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Whole school mapping to investigate the school environment's potential to promote a healthy diet and physical activity in Malaysia.

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INTRODUCTION: The school is a vital part in the development of children's dietary practices, as children consume a substantial proportion of their daily intake at school. The school environment offers an ideal location for health education and intervention against physical inactivity and poor nutritional intake. **METHODS:** A mapping tool was developed to map the school environment on 4 levels: physical, economic, political, and socio-cultural that can potentially affect healthy eating and physical activity. The mapping was piloted and completed by interviewing 12 teachers (responsible for student affairs and the school curriculum) followed by observation at 12 randomly selected schools (6 urban, 6 rural) in Terengganu, Eastern Peninsular Malaysia. **RESULTS:** For physical environment, 55.0% of the criteria were met and while all schools taught nutrition and physical activity, this was not backed up with actual facilities for practicing physical activity or food preparation. For economic environment, 17.7% of the criteria were met and 11 out of 12 schools had mobile caterers outside their front gates selling energy-dense food/drink. For political environment, 52.1% of the criteria were met and all teachers were aware of the existence of a national catering and nutrition guidelines, but they reported a lack of resources for implementation and monitoring. For socio-cultural environment, 59.2% of the criteria were met and all schools used sweet foods and drinks as rewards at large events. **CONCLUSIONS:** The findings suggest potential avenues exist for intervention in schools to provide a supportive environment that promotes healthier eating and physical activity to prevent obesity.

Keywords : Whole school mapping, school environment, physical activity, healthy eating, nutrition

INTRODUCTION

Schools are more than teaching centres; they are places where children and their families come into contact with society (Briefel et al., 2009). The school environment is also an important setting in the development of children's dietary practices, as children consume a substantial proportion of their daily intake at school (Ogden, Carroll & Flegal, 2008) and the school environment offers an ideal location for health education, intervention against inactivity and poor nutritional intake, and monitoring of BMI. Therefore, the school environment has been recognized as one of the most important influences on educating and modelling children's eating behaviours.

Among factor that leads to obesity among children are diet intake, sedentary lifestyles and environmental factor (Han, Lawlor, & Kimm, 2010). The increasing number of overweight and obesity cases among children has been one of the concerns related to school environment. Over the last few decades, the escalating prevalence of obesity and overweight has become a big concern among children in Malaysia A study by WHO (2007) indicated that 30.9% of children in Malaysia were overweight, and 3.3% were obese. When compared to adults, the overweight children may have more serious lifetime health problems (Ajau et al., 2014). In addition, the effects of hypertension among obese children increase tremendously up to 50% (Chong et al., 2012) compared to normal children.

In Malaysia, since school is the place where many students consume breakfast and lunch, it has been recommended that the school environment supports the development of healthy eating patterns by serving food in the school canteen that is healthy and nutritious, meeting food based dietary guidelines (Moy, Gan, & Zaleha, 2006). They proposed that students and teachers to be encouraged to serve as role models in the school canteen by eating healthily. These steps help to expose students who consume breakfast and lunch in school to

an environment that supports healthy eating. This is in agreement with a recent review that has provided some evidence on the importance of nutrition guidelines and environmental changes in school-based nutrition interventions (Jaime & Lock, 2009). Thus, research on school nutrition environment that focus mainly on food availability and policies (Masse & de Niet, 2013) need to be implemented.

Schools are also one of the places where children spend most of their time to socialise and play with their friends. This is supported by Nurul (2010) who found that children do prefer the outdoors environment of the learning institutions. This is consistent with the finding that suggests class environment does influence children's play behavior (Abbas, Othman, & Rahman 2010). Story et al. (2009) suggests that students with good health are more likely to become excellent in their study. Outdoor activities will also enhance students' cognitive skills and their social health (Nor Fadzilla & Ismail 2011). Therefore, it is vital for school to employ experts in teaching and physical training to successfully convey necessary information about health to gain the maximum benefit from it (Lee et al., 2007).

According to Kok et al. (2004), more studies that integrate potential determinants at the environmental and individual levels are required to study the relative importance of motivation, abilities and opportunities as mediators of nutrition and physical activity behaviours. Interventions that target the environment may be more efficient and potentially more effective than targeting individuals alone because they are designed to change the context in which people live and work to create conditions that are more supportive for healthy behavioural choices (Kok et al., 2004). Indeed it has been suggested that future research needs to adopt a broader contextual approach in developing and testing models of the development of childhood obesity (Davison & Birch, 2001)

This study, therefore, mapped school environments on criteria that can potentially impact children's healthy eating habit and physical activity. In response to Swinburn's (1999) recommendations, four components of the environment within schools were considered; what is available (physical), what are the costs (economic), what are the rules (political) and what is the social and cultural environment (socio-norm). To our knowledge, this is the first study conducted in Malaysia that investigated the school environment in-depth using this whole school mapping approach.

