



Research article

A quantitative assessment of school environment as viewed by teachers

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ABSTRACT

Background: There is evidence suggesting that the school environment does have prominent contributions to the rise of childhood obesity.

Aim: The objective of this study was to assess the school environment by interviewing the teachers and compare the school environment score between rural and urban schools in Terengganu, Malaysia.

Methods: Thirty-two teachers from 16 primary schools in Terengganu were interviewed using a set of validated Malay version "School Environmental Mapping" questionnaire. A total of 76 items consisting of four domains of school environment factor: physical (what is available) with 41 items; economic (what the costs are) with nine items; political (what the rules are) with nine items; and socio-cultural (what the attitudes and beliefs are) with 17 items. Every item was questioned using an initial closed question followed by an open question when the criteria were not met or need further information regarding those particular items.

Results: The present study revealed that the school environment of school in state of Terengganu is still low and not satisfied. Based on the schoolteacher's information and observation, there are significant barriers to promoting healthy eating and physical activity at school e.g. limited financial and budget allocation; lack of school facilities; lack of manpower to organise and monitor the programme; lack of participation and cooperation from parents; and no enforcement and serious action from authorized personnel on street hawkers near the school. This is reflected by the score achieved for 16 schools in Terengganu was only 63.05%. The political environment indicated the highest score among the domains, which was 77.78%, whereas, the lowest score was an economic environment (50.00%). Upon comparing between the urban and rural areas, the present study reported that there was a significant difference between school settings ($p < 0.001$) for an overall school environment, in which the rural areas had a significantly higher score than urban counterparts (64.86% vs 59.34%, $p < 0.001$). For each domain of the school environment, the findings showed that only two domains (physical and political environment) were significantly different between school settings.

Conclusion: This study revealed that the level of a healthy school environment among schools in both settings is still not satisfied. Addressing the obesogenic elements of school environments is one of the strategies in prevention since the school environments exert a great influence on children's behaviour.

1. Introduction

Recently, the school environment becomes one of the concerns to influence children's health-related behaviour. It has been regarded as optimum settings for such efforts to influence healthy eating behaviour as well as physical activity (Måsse et al., 2014; Kirby et al., 2012). Furthermore, schools represent a key environment in which children spend a lot of time at school and consume a substantial portion of their daily intake at school (Briefel et al., 2009). Moreover, schools not only act as institutions that emphasis on academic accomplishment, but it also

accentuates a particular value and prospect of the child through the influence of school culture (Story et al., 2009).

The school environmental factors such as physical, economic, political and socio-cultural are believed to influence the occurrence of childhood obesity (Ogden et al., 2012). The children have a wide variety of eating choices and opportunities at school. There is significance for children's diet to be influenced by the food they have access to in schools (Anderson et al., 2003). Besides, children may have access to a wide variety of snack foods and drinks through vending machines, school stores and fundraisers (Park et al., 2010). The availability of unhealthy foods and childhood obesity is problematic in the school environment

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because school cafeterias and vending machines often sell high energy density food with low nutritional value (Johnson et al., 2009).

Children's activeness is also influenced by the structure of school physical activity programmes. School may be the best place for children to play with friends and the curriculum at school needs to be reviewed on whether it ensures sufficient appropriate physical activity (CDC, 2010). Dennison et al. (2004) claimed that schools can use the facilities such as the classroom, the playground and the cafeteria to promote healthy lifestyles. School playgrounds and access to play facilities are important to promote physical activity among children (Troost et al., 2003). Despite that, physical education allocation and extra-curricular clubs at school have been proven to be the most powerful influencer to increase physical activity (Kirby et al., 2012).

