Addressing Childhood Obesity in Malaysia

According to the World Health Organisation (WHO), worldwide obesity rates nearly tripled between 1975 and 2016, with particularly significant increases in low- and middle-income countries.[1] As a result of socioeconomic progress (quantified by rising GDP per capita, greater levels of urbanisation and women's empowerment),[2] citizens have gained access to a wider variety of food, including unhealthier options. Various Southeast Asian countries were regarded as the poorest in the world in the 1980s, but are now regarded as lower middle-income nations.[3] In particular, Malaysia made significant economic progress, with the Organisation for Economic Co-operation and Development (OECD) classifying it as an upper-middle-income country.[4]

However, it had also been noted as the most obese country in Southeast Asia,[5] with 50.1% of Malaysians being overweight, according to the country's National Health and Morbidity Survey (NHMS).[6] The NHMS also highlighted a significant increase in childhood obesity rates in Malaysia within a short span of 8 years, from 6.1% in 2011 to 14.8% in 2019.[7] Thus, Malaysia is a noteworthy case study for childhood obesity. Given that eating habits are formed in the early stages of childhood,[8] childhood obesity is a pressing issue in need of intervention, lest it snowballs into lifelong, obesity-related health problems like heart disease.

This case study explores childhood obesity in Malaysia, focusing on individuals under the age of 18, as defined in the United Nations Convention on the Rights of the Child.[9] It begins by examining the causes of childhood obesity within Malaysia's sociocultural context, including dietary choices and

[1] "Obesity and overweight", World Health Organisation, 9 June 2021, https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight.
[2] Ashley Fox, Wenhui Feng and Victor Asal, "What is Driving Global Obesity Trends? Globalization or 'Modernization'?" *Globalization and Health* 15, no. 32 (2019): 1, https://doi.org/10.1186/s12992-019-0457-y.
[3] Teesta Prakash and Alexandre Dayant, "Mapping Southeast Asian Development Assistance", *The Interpreter,* 11 May 2022, https://www.lowyinstitute.org/the-interpreter/mapping-southeast-asian-development-assistance
[4] "DAC List of ODA Recipients: Effective for Reporting on 2022 and 2023 Flows", Organisation for Economic Co-operation and Development, accessed 26 November 2022, https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/DAC-List-of-ODA-Recipients-for-reporting-2022-23-flows.pdf
[5] Fernando Fong, "15% of Malaysians Obese, Still The Fattest Country in Southeast Asia", *The Rakyat Post*, 14 December 2021, https://www.therakyatpost.com/news/malaysia/2021/12/14/5-of-malaysians-obese-still-the-fattest-country-in-southeast-asia/
[6] Bernama, "One of Two Adults in Malaysia is Overweight, Says Deputy Health Minister", *New Straits Times*, 25 March 2022, https://www.nst.com.my/news/nation/2022/03/783279/one-two-adults-malaysia-overweight-says-deputy-health-minister
[7] Wilfred Kok Hoe Mok, Noran Naqiah Hairi, Caryn Mei Hsien Chan, Feisul Idzwan Mustapha, Tamil Arasu Saminathan and Wah Yun Low, "The Implementation of Childhood Obesity Related Policy Interventions in Malaysia - A Non Communicable Diseases Scorecard Project", *International Journal of Environmental Research and Public Health* 18, no. 11 (2021): 5950, https://doi.org/10.3390/ijerph18115950.
[8] Sylvie Issanchou, Habeat Consortium, "Determining Factors and Critical Periods in the Formation of Eating Habits: Results from the Habeat Project." *Annals of Nutrition & Metabolism* 70, no. 3 (2017): 251-256, https://doi.org/10.1159/000471514.
[9] United Nations, "Convention on the Rights of the Child", *United Nations,* accessed 3 December 2022, https://www.ohchr.org/en/instruments-mechanisms/instruments/convention-rights-child

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lifestyle choices. Thereafter, existing policies will be evaluated, before exploring various possible solutions, including case studies from other countries and ideas raised by stakeholders in Malaysia.

The Malaysian Context

Malaysia's sociocultural context, particularly with the COVID-19 pandemic, provides a good starting point for understanding childhood obesity. Malaysia experienced increasing tertiarisation of its domestic industries and thus significant economic growth, with an average growth of 5.4% and an average trade-to-GDP ratio of over 130% since 2010.[10] This has increased Malaysians' purchasing power, granting them access to more expensive diets and lifestyle habits, which tend to be unhealthier. For instance, online food delivery services became increasingly popular in Malaysia since 2018,[11] despite their higher prices due to service and delivery charges. Usage of these services further increased during Malaysia's COVID-19 lockdown, termed the Recovery Movement Control Order (RMCO), with 78% of Malaysians utilising food delivery services at least once a week.[12] The convenience of food delivery services incentivised the consumption of unhealthier food options like fast food. Rather than spending time and energy to prepare home-cooked food, users could have food delivered within minutes. Thus, this also reduced consumers' physical activity, since they would no longer have to walk to purchase food.

During the RMCO, even Malaysians who chose to consume home-cooked food experienced a shift in their dietary habits. Some 47% of them opted for easy-to-cook meals requiring less than 15 minutes of preparation, and another 30% chose to consume instant meals like instant noodles or canned food.[13] The desire for convenience, and thus these lifestyle habits, might have persisted even after lockdowns ceased. Overall, these unhealthier diets and increasingly sedentary lifestyles might have contributed to childhood obesity in Malaysia.

Causes

According to the Ministry of Health, up to 30% of Malaysian children were found to be overweight or obese,[14] highlighting the urgency of childhood obesity. Childhood obesity is caused by excess caloric intake, where a child's energy input (i.e. calories consumed through his diet) exceeds his energy output (i.e. calories burnt through physical activity).[15] Thus, children who consumed a large number of calories, and/or burnt a small number of calories, were more likely to be obese. For the purposes of this case study, dietary choices can be directly related to energy input, while lifestyle choices correspond to energy output.

However, given children's young age, their parents or guardians might make these choices on their behalf. As they progressed into their adolescent phase, their choices remained influenced by others around them, not just their family, but also their peers or social media influencers. These factors

[10] "The World Bank in Malaysia", The World Bank, accessed 26 November 2022, https://www.worldbank.org/en/country/malaysia/overview.

[11] Lau Teck Chai and David Ng Ching Yat, "Online Food Delivery Services: Making Food Delivery the New Normal", *Journal of Marketing Advances and Practices* 1, no. 1 (2019): 64-79, http://jmaap.org/wp-content/uploads/2019/01/5-Online-Food-Delivery-Services-Making-Food-Delivery-the-New-Normal-201911.pdf

[12] "How Are Malaysians Getting Their Daily Meals During the RMCO Period? [Data]", 1 July 2020, https://vase.ai/resources/consumer-food-purchase-and-eating-habits-during-the-rmco/

[13] Ibid.

[14] "Childhood Obesity", Kementerian Kesihatan Malaysia, accessed 26 November 2022, http://www.myhealth.gov.my/en/childhood-obesity/

[15] Sherina Mohd Sidik and Rozali Ahmad, "Childhood Obesity: Contributing Factors, Consequences and Intervention", *Malaysian Journal of Nutrition* 10, no. 1: 15

need to be considered in understanding childhood obesity, acknowledging that children's dietary and lifestyle choices are not made in isolation.