METHODS

Settings and Participants

This study was conducted in Kuala Terengganu, Terengganu, Malaysia. Terengganu is located in Eastern Peninsular Malaysia and is divided into 7 administrative districts (Kuala Terengganu, Besut, Dungun, Kemaman, Hulu Terengganu, Marang and Setiu). Among the 7 districts of Terengganu, Kuala Terengganu was chosen as a specific study location as it is the capital city of Terengganu state, which represents urban and rural areas which are similar in socio-demographic terms with other districts. In addition, in Malaysia, most studies to-date have been concentrated in the Southern, Central and Northern regions (Ismail et al., 2002; Ismail et al., 2008) and there has been less research in the Eastern region. Furthermore, it is also for pragmatic reasons and it was more practical and convenient to access these schools for the researcher and allowed utilisation of professional contacts when developing the study.

This research was conducted in 6 rural and 6 urban primary schools selected at random from a list of all schools in rural and urban areas of Kuala Terengganu. According to the Department of Statistics in Malaysia (DOSM), an area of 1 km square with a population of $\geq 10,000$ is classified as urban and $\leq 10,000$ for rural (DOSM, 2001). The aim was to recruit

a broad range of schools in order to make recommendations for subsequent interventions as effective and relevant as possible. Ethical approval was obtained from Research Committee, University of Nottingham United Kingdom, Ministry of Higher Education (MoHE) Malaysia, The Economic Planning Unit of the Prime Minister Department (EPRD) and Ministry of Education (MoE) Malaysia.

Procedures

This study was conducted by designing a whole school mapping questionnaire, which was then administered by face to face interviews with a school teacher (a teacher who is responsible for student affairs and the school curriculum) at each site and direct observation of the school environment. The questionnaire is formed based on the ANGELO Framework (Analysis Grid for Environments Linked to Obesity) developed by Swinburn, Egger & Raza, (1999) and from the ideas of the School Food Action Group (SFAG, 2003), which described an ideal whole school policy, and identified potential areas where schools could provide a supportive environment. The questionnaire assessed criteria that a school would need to meet to be a healthy and supportive environment for physical activity and healthy eating in four domains: Section A: Physical Environment (what is available) with 35 questions (Table1), Section B: Economic (what are the costs), with 8 questions (Table 2), Section C: Political (what are the rules) with 8 questions (Table 3) and Section D: Socio-cultural environment (what are the attitudes and beliefs) with 10 questions (Table 4). The development process of the questionnaire for this study went through a rigorous piloting process to assess face to face validity and content validity.

These questions were prepared in two languages (Malay/English) to account for language preferences of the interviewees. The interviews were conducted during the morning session on a school day. All of the questions were asked using an initial closed question (yes

= 1, no = 0) followed up with an open question when the criteria was not met, providing information about the constraints of implementing the criteria. These responses were written by the interviewer onto the questionnaire during the interviews.

Data analysis

Quantitative data were analysed using Statistical Package for the Social Sciences (SPSS) version 18. Summative scores for each of the four domains were calculated so that possible scores ranged between 0-35 for Physical Environment, 0-8 for Economic Environment, 0-8 for Political Environment and 0-10 for Socio-cultural Environment, with a higher score indicating a more supportive environment. In addition, to enable comparisons of scores between domains, a 'criteria achievement rate' score was calculated using the formula $(\text{Total score}/\text{Total possible score}) \times 100$. Total score refers to the number of schools that meet the identified criteria, while the total possible score refers to the number of criteria times the number of schools. A higher total score means that a larger number of schools complied with the criteria. Additional data from the interviews reported manually on the semi-structured questionnaire identifying reasons why some criteria were difficult to implement were synthesized as emerging themes and issues and the aim was to identify how the obstacles to implementing some of the criteria could be overcome in schools.

RESULTS

The data obtained for the four environments of physical, economic, political and socio-cultural, are presented in Tables 1 to 4. For the physical environment, out of 35 criteria, schools met 13 criteria (e.g. health education for healthy eating and organizing annual sport event), and they did not meet 16 criteria (e.g. using available education resources systematically and having appropriate sport facility, such as gymnasium or specific sport

centre for playing more games such as badminton and netball). For economic environment, schools met one criteria, where every school has a tuck shop, while for the rest of the criteria, schools did not meet the criteria (e.g. all mobile caterers outside school compound sell high calorie foods, e.g. nuggets and burger) and there is no policy to monitor mobile caterer). For political environment, schools met 4 criteria (e.g. have a national nutritional guideline and at the same time have policy for health education), and did not meet 4 other criteria (e.g., guideline enforcement and having specific policy for physical activity for primary school). For socio-cultural environment, schools met 5 criteria (e.g. training teachers to become a role model, forming collaboration with private sector and organising activities involving the public and family), and did not meet 5 other criteria, (e.g. growing food at school and inviting celebrities to promote healthy lifestyle).