Despite the plethora of international evidence, scarce scientific findings are available about the Malaysian school environment. However, a recent qualitative investigation (Suhaila et al., 2019) that explored the views of adolescents on school food environment in Malaysian secondary schools replicate international findings. It found that Malaysian school adolescent reported barriers to practising a healthy dietary intake within the school food environment. Despite numerous guidelines have been developed at the Ministry of Health and Ministry of Education level, the problem still exists due to lack of enforcement that confirmed in previous study (Hayati Adilin et al., 2015b). The interviewees also reported that canteen sold snacks and fried foods at low cost and the availability of these types of food influenced their daily food consumption (Suhaila et al., 2019), a criticism often reported in the literature (Rathi et al., 2018; Banna et al., 2016).

Research finding has suggested that improvements to the school food environment may enable students to make healthier food choices and lower their body mass index (BMI) (Suhaila et al., 2019). Considering the relative scarcity of information about the Malaysian school environment, a descriptive study was warranted. Therefore, the present study aimed to examine the views of teachers about the current school environments that potentially can affect children's healthy eating habits and physical activity and to compare between two settings, urban and rural schools. The views of teachers are an important part of creating a framework for planning, organising, and clarifying roles and responsibilities to ensure efficiency and commitment to supporting a healthy school environment in Malaysia.

2. Materials and methods

2.1. Study design and study population

This study utilized a cross-sectional study design and was conducted in government primary schools in Terengganu, Malaysia. The sampling frame for this study was obtained from the Department of Education website. There were 366 government primary schools located in Terengganu that covered eight districts: Besut, Setiu, Hulu Terengganu, Kuala Nerus, Kuala Terengganu, Marang, Dungun and Kemaman. From the list of 366 schools, the schools were identified and separated accordingly into two settings, either urban or rural. For this study, the school setting was defined by Department of Education Terengganu, according to the Department of Statistics in Malaysia. By using computer-generated random numbers, eight schools were selected for each setting. After the random allocation process was applied, the schools selected in this study ranged from three districts, Kuala Nerus, Kuala Terengganu and Besut. In each school, a teacher (who is responsible for student affairs and the school curriculum) was interviewed using an initial closed-ended question (yes = 1, no = 0).

2.2. Data collections

Variables on the school environment were obtained from a interview with each school teacher using a whole-school environmental mapping

questionnaire in Malay (Hayati Adilin et al., 2015b). The questionnaire was developed based on the ANGELO Framework (Analysis Grid for Environments Linked to Obesity) (Swinburn et al., 1999) and from the 'School Food Pack' produced by the School Food Action Group (SFAG, 2003).

Before commencing the survey, the questionnaire was piloted to assess the suitability for the questionnaire used in this study, identify limitation or barrier, understandable of the respondents towards the questionnaire and to measure the time taken required to fulfil the questionnaire. Five primary schools were involved in which three schools from rural areas and two schools from urban areas. The selection of a school for pilot study was based on pragmatic reasons which were more practical and convenient to access these schools for the researcher. Face-to-face questionnaire administration involved teachers from each school who is responsible for school children affairs and the school curriculum. An appointment with the school representative was made before commencing the pilot study. An explanation regarding the study objective was clarified with the school teacher. A validated Malay version of Whole-school Environmental Mapping questionnaires was used (Hayati Adilin et al., 2015a). Time is taken to finish answering the questionnaire was measured and recorded. After the subjects answered all the questions, they were asked about the experiences and opinions during answering the questions. Based on the pilot study, all the items in the set of questionnaires seem reliable and easy to be answered. Most of the respondents spent approximately 25–30 min to complete the questionnaires. As per domain, the reliability coefficient of physical environment (41 items) was 0.796, economic environment (9 items) was 0.796, political environment (9 items) was 0.863 and sociocultural environment (17 items) was 0.895. Meanwhile, the alpha coefficient for all domains (76 items) was 0.947, suggesting that the items have relatively high internal consistency. The reliability coefficient of 0.70 or higher is considered acceptable in most social science research situations (Gliem and Gliem, 2003), thus indicated the questionnaire was suitable and relevant to be used in the real data collection.