Dietary choices

Malaysians' typical diet made them predisposed to childhood obesity. Rice is a key ingredient in the country's cuisine, even featuring in its unofficial national dish, Nasi Lemak (Fatty Rice).[16] Consequently, the country's rice consumption per capita reached 120kg in 2017.[17] Many Malaysian dishes also contained coconut oil, coconut milk and deep-fried ingredients, which tended to be high in fat content. This high-carbohydrate and high-fat diet made Malaysian children predisposed to childhood obesity.

Beyond the traditional Malaysian diet, Malaysians also experienced a shift towards a westernised diet supplied by international confectionery companies and fast food chains, which has led to increased consumption of fats, oils and refined carbohydrates.[18] The consumption of such foods has resulted in an increased incidence of obesity-related, non-communicable diseases like hypertension, coronary heart disease, diabetes and cancer,[19] to which children were not immune. However, while dietary causes were evident, other causes were more insidious, making childhood obesity increasingly difficult to tackle.

Impact of poverty and inequality

For instance, as a result of poverty and inequality, children from lower-income backgrounds were more likely to have limited dietary choices, and thus develop obesity-related health conditions. Although the country has achieved significant economic growth, there remained inequality between Malaysians of different socioeconomic strata. This has materialised itself in the double burden of malnutrition, with both overeating and undernourishment being causes of obesity,[20] necessitating governmental intervention.

Individuals of lower socioeconomic status often could not afford healthier food options or better-quality food products. This has been exacerbated by rising inflation rates in recent years, with food inflation being 4.1% higher in 2022 compared to 2021, and 89.1% of items in the food and beverages group having recorded price increases.[21] When interviewed, a lady living in Kuala Lumpur shared how her middle-income family switched the protein component of their diet from salmon to chicken, acknowledging that this was a privilege she had, compared to lower-income residents.[22] Although inflation affected all citizens, it affected those of lower socioeconomic strata more significantly. They might struggle to have food on the table, let alone purchase expensive proteins and nutritious foods that granted them a balanced diet, experiencing such a form of food insecurity. According to the 1996 World Food Summit, food security is attained when "all people, at all times,

[16] Brenda Benedict, "Where is Malaysia's National Dish?", *BBC Travel*, 13 November 2019, https://www.bbc.com/travel/article/20191111-where-is-malaysias-national-dish

[17] "Rice Consumption Per Capita in Malaysia", Helgi Library, accessed 26 November 2022, https://www.helgilibrary.com/indicators/rice-consumption-per-capita/malaysia/

[18] Sidik and Ahmad, "Childhood Obesity": 14

[19] Ibid.

[20] Amutha Ramadas, Su Ming Tham, Shehzeen Alnoor Lalani and Sangeetha Shyam, "Diet Quality of Malaysians across Lifespan: A Scoping Review of Evidence in a Multi-Ethnic Population", *Nutrients* 13, no. 4 (2021): 1380, https://doi.org/10.3390/nu13041380.

[21] Rashvinjeet S Bedi, "'Most People are Complaining': With Food Inflation Higher at 4.1%, Malaysian Consumers are Feeling the Pinch", *Channel NewsAsia*, 2 June 2022, https://www.channelnewsasia.com/asia/malaysia-inflation-food-vegetables-meat-seafood-weak-ringgit-2720516

[22] Ibid.

have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life".[23]

In Malaysia, food-insecure households adopted "income soothing" and "consumption soothing" strategies to cope, cooking ingredients they had at home like self-grown cassava and banana, or reducing their food intake.[24] However, these solutions had adversely affected children's nutrition. According to the Malaysian Adult Nutrition Survey (MANS) 2014, about 20% of households were unable to provide their children with a variety of food and nutrients, instead relying on cheap and affordable food with reduced portion sizes.[25] Furthermore, a study conducted in 2020 showed that 89.5% of low-income adults had an inadequate intake of fruits and vegetables.[26] Given that children's meals tended to be prepared by their parents or guardians, they were likely to follow the latter's dietary habits. However, research had shown that a diet largely consisting of macronutrients (e.g. carbohydrates and fat), but low in micronutrients (e.g. vitamins and folic acid), increased the risk of obesity.[27]

In addition, the MANS 2014 found that 15.2% of Malaysian households skipped a meal to reduce expenditure on food.[28] Yet, regular breakfast intake has been associated with a lower likelihood of obesity, highlighting the need for regular meals. Thus, the unbalanced, irregular diet of children from low-income backgrounds made them predisposed to childhood obesity.

Time poverty was also another cause of childhood obesity. It occurs when those from impoverished backgrounds have to work for long hours in low-paid jobs,[29] consequently having insufficient time for personal rest and leisure.[30] As a result, parents from low-income households were unlikely to have time to cook, causing their children to eat out more regularly. Yet, eating out frequently has been associated with poor nutrition, specifically high sodium, energy and fat intakes.[31] In particular, the fast food industry has grown rapidly in Malaysia, being frequently patronised by the working

[23] "An Introduction to the Basic Concepts of Food Security", Food and Agriculture Organization of the United Nations Food Security Programme, accessed 28 November 2022, https://www.fao.org/3/al936e/al936e00.pdf.
[24] M. Nasir Shamsudin, "Food Insecurity: Coping Strategies and Policy Responds", *Universiti Putra Malaysia*, 9 September 2019, https://upm.edu.my/article/food_insecurity_coping_strategies_and_policy_responds-53445.
[25] Mohamad Hasnan Ahmad, Rusidah Selamat, Ruhaya Salleh, Nur Liana Abdul Majid, Ahmad Ali Zainuddin, Wan Azdie Mohd Abu Bakar and Tahir Aris, "Food Insecurity Situation in Malaysia: Findings from Malaysian Adult Nutrition Survey (MANS) 2014", *Malaysian Journal of Public Health Medicine* 20, no. 1 (2020): 172, https://doi.org/10.37268/mjphm/vol.20/no.1/art.553
[26] Chee Wen Eng, Shiang Cheng Lim, Carrie Ngongo, Zhi Hao Sham, Ishu Kataria, Arunah Chandran and Feisul Idzwan Mustapha. "Dietary Practices, Food Purchasing, and Perceptions about Healthy Food Availability and Affordability: A Cross-sectional Study of Low-income Malaysian Adults", *BMC Public Health* 22, no. 192 (2022), https://doi.org/10.1186/s12889-022-12598-y.
[27] Jonathan Wrathall, "Linking Obesity and Malnutrition: Two Forms of Nutritional Stress in Developing Countries", *International Journal of Sociology* 44, no. 2 (Summer 2014): 66, https://www.jstor.org/stable/43301233.
[28] Ahmad et. al., "Food Insecurity Situation in Malaysia"
[29] Ion Ilasco, "Time Poverty in Modern World", *Development Aid*, 23 November 2021, https://www.developmentaid.org/news-stream/post/119546/time-poverty-in-modern-world.
[30] Julian Walker, "Time Poverty, Gender and Well-being: Lessons from the Kyrgyz Swiss Swedish Health Programme", *Development in Practice* 23, no. 1 (2013): 59, https://doi.org/10.1080/09614524.2013.751357.
[31] Lydiatul Shima Ashari, Ainaa Almardhiyah Abd Rashid, Mohd Razif Shahril, Yeong Yeh Lee, Yee Cheng Kueh, Bibi Nabihah Abdul Hakim, Nor Hamizah Shafiee, Raja Affendi Raja Ali and Hamid Jan Jan Mohamed, "Exploring the Norms of Eating-out Practice Among Adults in Malaysia", *Malaysia Journal of Nutrition* 28, no. 1 (2022): 39, https://doi.org/10.31246/mjn-2021-0008.

class for its convenience.[32] This has caused fast food to become a dominant yet detrimental diet for low-income children in urban Malaysia,[33] causing them to become more prone to childhood obesity.