On average, 46.0% of the criteria that a school would need to meet to be a healthy, supportive environment for physical activity and healthy eating were met (Table 5). For physical environment 55.0% of the criteria were met (Table 1) and whilst all schools taught nutrition and physical activity, this was not backed up with actual facilities for practicing physical activity or food preparation. For economic environment 17.7% of the criteria were met (Table 2) and 11 out of 12 schools had mobile caterers outside their front gates selling energy-dense food/drink. For political environment 52.1% of the criteria were met (Table 3) and all teachers were aware of the existence of national catering nutrition guidelines (Ministry of Education 2008) but they reported a lack of resources for implementation and monitoring. For socio-cultural environment 59.2% of the criteria were met (Table 4) and all schools used sweet foods and drinks as rewards at large events.

The interviews revealed some significant barriers to implementing healthy eating and physical activity environments at school particularly in relation to the physical environment,

e.g. lack of facilities, time constraints and unhealthy menu with less healthy menu options at school canteens, tuck shops, and mobile caterers outside school. A recurrent barrier that emerged in the different environments was a lack of resources in promoting healthy eating and physical activity amongst children, doing some enforcement to practice healthy eating and consistently maintaining a healthy eating environment at school with physically active. In addition health concerns become low priority by schools compared than academic achievement and the teacher also stated that there are limited financial resources and allocation to health programmes. There are also limited information, knowledge, and resources on health, nutrition, and physical activity in tandem with inadequate rules and effective guidelines to support schools to become health promoting schools

Opportunities for improvement that emerged from interviews with teachers about healthy eating suggested an overwhelming need for more financial support to be used specifically in promoting healthy eating habits and physical activity. They also need more information or modules about healthy eating and being physically active to implement it well at school. However, in order to make this succeed, teachers also identified the need for more resources (manpower) to assist in developing healthy environments at schools and advocacy within city councils to prevent the presence of mobile caterers outside schools that sell unhealthy food and drink. They also suggested launching a 'fruit and vegetables day once a week, to promote healthy eating habits.

DISCUSSION

A diversity of programmes and policies in schools has been designed to offer opportunities for pupils to eat a balanced diet and to be physically active (DHHS, 2001). However, even with recommended nutrition and physical activity programmes and policies in place, barriers

within the school environment inhibit pupils from taking advantage of these opportunities. This can be seen from the findings of this study using a whole school mapping approach that identified a number of contradictory pressures within school environments that could suggest some room for improvement in the future.

Some positive measures have been taken in Malaysia, such as the introduction of health programmes and an apparent promotion of a healthy school environment by Ministry of Health, Ministry of Education and some professional's bodies (e.g. Nutrition Society, and Dietetic Association). However, most teachers in this study stated obstacles including a lack of ideas, skills, time, and manpower to plan more programmes to promote a healthy environment. As such, more guidance apart from the one that is being referred to; Nutritional guidelines and administration for school canteen, Ministry of Education (2008) need to be revised. This finding has summarized some details /examples by mapping section (i.e. physical, economic, political and sociocultural) on why the school did not meet the criteria that may help in preventing childhood obesity. Information regarding the influences of the school environment has been added in Malaysia that can help fill the gaps between studies of the individual and environmental study in preventing childhood obesity.

For physical environment, some schools did not meet the criteria because of certain barriers. Findings showed that only a limited amount of time and space are allocated for health, nutrition and physical activity in the school curriculum. In addition, health outcomes were generally perceived by school staff to have a lower priority than educational achievements. Barriers to participating in extracurricular sports were mainly due to a limited availability of coaches, playing space, and sports equipment plus some other problems (e.g. teasing, bullying, and inferiority complex) that may contribute to reducing children's interest.

Apart from that some schools that reported insufficient facilities to support healthy environments (e.g. a specific leisure room for health education, hall and specific sports centre) should be given priority assistance. Currently they just use the assembly hall to play badminton and netball, which are supposed to be used for school occasion. That is why a specific sport centre that can be used any time by students without a need for sharing. is suggested

At school canteen, some school did not meet the criteria because they provide a poor choice of healthy food, unpalatable healthy dishes and a lack of healthy information in the school canteen on high calorie foods (e.g. nuggets and fried burgers) that uses deep fry method and are not healthy (e.g. oily and greasy). Lyn et al. (2011) reported that they have found some schools in Georgia that tend to sell energy dense food and non-nutritious foods. This is also supported by Baur et al., (2004) who found easy access to non-nutritious snack foods in the cafeteria, combined with unpalatable and insufficient time to finish eating a full lunch, led pupils to select non-nutritious snacks instead of the provided lunch.