The questionnaire consisted of four main domains of school environment factors (Table 1). The first domain, which is a physical environment, refers to "what is available?" which comprises 41 items. Meanwhile, the economic environment refers to "what are the costs or financial measures?" which encompasses nine items. The political environment refers to "what are the rules and regulations?" which consists of nine items; and socio-cultural environment refers to "what are the attitudes, beliefs, perceptions as well as accepted values and behaviours?" which covers 17 items. Each question was addressed using an initial closed question (yes = agree with the statement, no = disagree with the statement), followed by an open question when the criteria were not met or further information regarding the items were required. For each domain, a summative score was calculated and the score was standardized to (yes = 1, no = 0). A higher score indicates a healthier and supportive school environment.

2.3. Statistical analysis

Data analysis was conducted using Statistical Package for Social Science (SPSS) Version 20.0. The data were first analysed using descriptive statistics to describe the number and percentage of the school that met the criteria for each domain of the school environment. Furthermore, non-parametric statistical analysis by using Mann-Whitney test was applied to compare the score of the school environment between rural and urban schools. The significance level was set at 0.05 for the analysis.

2.4. Ethical considerations

Ethical approval was obtained from the UniSZA Human Research Ethics Committee (UHREC) [UniSZA.C/1/UHREC/628-1(6)].

Table 1. ANGELO grid with settings, sectors and environmental elements (as adapted from Swinburn et al.).

Environment influences	Environment size	
	Micro-environment (settings) (e.g. household; community) diet-related/activity-related	Macro-environment (sectors) (e.g. regional; national) diet-related/activity-related
Physical	What is/is not available?	
Economic	What are the financial factors?	
Legislative	What are the rules?	
Socio-cultural	What are the attitudes, beliefs, perceptions and values?	

3. Results

Table 2 shows that the overall school environment for 16 schools in Terengganu was only 63.05%. The study found that the political environment indicates the highest score among the domains, which was 77.78%, whereas, the lowest score was an economic environment (50.00%). Meanwhile, the score for physical and sociocultural environment were 67.07% and 52.94%, respectively.

On comparing the urban and rural areas, the present study reported that there was a significant difference between school settings ($p < 0.001$) for an overall school environment, in which rural areas had a significantly higher score than their urban counterparts (64.86% vs 59.34%, $p < 0.001$). Meanwhile, the analysis according to each domain found that there were significant differences between rural and urban except for economic environment ($p = 0.783$) and socio-cultural environment ($p=0.172$). Based on the findings, it shows that rural schools had a significantly higher score than urban schools for two domains: physical environment (73.17% vs 64.63%, $p < 0.001$) and political environment (83.33% vs 66.67%, $p < 0.001$).

3.1. Physical environment analysis

The physical environment encompasses availability at the school that consists of 41 items. The findings of a score for each criteria for physical environmental were summarised in Table 3. Out of 41 criteria, only nine criteria were met by all schools in the present study. All the schools have educational resources such as food pyramid and food models, used the educational resources systematically, compulsory physical activity session among children at school, the availability of playground (field) and equipment to encourage physical activity such as ball, skipping ropes, badminton. Besides, the study also found all the schools have break time for eating and the canteen environment are considered as pleasant, cheerful, pleasant and clean. On the other hand, none of the primary schools in the present study met the criteria of having a specific sports centre for playing more games at school.

3.1.1. Economic environment analysis

There were two criteria emphasised in this section: the availability of mobile caterers and tuck shop at the school (Table 3). Only 25.0% of the

school claimed there was no mobile caterer outside the school compound. Surprisingly, only 56.2% of schools have the policy to monitor foodstuffs sold outside the school gates. Furthermore, the result also shows that majority of the school had a tuck shop and 93.8% have specific rules to monitor tuck shop at the school. The findings show that other than stationaries, there was 50.0%, 31.2% and 43.8% of the school that sold additional stuff to children includes healthy foods (e.g. fruits) and drinks (e.g. cultured milk and yoghurt), a low calorie of fizzy drinks and low-fat snacks (e.g. cereal snack), respectively (Table 3).

