools in Indonesia and Malaysia. To begin with, it is important to enforce the making of a policy that regulates the nutrition education curriculum at every education level. Students' attitudes and motivation toward healthier food choices can be pursued by improving their knowledge about the benefits of healthy foods and the harmful consequences of the not healthy ones. On the other side, food retailers need to be educated in finding profitable healthy foods. Food retailers are also needed to be exposed to the information about nutrition and ingredients in what they sell. A regulation, including frequent monitoring and evaluation by the school principal, teachers, and school committee, is needed to ensure the compliance of the food retailers in selling healthy food. In addition, it is important to ensure the prohibition of advertisement, promotion, and sponsorship of junk food and soft drinks in the school environment. Based on FGD, teachers from Indonesia and Malaysia suggested the following concept to improve a healthy food environment in school settings (Figure 1).

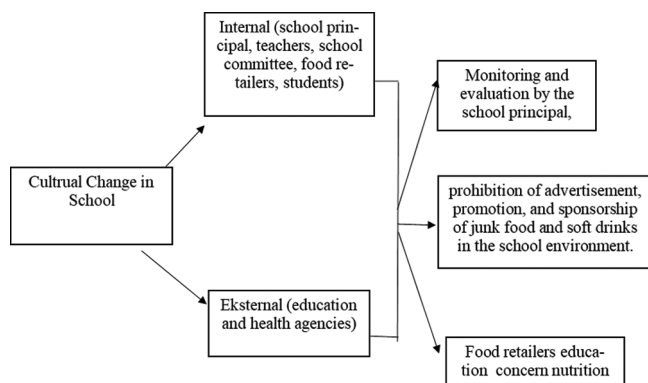


Figure 1: Propose concept and solution to initiate a healthy school food environment

## Discussion

This research found that there still needed a lot of improvement in the implementation of a healthy food environment in Indonesia and Malaysia. Schools in both countries face similar challenges with a lack of law enforcement, a lack of nutrition education, higher prices

in healthy foods, and higher accessibility to unhealthy foods as predictors. Law enforcement regarding the school food policy needs to be carried out as it is proven that school food policy sets out a coordinated approach to food and drink to increase the availability of healthier options, ensures equality of access to healthy food and drink for all, reinforces appropriate messages relating to food and drink including ensuring consistency between the nutrition education and school food and drink provision, and engages the entire school community in taking part in the policy development [10].

Knowledge improvement regarding the benefits of healthy foods and harmful consequences of unhealthy ones is also the main key to enhancing healthy eating habits among students in schools. For instance, an educational intervention regarding the effects of junk food in Nepal resulted in an increase in behavioral intention for reducing junk food consumption [11]. In addition, the food and nutrition education program carried out in Teresina was also proven efficacious not only in reducing the consumption of high-calorie foods but also contributed to an improvement in the quality of food intake among students [12].

Price as one of the food choices' predictors was also found by a study in an Australian canteen that stated in 75% of primary and 57% of secondary schools, the selected unhealthy lunch item was cheaper than the healthy ones. Moreover, in 41% of primary and 48% of secondary schools, the selected unhealthy snack was cheaper than the healthy ones [13]. Another study in the United States also suggested that healthy foods and diets are more expensive than unhealthy ones and hence that cost is a barrier to healthy eating habits and a factor that contributes to obesity inequalities [14]. Findings from recent studies indicate that subsidies can be effective in increasing the consumption of healthier options [15] and leading to a higher ratio of expenditure on healthy foods [16], [17], [18].

Strength of the study includes qualitative findings related to a healthy food environment based on FGD with teachers from both Indonesia and Malaysia. However, generalization of this study is limited because teachers that participate in the FGD might not be representing typical teachers and schools in Indonesia and Malaysia. Nonetheless, this study dug deeper to understand why the school food environment in Indonesia and Malaysia is still far from an ideal healthy food environment. Concept and suggestion on how schools in Indonesia and Malaysia should move forward to build a healthy school food environment also presented in this paper.

## Conclusions

This research found that there still needed a lot of improvement in the implementation of a healthy food

environment in Indonesia and Malaysia. Schools in both countries face similar challenges with a lack of law enforcement, a lack of nutrition education, higher prices in healthy foods, and higher accessibility to unhealthy foods as predictors.

## Authors' Contributions

Conceptualization, T.M.; investigation, T.M. and M.A.V.; methodology, T.M., M.A.V., E.E., and E.L.; validation, T.M., E.E. and C.A.T.; formal analysis, T.M., E.L., and C.A.T.; resources, E.L.; writing – original draft preparation, T.M., M.A.V., E.E., and E.L.; writing – review and editing, C.A.T., T.M., M.A.V., E.E., and E.L.; and supervision, T.M. and C.A.T. All authors have read and agreed to the published version of the manuscript.