Parental decisions were an influential factor affecting children's nutrition. However, parents in low-income households had limited financial resources, and thus forced to make decisions that compromised their children's health. Their inability to afford a balanced, regular diet contributed to childhood obesity, presenting poverty and inequality as significant drivers to be addressed.

The convenient option

According to the convenience orientation, products that grant personal comfort and/or reduce the time required to complete certain tasks are deemed more valuable.[34] This applied to food consumption, where consumers tended to opt for food that could be easily acquired, prepared, stored or eaten.[35] Particularly with increasingly fast-paced lifestyles, the convenience orientation influenced consumer decisions across society, disproportionately affecting those of low-income backgrounds.[36]

Impact of the Internet

Globally, the fast food industry spent nearly US$600 million on child-targeted marketing in 2009, leading children as young as 3 years old to be able to recognise and form positive impressions about fast food brands just by looking at their brand logos.[37] At a young age, children lack the cognitive ability to identify and understand persuasive elements of fast food advertising, thus making them vulnerable to the influence of these marketing tactics.[38] A study showed that children with moderate exposure to fast food television advertising were more likely to have consumed fast food in the past week.[39] This highlighted the influence of the media on children's dietary habits, and possibly childhood obesity rates. This problem was evident in Malaysia, with up to two-thirds of children having at least three hours of screen time daily on television, tablets or smartphones.[40]

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[32] Amuthaganesh Mathialagan, Narkeeran Nallasamy, Syaza Nurfarida Razali, "Physical Activity and Media Environment as Antecedents of Childhood Obesity in Malaysia", *Asian Journal of Pharmaceutical and Clinical Research* 11, no. 9 (2018): 289, https://doi.org/10.22159/ajpcr.2019.v11i9.17095.

[33] Ibid.

[34] Anna Botonaki, Dimitrios Natos and Konstadinos Mattas, "Exploring Convenience Food Consumption Through a Structural Equation Model", *Journal of Food Products Marketing* 15, no. 1: 67, https://doi.org/10.1080/10454440802470607.

[35] Ibid, 65

[36] Ibid, 74.

[37] Jennifer A. Emond, Meghan R. Longacre, Keith M. Drake, Linda J. Titus, Kristy Hendricks, Todd MacKenzie, Jennifer L. Harris, Jennifer E. Carroll, Lauren P. Cleveland, Kelly Gaynor and Madeline A. Dalton, "Influence of Child-targeted Fast Food TV Advertising Exposure on Fast Food Intake: A Longitudinal Study of Preschool-age Children", *Appetite* 140 (2019): 134-141, https://doi.org/10.1016/j.appet.2019.05.012.

[38] Madeline A. Dalton, Meghan R. Longacre, Keith M. Drake, Lauren P. Cleveland, Jennifer L. Harris, Kristy Hendricks, Linda J. Titus, "Child-targeted Fast-food Television Advertising Exposure is Linked with Fast-food Intake Among Pre-School Children", *Public Health Nutrition* 20, no. 9 (2017), https://doi.org/10.1017/S1368980017000520.

[39] Ibid.

[40] Yeap Jo Wearn, "Control Children's Screen Time", *New Straits Times,* 11 June 2022, https://www.nst.com.my/opinion/letters/2022/06/803942/control-childrens-screen-time

The Internet has also become a significant influence in Malaysia. As of 2018, 92% of Malaysian children aged 5 to 17 used the Internet,[41] with YouTube being the most visited website.[42] The implementation of online learning during the MCO might have increased this figure. Such extensive use of the Internet had become a new norm for Malaysian school-going children, highlighting the influence that the Internet had on them from a young age. Consequently, children were exposed to fast food advertisements on various social media platforms, as well as content produced by social media influencers, whom they often relied on for information, company and comfort while their parents were at work.[43] Thus, children might have learnt to emulate online content and trends. In particular, many videos frequently featured food and beverage cues, shaping children's perceptions of food and food consumption and influencing their dietary habits,[44] with one example being the Mukbang culture.

Mukbang, which means "eating broadcast" in Korean, refers to videos where individuals binge-eat in front of the camera, often consuming 4,000 or more calories in one sitting.[45] Since 2018, various local *mukbang* celebrities had gained popularity in Malaysia,[46] consuming large amounts of local dishes like stir-fried noodles on camera.[47] McDonald's also utilised this trend, creating a "McDonald's Malaysia GCB Mukbang Challenge" in November 2018, in which Malaysian citizens would eat as many burgers as they could within 5 minutes.[48] While most children under parental supervision were unlikely to engage in *mukbang*, watching such videos could alter their perceptions of food.

Research has established a correlation between *mukbang* viewing time and dietary behaviour, with *mukbang* viewers tending to have remarkably high BMI.[49] Firstly, *mukbang* videos encouraged the consumption of large quantities of carbohydrate-rich foods,[50] portraying it as a challenge to be accomplished. Furthermore, the food consumed in *mukbang* was typically high in fat and/or carbohydrates, including fast food and instant noodles. Thus, if impressionable children perceived such eating habits as normal, *mukbang* videos might reinforce their desire to consume larger quantities of unhealthy food. This problem posed by social media was largely similar to that of

[41] UNICEF East Asia and the Pacific Regional Office and the Centre for Justice and Crime Prevention, "Our Lives Online: Use of Social Media by Children and Adolescents in East Asia - Opportunities, Risks and Harms", *UNICEF*, 2020, www.unicef.org/malaysia/media/1506/file/Accessible_version_-_Our_Lives_Online_Executive_Summary.pdf

[42] Staff Writers, "New Study Shows How Malaysian Kids Spend Time Online", *Malaysia Now*, 4 June 2021, https://www.malaysianow.com/news/2021/06/04/new-study-shows-how-kids-spend-time-online

[43] Frontiers, "The Role of Social Media Influencers in the Lives of Children and Adolescents", *Frontiers*, accessed 25 December 2022, https://www.frontiersin.org/research-topics/9295/the-role-of-social-media-influencers-in-the-lives-of-children-and-adolescents#articles

[44] Anna E. Coates, Charlotte A. Hardman, Jason C. G. Halford, Paul Christiansen and Emma J. Boyland, "Food and Beverage Cues Featured in YouTube Videos of Social Media Influencers Popular with Children: An Exploratory Study", *Frontiers in Psychology* 10: 2142, https://doi.org/10.3389/fp-syg.2019.02142.