3.1.2. Political environment analysis

There were four main criteria in this section, including the national nutrition guidelines and food policy, policy for health education, policy for physical activity and the responsibility for the policy (Table 3). Based on the findings, all schools regardless of urban and rural settings have enforcement and monitoring at the school canteen. Besides that, only 37.5% of the schools have given guidelines and information to parent in preparing lunch-box meals to children. The purpose of the guidelines to ensure the foods provided from home are healthy and not high-calorie foods. Surprisingly, there were some schools not allow the children to bring any food from home except drinking water (Table 3).

3.1.3. Socio-cultural environment analysis

In this domain, the schoolteachers were asked regarding the food beliefs, culture and preferences, food reward, role model, growing food, collaboration in promoting healthy eating and physical activities, and barriers in promoting healthy eating and physical activities at school (Table 3). Based on the findings, only 6.2% of schools reported that they had given food or drink such as carbonated drink, biscuits, cake, snack, chocolate, sweets and junk food as a reward (hamper) to the school children. Other than that, the least criteria met by all school from rural and urban were having a network with other schools to promote healthy eating and physical activity (18.8%) and writing or publishing articles about a healthy lifestyle for the school newsletter/website (12.5%). Meanwhile, a majority (93.8%) of schools claimed that trained food handlers play a role in guiding and leading the school children toward good eating practice (Table 3).

A part of the questionnaire, the schoolteachers were interviewed for certain questions as for subjective assessment at the end of the interview

Table 2. Comparison of school environment score (%) between rural and urban schools.

Measurements	Median (IQR) of score (%)		Z statistics	p-value*	
	Total (n=16)	Rural (n=8)			Urban (n=8)
Overall school environment	63.05 (19.00)	64.86 (29.30)	59.34 (17.90)	-3.792	<0.001
Physical environment	67.07 (14.00)	73.17 (12.20)	64.63 (16.50)	-6.025	<0.001
Economic environment	50.00 (30.60)	52.78 (31.10)	50.00 (30.60)	-0.275	0.783
Political environment	77.78 (41.70)	83.33 (50.00)	66.67 (38.90)	-5.477	<0.001
Socio-cultural environment	52.94 (23.53)	52.94 (38.24)	52.94 (20.59)	-1.366	0.172

* Mann-Whitney test.

Table 3. Number of schools meets the criteria for physical, economic, political and sociocultural environment (n=16).