## Institutional Review Board Statement

This study was approved by the ethics committee from the Faculty of Dentistry, Airlangga University, on December 15, 2021, with approval number 632/HRECC.FODM/XII/2021.

## Data Availability Statement

The datasets generated during and analyzed during the present study are not publicly available due to the subject's privacy and ethical concern but are available from the corresponding author on reasonable request.

## References

- Antipatis VJ, Gilli TP. Obesity as a global problem. In: Bjontrop P, editor. *International Textbook of Obesity*. New York: John Wiley and Sons; 2001. p. 3-5.
- Smith JC. *Understanding Children Obesity*. Missisipi: University Press of Missisipi; 1999. p. 33-7, 60-4.
- Zametkin AJ, Zoon CK, Klein HW, Munson S. Psychiatric aspects of child and adolescent obesity: A review of the past 10 years. *J Am Acad Child Adolesc Psychiatry*. 2004;43(2):134-50. <https://doi.org/10.1097/00004583-200402000-00008> PMID:14726719
- Emilia E. Pengetahuan, sikap, dan praktek gizi pada remaja dan implikasinya pada sosialisasi perilaku hidup sehat. *Med Pendidikan Gizi Kuliner*. 2009;1(1):1-10.
- Rezali FW, Chin YS, Yusof BN. Obesity-related behaviors of Malaysian adolescents: A sample from Kajang district of Selangor state. *Nutr Res Pract*. 2012;6(5):458-65. <https://doi.org/10.4162/nrp.2012.6.5.458> PMID:23198026
- World Health Organization. Obesity and Overweight. Available from: <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight> [Last accessed on 2022 Jan 30].
- Nugroho PS, Wijayanti AC, Sunarti S. Obesity and its risk factors among adolescent in Indonesia. *Mal J Med Health Sci*. 2020;16(3):173-9.
- Ahmad A, Zulaily N, Shahril MR, Syed Abdullah EF, Ahmed A. Association between socioeconomic status and obesity among 12-year-old Malaysian adolescents. *PLoS One*. 2018;13(7):0200577. <https://doi.org/10.1371/journal.pone.0200577> PMID:30044842
- Centres for Disease Control. Healthy Food Environment. Available from: <https://www.cdc.gov/nutrition/healthy-food-environments/index.html> [Last accessed on 2022 Jan 18]
- Health Promotion Agency. *Establishing a Whole School Food Policy*. Northern Ireland: Health Promotion Agency; 2009.
- Singh UK, Gautam N, Bhandari TR, Sapkota N. Educational intervention of intention change for consumption of junk food among school adolescents in Birgunj Metropolitan City, Nepal, based on theory of planned behaviors. *J Nutr Metab*. 2020;2020:7932324. <https://doi.org/10.1155/2020/7932324>
- Santos MM, Oliveira VP, Lima SM, Cruz KJ, Oliveira AR, Severo JS. Effectiveness of an educational intervention to reduce the consumption of high-calorie foods in public school children in Teresina, Piauí (Brazil). *Nutr Hosp*. 2015;32(2):622-6. <https://doi.org/10.3305/nh.2015.32.2.9183> PMID:26268090
- Billich N, Adderley M, Ford L, Keeton I, Palermo C, Peeters A, et al. The relative price of healthy and less healthy foods available in Australian school canteens. *Health Promot Int*. 2019;34(4):677-86. <https://doi.org/10.1093/heapro/day025> PMID:29659816
- Darmon N, Drewnowski A. Contribution of food prices and diet cost to socioeconomic disparities in diet quality and health: A systematic review and analysis. *Nutr Rev*. 2015;73(10):643-60. <https://doi.org/10.1093/nutrit/nuv027> PMID:26307238
- Eyles H, Mhurchu CN, Nghiem N, Blakely T. Food pricing strategies, population diets, and non-communicable disease: A systematic review of simulation studies. *PLOS Med*. 2012;9(12):1001353. <https://doi.org/10.1371/journal.pmed.1001353> PMID:23239943
- An R, Patel D, Segal D, Sturm R. Eating better for less: A national discount program for healthy food purchases in South Africa. *Am J Health Behav*. 2013;37(1):56-61. <https://doi.org/10.5993/ajhb.37.1.6> PMID:22943101
- Sturm R, An R, Segal D, Patel D. A cash-back rebate program for healthy food purchases in South Africa: Results from scanner data. *Am J Prev Med*. 2013;44(6):567-72. <https://doi.org/10.1016/j.amepre.2013.02.011> PMID:23683973
- Thow AM, Jan S, Leeder S, Swinburn B. The effect of fiscal policy on diet, obesity and chronic disease: A systematic review. *Bull World Health Organ*. 2010;88(8):609-14. <https://doi.org/10.2471/BLT.09.070987> PMID:20680126