[45] Katie Jackson, "What is 'Mukbang'? Inside the Viral Korean Food YouTube Trend", *Today*, 23 February 2018, https://www.today.com/food/what-mukbang-inside-viral-korean-food-phenomenon-t123251

[46] Nur Hasliza Mohd Salleh, "Why Do People Watch Videos of Other People Eating?", *Malaysia Now*, 17 August 2022, https://www.malaysianow.com/news/2022/08/17/why-do-people-watch-other-people-eat

[47] Juicy Stuff, "MUKBANGERS Malaysia Paling Popular", *YouTube*, 13 June 2020, https://www.youtube.com/watch?v=_p13L7RRF9g

[48] McDonalds, "McDonald's Malaysia GCB Mukbang Challenge Terms and Conditions", *McDonalds*, https://www.mcdonalds.com.my/gcbmukbang/terms

[49] Kang Sue-min, "Watching 'Meokbang' Can Lead to Health Issues Such As Obesity: Report", *The Korea Herald*, 19 June 2021, https://www.koreaherald.com/view.php?ud=20210618000695

[50] Ibid.

television commercials. However, while commercials on state-run television could be regulated by the government, it was more difficult to do so with such content on social media.[51]

Lifestyle choices

Beyond the nature of its content, the Internet tends to encourage children to lead more sedentary lifestyles, particularly with the use of addictive social media sites. Social media platforms utilise reward systems which gave their users dopamine and happiness rushes, thus encouraging frequent usage and consequently, social media addiction over time.[52] The Malaysian Communications and Multimedia Commission found that children and youths constituted about 14% of social media users in the country.[53] Given their young age, children were less able to exercise self-control in regulating their use of social media, making them more likely to become victims of social media addiction, particularly without adequate adult supervision.[54] In particular, social media addiction has been linked to inequality, with time poverty causing decreased levels of parental support for children of low-income backgrounds.[55] As a result of social media usage, children tended to lead more sedentary lifestyles, spending more time indoors on their devices rather than being physically active outdoors. This led to decreased energy output, justifying the correlation between social media usage and a child's BMI.[56]

Existing Policies

Various solutions had been implemented, seeking to address these causes of childhood obesity. Since children spent a significant amount of time in school, educational institutions have been one of the key stakeholders involved in Malaysia.

Mandatory physical education

According to the Ministry of Education, the Malaysian National Education System consists of preschool education for pupils aged four to six, primary education for another six years and subsequently, secondary education.[57] Physical education (PE) has been a compulsory subject in Malaysian primary schools, allowing students to maintain their fitness through engaging in their favourite sports while gaining knowledge about physical wellness.[58] The National Physical Education

[51] Vase.ai, "Malaysians Call for Government Regulations on Social Media", *Vase.ai*, 11 November 2022, https://www.vase.ai/resources/blogs/malaysians-call-for-government-regulations-on-social-media

[52] Erika P, "Reward Systems: Why Social Media is So Addicting", *Science Times*, 14 September 2020, https://www.sciencetimes.com/articles/27290/20200914/social-media-addiction-ways-counter.htm

[53] Faridah Nazir, Norliza Omar, Muhamad Afzamiman Aripin, Mohd Hizwan Mohd Hisham, "A Case Study of Social Media Addiction Among Malaysians", *Solid State Technology* 63, no. 4 (2020), http://irep.iium.edu.my/84010/1/A%20Case%20Study%20of%20Social%20Media%20Addiction%20Among%20Malaysian.pdf

[54] Gwenn Schurgin O'Keeffe, Kathleen Clarke-Pearson and Council on Communications and Media, "Clinical Report - The Impact of Social Media on Children, Adolescents and Families", *Paediatrics* 127, no. 4 (2011): 801, https://doi.org/10.1542/peds.2011-0054.

[55] Rohitha Naraharisetty, "Children's Social Media Addiction is Linked to Inequality, Finds Global Study", *The Swaddle,* 9 September 2022, https://theswaddle.com/childrens-social-media-addiction-is-linked-to-inequality-finds-global-study/

[56] Datis Khajeheian, Amir Mohammad Colabi, Nordiana Binti Ahmad Kharman Shah, Che Wan Jasimah Bt Wan Mohamed Radzi and Hashem Salarzadeh Jentabadi, "Effect of Social Media on Child Obesity: Application of Structural Equation Modeling with the Taguchi Method", *International Journal of Environmental Research and Public Health* 15, no. 7 (2018): 1343, https://doi.org/10.3390/ijerph15071343.

[57] Kementerian Pendidikan, "Education System", *Kementerian Pendidikan*, accessed 3 December 2022, https://www.moe.gov.my/en/dasarmenu/sistem-pendidikan

[58] Ahmad Hashim, Yusof Ahmad and Zulakbal Abd Karim, "National Physical Education Standards: Level of Physical Fitness Female Student Primary School in Malaysia", *International Journal of Humanities and Social Science* 8, no. 5 (2018): 131, https://www.ijhssnet.com/journals/Vol_8_No_5_May_2018/14.pdf

Standards for Primary School in Malaysia have also been implemented,[59] providing consistent guidelines for schools across the country, in alignment with the government's direction.

A PE curriculum encouraged children to attain the minimum level of physical activity. According to governmental standards, PE lessons should be conducted twice a week, for 40 minutes each session.[60] By allocating and formalising this period, students, even those with sedentary lifestyles, were obligated to participate in physical activity, possibly improving their health and reducing childhood obesity rates. Physical activity during childhood was a significant predictor of activity in adulthood; physically active children tended to maintain such healthy habits as they grow up, and likewise, sedentary lifestyles tended to persist into later stages of life.[61] Hence, the impact of the PE curriculum was potentially long-lasting. In addition, the PE curriculum equipped students with the knowledge and skills to lead physically active lifestyles.[62] If PE lessons and teachers were sufficiently engaging, students might even pursue sports outside of school, increasing their physical activity and further reducing childhood obesity rates.[63]

However, medical professionals argued that the minimum duration for PE was still insufficient to enhance cardiovascular endurance or reduce the incidence of other health conditions.[64] In addition, despite prevailing national guidelines, the nature and quality of PE lessons tended to differ across states and schools, depending on the time, expertise, training and resources that teachers have access to.[65] If teachers were stretched by other demands, they were less likely to value the PE curriculum, thus affecting their enthusiasm, or lack thereof, when facilitating the lessons. With the National Physical Education Standards for Primary Schools in Malaysia, teachers might also become preoccupied with fulfilling objectives rather than making lessons enjoyable.[66] Yet, a teacher's behaviour and pedagogy tended to influence students' attitudes towards PE and physical activity, with negative experiences possibly making students disinterested, deterring them from exercising and undermining the intended purposes of PE.[67]

School feeding programmes

Given that children spent a significant amount of time in school, school feeding programmes had been implemented in Malaysia. These programmes helped address the aforementioned double burden of malnutrition and obesity,[68] ensuring that lower-income students consume nutritious,

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[59] Ibid, 132.

[60] Shabeshan Rengasamy, Subramaniam Raju, Wee Akina Sia Seng Lee and Ramachandran Roa, "A Fitness Intervention Program within a Physical Education Class on Cardiovascular Endurance among Malaysian Secondary School Students", *The Malaysian Online Journal of Education; Science* 2, no. 1 (2014): 1-8, https://files.eric.ed.gov/fulltext/EJ1086262.pdf

[61] Richard Bailey, "Physical Education and Sport in Schools: A Review of Benefits and Outcomes", *Journal of School Health* 76, no. 8 (2006): 398, https://doi.org/10.1111/j.1746-1561.2006.00132.x

[62] Philip J Morgan and Vibeke Hansen, "Physical Education in Primary Schools: Classroom Teachers' Perceptions of Benefits and Outcomes", *Health Education Journal* 67, no. 3 (2008): 197, https://doi.org/10.1177/0017896908094637.

[63] Juho Poley, Mary Hassandra, Taru Lintunen, Arto Laukkanen, Nelli Hankonen, Mirja Hirvensalo, Tuija Tammelin and Martin S. Hagger, "Using Physical Education to Promote Out-of School Physical Activity in Lower Secondary School Students - A Randomized Controlled Trial Protocol", *BMC Public Health* 19, no. 157 (2019), https://doi.org/10.1186/s12889-019-6478-x.

[64] Rengasamy et al., "A Fitness Intervention Program"

[65] Ibid, 198.

[66] Ibid, 197.

[67] Ibid, 198.