No.	School Environment	Rural n=8	Urban n=8
Criteria for physical environment			
Curriculum and education resources			
1	Health and nutrition are taught in the curriculum	7 (87.5)	8 (100)
2	Education resources: Food pyramid, food models, etc.	8 (100)	8 (100)
3	Using educational resources (e.g. Food pyramid & food models, systematically)	8 (100)	8 (100)
Health, nutrition and physical activity programme			
4	Health professional involvement (Doctor or nurse visits)	6 (75.0)	6 (75.0)
5	Programme involving health professionals (e.g. Nutritionist & dietitian) Motivation/ promoting healthy eating and physically active	6 (75.0)	5 (62.5)
6	Health education for healthy eating (promotion, information and programme conducted by school teachers)	6 (75.0)	4 (50.0)
7	Display information about healthy eating along school corridor (e.g. Food calories posters, etc)	7 (87.5)	7 (87.5)
8	Food calorie guidelines or other leaflets/ books to children	5 (62.5)	8 (100)
9	Health education for physical activity (promotion, information and programme conducted by school teachers)	7 (87.5)	8 (100)
10	Annual sport event	8 (100)	7 (87.5)
11	Compulsory physical activity session among children at school	8 (100)	8 (100)
12	Simple exercise (stretching/ warm-up) available before class	2 (25.0)	2 (25.0)
13	Walking/ riding bicycle to school encouraged	6 (75.0)	3 (37.5)
14	Provision physical activity guidelines or other leaflets/ books to children	6 (75.0)	5 (62.5)
15	Information along the corridor about a healthy lifestyle	5 (62.5)	3 (37.5)
16	Visit to sports centre	1 (12.5)	1 (12.5)
17	Visit to farm or food factory	3 (37.5)	0
Facilities at school			
18	Gym	1 (12.5)	0
19	Sport centre (specific place for playing game/ sport at school e.g. Badminton court and netball space instead of using assembly hall)	0	0
20	Playground (Field)	8 (100)	8 (100)
21	Indoor hall (use for any programme at school, indoor game like badminton etc.)	7 (87.5)	6 (75.0)
22	Equipment/ toys to encourage physical activity (ball, skipping ropes, badminton etc.)	8 (100)	8 (100)
23	Availability of footpath	4 (50.0)	6 (75.0)
24	Leisure room specific for health promotion	3 (37.5)	4 (50.0)
Break time and canteen environment			
25	Break time available at schools for eating	8 (100)	8 (100)
26	Pleasant and cheerful canteen	8 (100)	8 (100)
27	Relaxing canteen	8 (100)	8 (100)
28	Attractive canteen	8 (100)	7 (87.5)
29	Calm canteen	8 (100)	6 (75.0)
30	Clean canteen	8 (100)	8 (100)
Menu provision			
31	No high calorie foods sold (nuggets, sausage etc.)	5 (62.5)	1 (12.5)
32	No high calorie drink sold (fizzy etc.)	7 (87.5)	5 (62.5)
33	No snack foods	5 (62.5)	5 (62.5)
34	Healthy eating information displayed	8 (100)	7 (87.5)
35	Healthy food choices positioned attractively at the front of the serving counter	7 (87.5)	7 (87.5)
36	Equality of food choices sold	1 (12.5)	5 (62.5)
Healthy food/drink subsidize			
37	Free drinking water (water cooler machines etc.)	5 (62.5)	0
38	Other free drinking water (free milk scheme etc.)	7 (87.5)	7 (87.5)
39	Free fruits to all pupils (Notes: free only for Supplementary Feeding Scheme to pupils from low income family)	4 (50.0)	5 (62.5)
40	Free vegetables to all pupils (Notes: free only for Supplementary Feeding Scheme to pupils from low income family)	3 (37.5)	4 (50.0)
41	Free food or drink during extracurricular activities in the evening to all pupils)	5 (62.5)	2 (25.0)
Criteria for economic environment			
Mobile caterer			
42	No mobile caterers near schools	3 (37.5)	1 (12.5)
43	Rules/ policy to monitor food sold outside the school gates	4 (50.0)	5 (62.5)
44	Nutritious food sold near school (e.g. Fruit)	6 (75.0)	4 (50.0)
Tuck shop			
45	Tuck shop available at schools	8 (100)	8 (100)
46	Specific rules/ policy to monitor tuck shop at school	7 (87.5)	8 (100)
47	Existence of healthy foods and drinks	3 (37.5)	5 (62.5)
48	Existence of low calorie versions of fizzy drinks, no added sugar fruit juices, low fat milk or water	4 (50.0)	1 (12.5)

(continued on next page)

Table 3 (continued)

No.	School Environment	Rural n=8	Urban n=8
49	Existence of low fat snacks	2 (25.0)	5 (62.5)
50	Promotion leaflets for healthy eating/ physical activity at tuck shop	1 (12.5)	1 (12.5)
Criteria for political environment			
National nutrition guidelines & food policy			
51	National nutrition guidelines and Food policy use for school canteen guideline and others related to food	7 (87.5)	7 (87.5)
52	Implementation of the guidelines at the canteen	8 (100)	6 (75.0)
53	Monitoring/ enforcement of the guideline at school	8 (100)	8 (100)
54	Rules for children to bring food to school	5 (62.5)	3 (37.5)
55	Information to families to prepare healthy meals at home and lunch box	4 (50.0)	2 (25.0)
Policy for healthy education			
56	Existence of policies for staff to attend training programs	5 (62.5)	6 (75.0)
Policy for physical activity			
57	Availability of policy for physical activity (specific)	6 (75.0)	5 (62.5)
Responsibility for the policy			
58	Deciding the types of food to be provided (e.g. Catering etc)	7 (87.5)	5 (62.5)
59	Other programs or policy if any, in schools (breakfast, lunch or snacks)	5 (62.5)	5 (62.5)
Criteria for socio-cultural environment			
Food beliefs, culture and preferences			
60	Trial/ alternatives to change food beliefs, culture and preferences	7 (87.5)	6 (75.0)
Use of food as a reward			
61	Food not used as a reward	7 (87.5)	8 (100)
Leading by example-role models			
62	Leading by example (training teacher as a role model)	6 (75.0)	6 (75.0)
63	Leading by example (training food handlers as role models)	7 (87.5)	8 (100)
64	Celebrities invited for promoting healthy lifestyle	2 (25.0)	2 (25.0)
Growing food			
65	Growing food at school	4 (50.0)	4 (50.0)
Collaboration in promoting healthy eating and physical activity			
66	Collaboration with the department of health	6 (75.0)	5 (62.5)
67	Collaboration with the department of education	3 (37.5)	4 (50.0)
68	Collaboration with the others (e.g. counselor, public health service etc.)	4 (50.0)	1 (12.5)
69	Collaboration with the private sector	3 (37.5)	8 (100)
70	Activities involving public, family and community	3 (37.5)	3 (37.5)
71	Network with other schools to promote healthy eating and physical activity	1 (12.5)	2 (25.0)
72	Committee/ working group for school health promotion	4 (50.0)	4 (50.0)
73	Incentives or rewards to children who behavioural improvement (i.e. eating healthier or doing more physical activity)	4 (50.0)	2 (25.0)
74	Assessment for décor and seating arrangement	5 (62.5)	4 (50.0)
75	Articles about healthy lifestyle for the school newsletter/ website	1 (12.5)	1 (12.5)
Barrier in promoting healthy eating and physical activity in school			
76	No barrier to implement healthy eating and doing physical activity regularly	7 (87.5)	5 (62.5)

session. The interviews session revealed some significant barriers to promoting healthy eating and physical activity at school e.g. limited financial and budget allocation; lack of school facilities; lack of manpower to organise and monitor the programme; lack of participation and cooperation from parents; and no enforcement and serious action from authorized personnel (e.g. city council) on street hawkers near the school. All these details may explain why there were still many barriers faced by schools to implement a healthy environment and support children to adopt a healthy lifestyle.

4. Discussions

This investigation set out to develop a better understanding of the school environment of primary schools in Terengganu from the perspective of teachers, who are acknowledged as key stakeholders in education settings. The present study revealed that the school environment score of school in state of Terengganu is still low and not satisfied.

Out of four domains, the lowest score of the school environment was the socio-cultural environment and followed with economic environment. The finding was parallel with the previous school environmental study conducted among 12 schools in Kuala Terengganu, in which the least criteria met by the school was associated with economic environment than for the physical, political and socio-cultural environments (Hayati Adilin et al., 2015a). Despite that, the previous study was reported the proportion of the school met the criteria for different components of the environment but not the scoring for each of the school environment. Thus, the findings are therefore not strictly comparable.

On comparing between school settings according to each of domain, the present study shows that rural school scores higher for school environments compare to urban counterpart. However, there were no statistically significant differences in economic and sociocultural environment between school settings even though the rural school scores higher than urban. In marked contrast, Hayati Adilin et al. (2015a) reported that the urban school indicated higher scores compared to rural

school except for political environment. The rural school scored least for physical, economic and socio-cultural compared to urban counterpart. It should be noted, however, that the previous study was only examined the score of the school compliance toward Whole-School Environmental Mapping framework without presenting any statistical difference between school settings.