[68] Jarud Romadan Khalidi and Tan Zhai Gen, "Understanding School Feeding in Malaysia", *Khazanah Research Institute*, 7 February 2020,

healthy food when they were in school. The two main school feeding programmes in Malaysia were the Rancangan Makanan Tambahan (RMT), which provided low-income primary school students with free meals, and the parent-funded Program Hidangan Berkhasiat di Sekolah (HiTS).[69] This paper focuses on the RMT since it is the main tenet of government policy.

Rancangan Makanan Tambahan (RMT)

The RMT, also known as the Supplementary Feeding Programme, was implemented to meet students' macronutrient requirements and create opportunities for both formal and informal nutrition education, particularly among students from low-income households.[70] The RMT was wholly funded by the Ministry of Education, in collaboration with existing canteen operators who provided low-income students with food before school starts (i.e. breakfast for morning-session students and lunch for afternoon-session students), based on 20 options stated in the Food Supply Agreement.[71] In addition, students under the RMT were also enrolled in the School Milk Programme (SMP).[72] With these two government-funded programs, children from lower-income families were ensured at least one nutritious meal every school day.

However, the RMT had come under scrutiny, after students under the RMT programme were served only white rice with gravy.[73] With rising costs due to inflation, the existing RMT rate of RM2.50 to RM3 was insufficient for canteen operators.[74] Consequently, the quantity and quality of food provided under the RMT had been compromised. Despite recommendations from the Health Ministry to provide a balanced diet of rice or noodles, a vegetable, a protein, a fruit and a drink in every meal,[75] canteen operators were providing smaller portion sizes and using cheaper but less nutritious ingredients like processed carbohydrates and deep-fried food.[76] According to the Health Ministry, only 61% of schools complied with the menus.[77] Canteen vendors argued that unless the RMT rate is increased, it was not feasible for them to provide low-income students with nutritious food, thus rendering the RMT programme ineffective with recent economic difficulties.[78]

Public messaging

Beyond the context of school, the government also sought to increase public awareness through various public messaging campaigns, making the concept of healthy eating more accessible to the population. Simultaneously, heightened public awareness of these concepts continued to exert pressure on manufacturers and stallholders to conform to the government's directive and provide healthier food.

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https://www.krinstitute.org/assets/contentMS/img/template/editor/20200207_Understanding%20School%20Feeding%20in%20Malaysia.pdf.

[69] Ibid, 2.

[70] Ibid, 10.

[71] Ibid, 11.

[72] Malaysia Students Web, "School Milk Programme (SMP)", accessed 5 December 2022, https://sites.google.com/a/malaysia-students.com/www/school-milk-program-smp?pli=1

[73] Bernama, "Ministry Investigating Students Served Only White Rice with Gravy under RMT Progarmme - Radzi", *The Malaysian Reserve,* 20 January 2022, https://themalaysianreserve.com/2022/01/20/ministry-investigating-students-served-only-white-rice-with-gravy-under-rmt-programme-radzi/

[74] Suraya Roslan, "Canteen Operators Hoping for a Review of Supplementary Food Programme's Rates", *New Straits Times,* 23 July 2022, https://www.nst.com.my/news/nation/2022/07/815881/canteen-operators-hoping-review-supplementary-food-programmes-rates

[75] Ibid.

[76] Chester Chin and Rebecca Rajaendram, "RMT: Why RM2.50 isn't Enough to Feed Poor M'sian Students Quality Canteen Food", *The Star*, 28 August 2022, https://www.thestar.com.my/news/education/2022/08/28/food-for-thought

[77] Roslan, "Canteen Operators"

[78] Ibid.

Healthier Choices Logo

The Healthier Choices Logo was introduced on 20 April 2017, seeking to achieve a variety of objectives – to allow consumers to make informed choices by looking out for the logo, to allow them to make comparisons and identify healthier alternatives within the same food category, and to encourage manufacturers to make their products healthier.[79] For a product to display the logo on its packaging, it needed to meet various nutrient criteria established by the Ministry of Health and was subject to renewal every two years.[80] For instance, Nestlé was a prominent multinational company with a "firmly entrenched presence in Malaysia".[81] Its Milo malt beverage was popular with Malaysians, described by *The Star* as "a Malaysian must-have breakfast drink".[82] As of April 2021, 21 of their products had attained the Healthier Choices Logo certification, including their Milo drinks, canned coffee, chocolate milk and instant oats.[83]

However, different stakeholders had highlighted the limitations of the Healthier Choices Logo. Having the logo was based on an application basis, rather than being a must-have. Given that it operated on a voluntary basis, individual companies were responsible for their own decisions, and for abiding by the standards established.[84] Thus, some companies might choose not to do so.

In addition, psychologists have described the halo effect, where a perceived positive attribute is overgeneralised to include other positive attributes,[85] improving its marketability. With the halo effect, consumers had a false perception, possibly being misled into making unhealthier choices. For instance, although instant oats or chocolate milk might be healthier than other products in the beverage category, and thus have the Healthier Choices Logo, consuming such foods in excess was still not beneficial.[86] Many such products consisted of processed carbohydrates instead of whole grains. Like sugar, these refined carbohydrates tended to increase the risk of obesity. In addition, these products did not provide adequate macronutrients and micronutrients that were required for a balanced diet. Yet, with the logo, consumers might falsely perceive these products as a seemingly nutritious yet convenient food or beverage option.[87]

Malaysian Dietary Guidelines and Malaysian Healthy Plate

To encourage Malaysians to have balanced diets, the Ministry of Health also introduced the Malaysian Dietary Guidelines (MDG) and the Malaysian Food Pyramid in 1999, which was revised to the Malaysian Healthy Plate in 2017.[88] This revised representation acts as a visual guide, reflecting

[79] Nutrition Division, Ministry of Health Malaysia, "Guidelines of Healthier Choice Logo Malaysia", *Nutrition Division, Ministry of Health Malaysia*, November 2017, https://myhcl.moh.gov.my/assets/doc/guidelines.pdf

[80] Ibid.

[81] Nestlé Malaysia, "Our Presence", *Nestlé*, accessed 29 March 2023, https://www.nestle.com.my/aboutus/nestle-my/office-factories

[82] The Star, "Goodness in Every Cup of Milo", *The Star*, 4 March 2020, https://www.thestar.com.my/food/food-news/2020/03/04/natural-goodness-in-every-cup-of-milo

[83] Nestlé Malaysia, "Tastier and Healthier Choices", *Nestlé*, accessed 6 December 2022, https://www.nestle.com.my/impact-areas/indi-families/healthier-choices

[84] Nutrition Division, Ministry of Health Malaysia, "Guidelines of Healthier Choice Logo Malaysia"

[85] Keri McCrikerd, "Judging a Food by its Label", *Agency for Science, Technology and Research,* 2 July 2020, https://www.a-star.edu.sg/sics/news-views/blog/blog/human-development/judging-a-food-by-its-label

[86] Dana Angelo White, "Is Instant Oatmeal Healthy?", *Food Network*, 4 April 2022, https://www.foodnetwork.com/healthyeats/healthy-tips/2010/09/instant-oatmeal-good-or-bad

[87] McCrikerd, "Judging a Food by its Label"

[88] Norsyamlina Che Abdul Rahim, Mohamad Hasnan Ahmad, Cheong Siew Man, Ahmad Ali Zainuddin, Wan Shakira Rodzlan Hasani, Shubash Shander Ganapathy and Noor Ani Ahmad, "Factors Influencing the Levels of Awareness on Malaysian Healthy Plate Concept among Rural Adults in Malaysia", *International Journal of Environmental Research and Public Health* 19 (2022): 6257, https://doi.org/10.3390/ijerph19106257.

the different categories (e.g. carbohydrates, proteins, foods) and the recommended number of servings that should be consumed daily,[89] described as the "quarter-quarter-half" concept.[90] Through such pictorial representations, nutritional concepts had become easily accessible to the general public, even children,[91] thus increasing the accessibility of nutrition-related knowledge. The MDG also provided annual recommendations for healthy eating, for instance, limiting one's intake of processed food and promoting dietary habits that could reduce childhood obesity.

The Malaysian Healthy Plate had been promoted to the public through advertising at places like clinics, schools and grocery markets, and through mass media and online applications.[92] However, despite governmental efforts, a study found that only 20.4% of the population was aware of the Healthy Plate concept, with most of these individuals coming from urban areas.[93] Thus, despite its potential benefits, this campaign had only reached a small proportion of Malaysians, rather than the wider population.

Sugar taxes

Despite aforementioned efforts at soft policy options like public messaging,[94] Malaysians' dietary habits had limited change. Unhealthy food continued to cause rising childhood obesity rates, with sugar intake being associated with obesity in children and adolescents.[95] As of 2013, Malaysian nationals were estimated to have one of the highest per capita levels of sugar intake in the world, with residents consuming approximately 3 kg of sugar annually from soft drinks alone.[96] With sugar-sweetened beverages being a key source of Malaysians' sugar intake, the government sought to disincentivise its consumption through a soda tax. Since its implementation in July 2019, a one-litre sugar-sweetened beverage would cost RM0.40 more if its sugar content exceeds the government-established limit.[97] This limit varied with the type of beverage, for instance, being set at 5g for beverages and 12g for fruit and vegetable juices.[98] In implementing this tax, the government openly discouraged the consumption of sugar-sweetened beverages, imposing financial penalties and prompting consumers to reconsider their beverage choices.

Given that more than one in three Malaysian students consumed at least one can of soft drink a day, this tax was particularly crucial and effective in deterring their consumption and tackling childhood

[89] National Coordinating Committee on Food and Nutrition, Ministry of Health Malaysia, "Malaysian Dietary Guidelines 2020", *Ministry of Health Malaysia,* https://nutrition.moh.gov.my/wp-content/uploads/2021/07/Web%20MDG.pdf

[90] Ibid.

[91] M González-Gross, J J Gómez-Lorente, J Valtueña, J C Ortiz and A Meléndez, "The 'Healthy Lifestyle Guide Pyramid' for Children and Adolescents", *Nutr Hosp* 23, no. 2 (2008): 159-168, https://pubmed.ncbi.nlm.nih.gov/18509897/

[92] Norsyamlina Che Abdul Rahim et al., "Factors Influencing the Levels of Awareness"

[93] Ibid.

[94] Geoffrey K. Pakiam, "Malaysia's New Soda Tax: An Easy Swallow?", *Yusof Ishak Institute*, 13 December 2019, https://www.iseas.edu.sg/images/pdf/ISEAS_Perspective_2019_103.pdf

[95] Emmanuella Magriplis, George Michas, Evgenia Petridi, George P. Chrousos, Eleftheria Roma, Vassiliki Benetou, Nikos Cholopoulos, Renata Micha, Demosthenes Panagiotakos and Antonis Zampelas, "Dietary Sugar Intake and its Association with Obesity in Children and Adolescents", *Children* 8 (2021): 676, https://doi.org/10.3390/children8080676.

[96] Geoffrey K. Pakiam, "Malaysia's New Soda Tax"

[97] Ibid.

[98] Bahagian Pemakanan, "The Implementation of Taxation on Sugar-sweetened Beverages (SSBs) in Malaysia", last updated 5 February 2022, accessed 5 December 2022, https://nutrition.moh.gov.my/en/the-implemention-of-taxation-on-sugar-sweetened-beverages-ssbs-in-malaysia/

obesity.[99] Most children had a limited allowance given by their parents,[100] and a hike in prices of sugar-sweetened drinks would likely make it more difficult for them to purchase and consume these beverages on their own. Instead, they were more likely to ask their parents to purchase it for them, holding them accountable for their dietary habits.

However, research had shown that the consumption of sugar was highly addictive.[101] With the current soda tax, consumers, particularly children, might turn to alternative sources of sugar, increasing demand for sugar and sweet products excluded from the tax structure.[102] This included supposedly nutritious and fortified drinks like Milo and chocolate milk, undermining the government's goal of discouraging sugar consumption. In anticipation of such a phenomenon, the government proposed expanding the scope of the tax to include other drinks like chocolate, malt, coffee and tea drinks in its 2020 budget.[103] Although the implementation of this extension was postponed, when applied, the soda tax would become a sugar tax, addressing and targeting sugar as a cause of obesity.[104] The implementation of the sugar tax reinforced the government's message, sending a clear signal about the importance of healthy dietary habits,[105] and enabling childhood obesity to be addressed more effectively.

Nevertheless, various stakeholders had pointed out the limitations of the soda tax. International bodies like the United Nations Children's Fund (UNICEF) and the World Health Organisation (WHO) had criticised the tax for being too lenient to change consumer behaviour, being 60% lower than suggestions based on international benchmarks and scientific evidence.[106] In addition, with the proposed extension, retailers were likely to raise prices of food and beverage items in general, even if they were not directly affected by the sugar tax.[107] With this rise in costs of living, the aforementioned concern of poverty and inequality might be exacerbated.

Policy Options

Various policy options have been explored in Malaysia, by different stakeholders, including the government, businesses, schools and parents. This section considers these options, as well as other solutions implemented in other countries.

Improving health-friendly infrastructure

As mentioned, consumers tended to prefer unhealthier food options, due to their convenience and accessibility. These instant food options could be prepared and consumed easily and quickly and are

[99] Ying-Ru Jacqueline Lo, Marianne Clark-Hattingh, "Tax on Sugary Drinks Will Make Children and the Budget Healthier", *World Health Organisation*, 18 October 2018, https://www.who.int/malaysia/news/commentaries/detail/tax-on-sugary-drinks-will-make-children-and-the-budget-healthier

[100] Sade Dayangku, "This Finance App Wants to Stop Your Kids from Getting Obese & Spending Recklessly", *Vulcan Post*, 30 June 2020, https://vulcanpost.com/703124/vircle-malaysia-app-child-obesity-financial-literacy/

[101] Nicole M. Avena, Pedro Rada and Bartley G. Hoebel, "Evidence for Sugar Addiction: Behavioural and Neurochemical Effects of Intermittent, Excessive Sugar Intake", *Neuroscience and Biobehavioural Reviews* 32, no. 1 (2008): 20-49, https://doi.org/10.1016/j.neubiorev.2007.04.019.

[102] Geoffrey K. Pakiam, "Malaysia's New Soda Tax"

[103] Ahmad Amiruddin Bin Ridha Allah and Patrick Wei Hau Ng, "Expansion of Excise Duty on Sugar-sweetened Beverages Postponed", *Deloitte Malaysia*, 1 April 2022, https://www.taxathand.com/article/23191/Malaysia/2022/Expansion-of-excise-duty-on-sugar-sweetened-beverages-postponed

[104] Ibid.