Regarding the differences found between the aforementioned studies can be explained by many factors. According to Ahram and colleagues in their report stated that the challenges facing urban school system are greater from suburban and rural school districts when implementing response to intervention (Ahram et al., 2013). Unlike suburban and rural school districts, urban school districts operate in densely populated areas serving significantly more students. Furthermore, in comparison to suburban and rural districts, urban school districts are frequently marked by higher concentrations of poverty, greater racial and ethnic diversity, and larger concentrations of immigrant populations and linguistic diversity (Kincheloe, 2004, 2010). On the other hand, many problems such as financial constraint, lack of teachers, changing social values, schools remotely located and inadequate mentoring support, was relatively associated with the school in rural areas (Manwa et al., 2016; Redding and Walberg, 2012). Despite that constraint and limitation, teachers in rural schools show their high concern and responsibility to support the students' social and behavioural needs as well as offer the best opportunities to create a school climate conducive to the best teaching and learning (Rosenberg et al., 2015). Surveys in rural areas revealed that a significantly high level of satisfaction with schools existed, in which most of rural people were proud of their schools and typically described a feeling of family, individual attention, trust and safety, and community commitment of resources and people (Agabrian, 2007).

For physical environment, based on overall finding, there are some barriers recognised from the present study that prevent the schools from following and improving the physical environmental factors. In terms of health, nutrition and physical activity program, there were few schools has simple exercises (stretching/warm-up) available before class. Previous studies suggested the possibility of doing simple would increase energy expenditure tasks and promoting physical activities in the classroom results in positive changes in health-related behaviours among school children (Bassett et al., 2013). In terms of facilities at school, majority of the teachers reported limited access to sports facilities that is the main priority to promote physical activity among children. The results were parallel with the previous study reported insufficient facilities to support a healthy environment that should be given priority assistance to promote physical activity among school children (Hayati Adilin et al., 2015b).

Surprisingly, the study shows that there were relatively high numbers of schools that sold high-calorie food and drinks, particularly from urban schools. Based on the schoolteacher's information and observation, the majority of the canteens sold high-calorie food like a nugget, sausage, burger, fries, *keropok lekor* (fish crackers) and *kuih-muih* (traditional dessert). These environments are frequently associated with increased consumption of energy-dense, nutrient-poor that resulted in a higher BMI among the students (Rathi et al., 2018; Coffield et al., 2011; Taber et al., 2011; Sanchez-Vaznaugh et al., 2010). A guideline on the Management of Healthy School Canteen already outlines the type of foods allowed to be sold, foods that are not recommended, and foods that are not allowed to be sold in school canteens; this guide has been implemented in schools since 2012. However, compliance with the guideline has not been encouraging. Unhealthy foods are still widely available in school canteens.

For the economic environment, there were relatively poor criteria achievement in the present study due to the availability of mobile caterers that sold unhealthy food to the school children, lack of enforcement and monitoring from the school toward the mobile caterer and lack of promotion toward healthy eating at school's tuck shop. The most popular items sold by the mobile caterers, street vendors and outlets are sweetened ice-cold drinks with artificial flavours and colouring, coloured

candies and sweets, chocolates, pickles and ice-cream. According to the teachers, they already warned the mobile caterer from selling food near the school and reported to the city council. However, this phenomenon persists due to the lack of enforcement by the city council, and the teacher does not have authorities to stop them from selling their goods.

Apart from the mobile caterer, results showed that majority of the school had a tuck shop and have specific rules to monitor tuck shop at the school. Thus, it is very important to ensure tuck shop to adhere to the rules to include only healthy foods (e.g. fruits) and drinks (e.g. cultured milk and yoghurt), a low calorie of fizzy drinks and low-fat snacks (e.g. cereal snack), respectively. Prior research indicated that the availability of healthy and nutritious food at school is significantly associated with consumption levels among school children (Moore and Tapper, 2008).