[105] Bahagian Pemakanan, "The Implementation of Taxation"

[106] Geoffrey K. Pakiam, "Malaysia's New Soda Tax"

[107] Ibid.

thus particularly attractive to children who lacked adult supervision to cook. Yet, if such food items were consumed in excess, they would become at a higher risk of childhood obesity.[108] Vending machines were one such convenient means. They granted consumers almost instant access to snacks and sugar-sweetened beverages, without requiring them to step into a shop to make their purchases.[109] The novelty of vending machines also attracted children to use them. Thus, vending machines, specifically the unhealthy food options they offer, were catalysts for childhood obesity.[110]

Rather than eliminating vending machines, MyFITBOX in Malaysia created healthy vending machines, utilising the same concept with more nutritious snacks being sold. Their vending machines sold items like protein shakes, granola and protein bars that were healthier than typical sugar-laden vending machine snacks.[111] However, their vending machines were located in gyms, with an intention to expand their reach to international schools and shopping malls.[112] Given the potential consumer base at these locations, their vending machines utilised cashless payment methods.[113] Thus, these machines and their healthier options were less accessible to children, particularly those from low-income backgrounds who were less likely to own credit or debit cards.

Furthermore, although snacks could cause childhood obesity, regular meals constituted a significantly larger proportion of a child's diet and thus affected childhood obesity to a greater extent. If children consumed healthy snacks but unhealthy meals, they were still at risk of childhood obesity. Thus, healthy vending machines needed to address nutritional needs concerning main meals as well. One such business that had done so was Chef-in-Box in Singapore. Chef-in-Box was founded in 2001, seeking to help working mothers juggle work and taking care of their families, providing "quality meals… without compromis[ing]" on "tast[e] and quality", as described on their website.[114] Meals prepared by chefs and nutritionists could be purchased from Hot Food Vending Machines, supermarkets, or Chef-In-Box's online store,[115] providing various convenient options for busy individuals. Although Chef-in-Box was targeted at working parents, their children could utilise these services as well, rather than consuming unhealthy instant food like fast food. If necessary, the government or non-profit organisations could provide financial subsidies for lower-income families, making these options more financially accessible. Thus, increasing access to infrastructure beneficial to health was a policy option to address childhood obesity.

Healthier universal canteen options

To ensure the health of the general school population, the Malaysian Ministry of Education has implemented various guidelines for canteen vendors in educational institutions. For instance, the Ministry of Education and the Ministry of Health published the Healthy School Canteen Management Guide, monitoring the sale of food and beverages in school canteens based on a fixed food and

[108] Sonia Caprio, "Study Finds Snacking is a Major Cause of Child Obesity", *Yale School of Medicine*, 2 April 2010, https://medicine.yale.edu/news-article/study-finds-snacking-is-a-major-cause-of-child-obesity/

[109] Angus Chen, "Forcing People at Vending Machines to Wait Nudges Them to Buy Healthier Snacks", *The Salt*, 31 March 2017, https://www.npr.org/sections/thesalt/2017/03/31/522189753/forcing-people-at-vending-machines-to-wait-nudges-them-to-buy-healthier-snacks

[110] Live Science Staff, "School Vending Machines Detrimental to Kids' Diets", *LiveScience*, 9 March 2022, https://www.livescience.com/34893-school-vending-machines-children-poor-nutrition-diet-100803.html

[111] Lakshmi Sekhar, "myFITBOX's Cashless Vending Machines Make Healthy Treats Easily Accessible", *Options*, 15 June 2021, https://www.optionstheedge.com/topic/food/myfitbox%E2%80%99s-cashless-vending-machines-make-healthy-treats-easily-accessible

[112] Ibid.

[113] Ibid.

[114] Chef-in-Box, "About Chef In Box - ChefInBox.com.sg", *Chef-In-Box,* accessed 12 December 2022, https://chefinbox.com.sg/pages/about

[115] Ibid.

beverage list that supported healthy eating habits.[116] These policies and protocols set a good precedent for future policies to be implemented.

In Asia, a universal school lunch programme had been successfully implemented in Japan. This lunch programme was part of the School Lunch Act, which was enacted in 1954, after the Second World War.[117] With a school lunch provision rate of 95.2% across various types of schools in Japan (e.g. elementary school, junior high school),[118] children were ensured at least one nutritious meal a day, at a low cost included in their school fees.[119] Research has shown that Japanese school lunches ensured adequate nutrient intakes in school-going children, possibly contributing to Japan's low childhood obesity rates.[120] This has also helped to reduce the difference in dietary intakes of students from different socioeconomic statuses.[121] Thus, a universal lunch programme addressed issues of inequality, as well as the aforementioned problems of time poverty and food insecurity and their associations with childhood obesity.

In addition, Japanese schoolchildren were highly involved in the lunch programme itself. Through helping out with the preparation and serving of school lunches, they had the opportunity to learn more about a balanced diet, as well as the origin and importance of food, gaining a more holistic understanding of food and healthier dietary habits.[122] If a similar programme were to be implemented in Malaysia, it would complement existing school feeding programmes or substitute them entirely, providing the same meals for all children regardless of their families' income level.

Restrictions on junk food advertising

The media, particularly the advertising sector, often portrayed junk food in a positive, attractive light, increasing children's food preferences and consumption of such unhealthy food.[123] Thus, imposing restrictions or bans on fast food advertising was a possible method to reduce childhood obesity. The Malaysian government had adopted the role of regional leadership in managing this issue. In 2015, the Ministry of Health worked with the World Health Organisation (WHO) regional offices for Southeast Asia and the Western Pacific, exploring how to restrict the marketing of unhealthy foods and non-alcoholic beverages to children, and thus guiding other Member States in doing so.[124] Domestically, the Malaysian government imposed restrictions on fast food advertising. In March 2007, the government banned the broadcast of fast food advertisements targeted at

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[116] Kementerian Kesihatan Malaysia, "Monitoring the Sales of Food and Beverages in the School Canteen Introduction", *Kementerian Kesihatan Malaysia*, accessed 13 December 2022, https://nutrition.moh.gov.my/en/pemantauan-penjualan-makanan-dan-minuman-di-kantin-sekolah/

[117] Nobuko Tanaka and Miki Miyoshi, "School Lunch Program for Health Promotion among Children in Japan", *Asia Pacific Journal of Clinical Nutrition* 21, no. 1: 155-158, https://doi.org/10.6133/APJCN.2012.21.1.22.

[118] JAPAN Educational Travel, "Lunch in Japanese Schools", *JAPAN Educational Travel*, 24 January 2022, https://education.jnto.go.jp/en/school-in-japan/school-life-in-japan/lunch-in-japanese-schools/

[119] Ibid.

[120] Chika Horikawa, Nobuko Murayama, Hiromi Ishida, Taeko Yamamoto, Sayaka Hazano, Akemi Nakanishi, Yumi Arai, Miho Nozue, Yukiko Yoshioka, Saori Saito and Aya Abe, "Nutrient Adequacy of Japanese Schoolchildren on Days with and without a School Lunch by Household Income", *Food & Nutrition Research* 64 (2020), https://doi.org/10.29219/fnr.v64.5377.

[121] Keiko Asakura and Satoshi Sasaki, "School Lunches in Japan: Their Contribution to Healthier Nutrient Intake among Elementary-school and Junior High-school Children", *Public Health Nutrition* 20, no. 9: 1523-1533, https://doi.org/10.1017/S1368980017000374.

[122] Tanaka and Miyoshi, "School Lunch Program"

[123] Diva Fanian, "Being Consumed by Digital Junk Food Marketing", *World Cancer Research Fund International*, 18 December 2020, https://www.wcrf.org/being-consumed-by-digital-junk-food-marketing/

[124] Ruel E. Serrano, "Malaysia and WHO Tackle the Marketing of Unhealthy Food and Beverages to Children", *World Health Organization*, 7 December 2015, https://www.who.int/westernpacific/news/item/07-12-2015-malaysia-and-who-tackle-the-marketing-of-unhealthy-food-and-beverages-to-children

children on television,[125] thus limiting a channel through which children could be negatively influenced. However, this did not target junk food that was not classified as fast food (e.g. snacks like potato chips, or sugar-sweetened beverages), which was also a cause of childhood obesity. It also did not eliminate the presence of fast food advertisements targeted at the general public across all age groups.

In contrast to Malaysia, another Asian country, South Korea, had been able to do so. The Special Act on Safety Management of Children's Dietary Life restricted television advertising of energy-dense and nutrient-poor foods targeting children,[126] banning such advertisements from 5 pm to 7 pm, which was identified as the prime time for children.[127] Such targeted approaches could help reduce the incidence of childhood obesity. Likewise, a similar strategy was proposed in Australia. Independent Member of Parliament Sophie Scamps proposed that junk food advertising be banned before 9 pm on Australian television, reducing children's exposure to advertising for food products with little or no nutritional value.[128] This bill was expected to be introduced to the Australian parliament in early 2023.[129]

However, with the decreasing influence of national television and the corresponding increasing influence of social media on children's consumption habits,[130] the Malaysian government might no longer be able to regulate the content that children were viewing. For instance, it was difficult for social media content to be managed, given the free reign that technology companies had over their own platforms. Yet, beyond advertisements on television or social media, the inclusion of cartoons or sports on junk food packaging, as well as the strategic positioning of junk food at supermarket aisles, made children more likely to purchase and consume junk food,[131] and remained an avenue to manage childhood obesity.

Dietary and financial literacy

As mentioned, poverty – specifically the inability to purchase healthier food – was a cause of childhood obesity. This presented financial literacy programmes as a possible solution. Children and their parents could be guided to make wiser dietary choices within their financial means, despite the rising costs of living. Compared to external drivers like incentives (e.g. subsidised vouchers) or deterrents (e.g. sugar taxes), being equipped with such knowledge tackled the problem of childhood obesity in the long term. Not only could these skills be applied continuously, but they also created an intrinsic motivation for individuals to seek healthier eating habits.

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[125] Tilakavati Karupaiah, Karuthan Chinna, Loi Huei Mee, Lim Siau Mei and Mohd Ismail Noor, "What's on Malaysian Television? - A Survey on Food Advertising Targeting Children", *Asia Pacific Journal of Clinical Nutrition* 17, no. 3 (2008): 483-491, https://apjcn.nhri.org.tw/server/APJCN/17/3/483.pdf

[126] Soyoung Kim, Youngmi Lee, Jihyun Yoon, Sang-Jin Chung, Soo-Kyung Lee and Hyogyoo Kim, "Restriction of Television Food Advertising in South Korea: Impact on Advertising of Food Companies", *Health Promotion International* 28, no. 1 (2013): 17-25, https://doi.org/10.1093/heapro/das023.

[127] Marian Chu, "Seoul Retains Ban on Prime-time Junk Food Ads", *Korea Biomedical Review*, 9 January 2018, http://www.koreabiomed.com/news/articleView.html?idxno=2315

[128] Tom McIlroy, "Ban Junk Food Ads Targeting Kids: Teal MP", *Financial Review*, 19 October 2022, https://www.afr.com/politics/federal/ban-junk-food-ads-targeting-kids-teal-mp-20221019-p5bqya

[129] Ibid.

[130] Diva Fanian, “Being Consumed by Digital Junk Food Marketing”

[131] Audrey Vijaindren, "Ban Junk Food Ads, Govt Urged", *New Straits Times,* 18 August 2019, https://www.nst.com.my/news/nation/2019/08/513741/ban-junk-food-ads-govt-urged

One such example would be Vircle, a mobile phone application developed and used in Malaysia, in collaboration with 12 early adopter schools.[132] Parents could give their children pocket money through Vircle, subsequently monitoring how it was being spent, viewing not just the transactions, but the healthiness of their purchases, based on the food traffic lighting system.[133] This system, which was also used in countries like the United Kingdom, used colours to indicate a food item's nutritional value, based on its fat, sugar and salt content.[134] Since the COVID-19 pandemic, Malaysians had become more tech-savvy, with the country's smartphone usage growing to 94.8%.[135] Thus, applications like Vircle were accessible to the general population. The gamified, incentivised system also attracted children to use the application,[136] fulfilling its intended purpose of tackling childhood obesity. Nevertheless, some groups might remain left out if they lack access to the necessary infrastructure, and without intentional intervention to ensure their equal progress. For instance, only 96.2% of rural respondents and 92.3% of urban respondents were using smartphones as of 2021.[137] Since this application had been largely used in schools, educators had the responsibility of ensuring equal, fair access to such technology.

Epilogue

The Malaysian government has implemented and explored a variety of policy options. Through examining these policy options, gaps in tackling childhood obesity have been identified. Although childhood obesity had been a pertinent problem in Malaysia, recent societal trends exacerbated its significance. For instance, as mentioned, increased social media usage and the corresponding decrease in viewership of national television had undermined the effectiveness of junk food advertising restrictions.[138] The Malaysian government had to keep abreast with these societal changes, to tackle the root causes of childhood obesity.

In addition, poverty and inequality would likely remain significant drivers of childhood obesity, placing low-income children at a disadvantage. With a Gini coefficient of 41.0% as of 2015,[139] which was likely to have increased with the COVID-19 pandemic, more Malaysian children risked falling behind unless effective intervention was implemented. This would ensure that healthy diets and lifestyles, as well as an obesity-free childhood, were not privileges, but would be accessible to all children regardless of their socioeconomic status.

Lastly, although childhood obesity might appear to be a health-related crisis, various stakeholders could impact its outcomes. Beyond the Ministry of Health, businesses, parents, educators and social media companies had significant roles to play. These stakeholders may need to come to a compromise to address childhood obesity. Without this collaboration, it would be increasingly difficult for the government to manage the issue unilaterally.

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[132] Sade Dayangku, "This Finance App Wants to Stop Your Kids from Getting Obese & Spending Recklessly", *Vulcan Post*, 30 June 2020, https://vulcanpost.com/703124/vircle-malaysia-app-child-obesity-financial-literacy/

[133] Ibid.

[134] Food Standards Agency, "Check the Label", last updated 23 January 2020, https://www.food.gov.uk/safety-hygiene/check-the-label

[135] Imran Hilmy, "Smartphone Usage Nears 100%", *The Star*, 26 September 2022, https://www.thestar.com.my/news/nation/2022/09/26/smartphone-usage-nears-100

[136] Sade Dayangki, "This Finance App"

[137] Imran Hilmy, "Smartphone Usage Nears 100%"

[138] Diva Fanian, "Being Consumed by Digital Junk Food Marketing"

[139] Kenneth Simler, "Poverty & Equity Brief: East Asia & Pacific, Malaysia", *World Bank*, April 2020, https://databankfiles.worldbank.org/data/download/poverty/33EF03BB-9722-4AE2-ABC7-AA2972D68AFE/Global_POVEQ_MYS.pdf

Discussion questions

1. What are the most significant barriers to addressing childhood obesity?
2. How do you think the government can manage this issue better?
3. What role do non-state stakeholders play in addressing childhood obesity?