For the political environment, majority of the school reported having nutrition guidelines and food policy in their school besides a school canteens guideline developed by the Ministry of Education and Ministry of Health. Interestingly, majority of the school claimed to have enforcement and monitoring at the school canteen, but at the same time, they reported high-calorie food and drinks sold to their children that were previously discussed. Again, lack of enforcement towards the canteen handlers who were still not adhering to the guidelines may insecure the implementation of healthy food services to children at the school canteen that promotes obesity.

Furthermore, availability of policy for physical activity may promote increased participation in physical activities among school children. Based on the interview session with school teachers, a policy known as "one sport for one pupil" (1M 1S) has been introduced by the Ministry of Education to promote physical activity among schoolchildren. This policy is compulsory for year 4, 5 and 6 in primary school. Prior to that purpose, each school children needs to participate in at least one sports activity at the schools with regard to the children health condition. However, the success of "One Student, One Sport" policy depends on the sports facilities and equipment at the schools that were reported lack in the present study. Hence, it is extremely crucial to have enough physical activity facilities and space to make sure that the policies can be implemented successfully.

For the socio-cultural environment, food reward also known as food incentive was given to students due to good attitude and performance. Although only 6.2% of schools reported that they had given food or drink such as carbonated drink, biscuits, cake, snack, chocolate, sweets and junk food as a reward (hamper) to the school children, they realised the food was not suitable for children. However, it was still being used due to some reasons such as lower expenses and less time-consuming in preparation. Usually, these types of foods were given during an important occasion and large events such as the annual sports day and academic award ceremony. Therefore, new guidelines need to be enforced on choosing healthy options as a reward in any events at school. Writing articles about healthy lifestyle for the school newsletter/website and network with other schools to promote healthy eating and physical activity should be taken into account. This could help the schools to increase the knowledge and awareness, besides promoting a healthy lifestyle among the schoolchildren.

Upon the interview session with school teachers, some further suggestions were noted for improving the situation regarding healthy eating and physically active such as provide manpower and expert personnel to educate school children, monitor children's health status and the person in charge of catering and food preparation such as a dietitian and nutritionist. Furthermore, allocation of adequate financial support to implement programmes for school children such as supply food fare (e.g. fruits), provides facilities such as mineral water dispenser, a school visit to the health care centre and sports centre especially among rural schools can create a healthy school environment. The situation also can be improved by building a strong relationship between school, parent and food handlers to ensure the continuity, participation and idea contribution in promoting healthy eating and physical activity. Additionally, collaboration with universities to conduct the programme (e.g. talk,

workshop, health screening) in promoting healthy eating and physical activity among children and teachers, organize more modules to train food handlers and teachers regarding health, nutrition and physical activities were identified and provide for more pamphlets, posters and health education tools in schools, to canteen handlers and parents can help to enhance the school environment.

The novelty of this finding will enhance the school environmental mapping framework to be used in future studies. It also provides insight to the many parties about the significance of school environment to be applied as a tool and plan for childhood obesity prevention that involves diverse communities, which is the most approachable to community needs, uniting local and international knowledge and constructing stakeholder ownership of the action plan. The understanding healthy and unhealthy school environment is useful to assist healthcare professionals, government and other stakeholders such as parents, teachers and policy-makers in planning an effective intervention about improving school curriculum towards a healthier lifestyle and looking up to the availability of facilities for physical activities in a school setting, including rural and urban areas. The expected differences between the rural and urban areas in terms of school environment characteristics were reflected in this study.

5. Conclusion

Both rural and urban schools were not fully implementing the essential criteria to meet the healthy and effective school environment physically, economically, politically and socio-culturally. This study suggests the school to cooperate with other departments, for example, health department to strengthen their school environment. For instance, wellness programs for school and staff can also be integral to improve the school environment as well as to build school-wide enthusiasm for student-focused programs. Further, it has been known that making these types of changes in the school food environment will be no easy task, thus the present environmental study also helps to identify a barrier and problem faced by the school. For example, the compliance is not strictly monitored week to week and schools face many other challenges to creating a food environment where the healthy choice is the default choice.

Declarations

Author contribution statement

G. Rasyidah: Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

S.W. Wafa: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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