For the economic environment, observations on mobile caterers at school gates have given an insight to a relatively new problem. Nowadays, children are more likely to have food outside school, which in most cases is unhealthy (crisps, sweets, chocolate etc.). The serious problem arises as teachers do not have any authority to stop street vendor foods as they are controlled by the city council, and this should be considered for immediate action. Otherwise, children may continue to engage with unhealthy eating behaviour. It may be worth suggesting a meeting with city council to solve the presence of 'mobile caterers' outside schools who sell non-nutritious food and drink. The mobile caterers may need to be educated on healthy food choices if they want to continue their sales.

For the tuck shop, most of them are run by schools according to government rules by selling stationary, but a few of them do sell sweets, chocolate and sweet drinks, which is against school regulation. To date, schools under study only refer to Nutritional guidelines and administration for school canteen (Ministry of Education 2008). This indicates that strict guidelines need to be implemented specifically for tuck shop at school. If schools want to sell food at tuck shops, they should ensure that all food and drink sold in tuck shops adhere to the whole-school food guideline / policy. One example that they can refer to is the UK's Nutritional and Practical Guidelines for School Meals that suggests restrictions on food and beverages that are high in fat, sugar and salt to promote healthy environment (The Caroline Walker Trust, 2005). Another possible reference is the Nutrition Standards for Foods in Schools: Leading the Way toward Healthier Youth that proposed standard of food that should be sold to children inside and outside school compound (Stallings & Yaktine, 2007). Hence, new and specific guidelines may be helpful to advise schools on selling the right things at school's tuck shop.

For political environment, most of the schools showed inadequate rules and ineffective guidelines to support a healthy environment. Even though they have standard nutritional guidelines, some of the canteen handlers were still not following the menu guidelines. Some canteen handlers said that they had insufficient idea when preparing nutritious dishes, suggesting the need for a new revision to the guidelines with some options for healthy recipes. Apart from that, there were also suggestions from teachers regarding the addition of new regulations about selling healthy food in tender that must be followed by all the canteen handlers. This would guide them to be cautious and follow the contract strictly or otherwise, the contract that has been signed to operate school canteen sales would be withdrawn. This may secure the implementation of healthy food service to children at the school canteen. This

in turn can help in preventing childhood obesity. Nutrition policy must be monitored to make sure that the policies are not only limited to food accessibility and availability, but also encompass the food preparation and the hygiene level of the school canteen (Martins, Hogg, & Otero 2012).

For the socio-cultural environment, many schools are found to give food as a reward, such as creamy biscuits, chocolate and sweets drinks in large events. This need to be scrutinised specifically as this may mediate unhealthy eating amongst children. The barriers to choosing healthy food as a reward amongst children at a special school event, has provided suggestions on some ideas to develop new guidelines in preparing healthy food choices for rewards or some other appropriate rewards as substitution. The rewards, which also came from sponsorship by outsiders (e.g. companies, corporates and parents) during the event, may need to be controlled, with reference to guidelines. Ideas from teachers, such as inviting celebrities/professionals to motivate children, should be taken into account. More information about selected celebrities or professionals should be discussed properly according to budget and time for implementation at schools. This could motivate children to practise a healthy lifestyle according to their role model. The idea of introducing school gardens, which as stated by teachers, is incompatible due to burglars and time constraints, may need more investigation for effective implementation.

In order to achieve the target of encouraging children to eat healthily and promoting healthier school environment, cooperation and contribution from everyone (public sector, private sector, parents and other schools) is a must (De Bourdeaudhuij et al., 2011). Understanding the physical environment that can be achieved through collaborations and activities is important to ensure a favourable learning environment (Nur Hidayatuljamilah et al., 2014). The planning of both interior and exterior learning environment should be taken

into account to create a conducive learning environment (Shuhana, Hanim & Norsiah 2012), as environment can affect one's life internally and externally.

The schools' environmental study has provided suggestions for some improvements in the future. One of the greatest concerns to be considered as a policy document is the lack of manpower that was reported happening in every aspect of the whole-school mapping (physical, economic, political and socio-cultural). A nutritionist must be placed at the Department of Education in every district or state to monitor health programmes at schools. Hence, it is hoped that the health barriers can be overcome by a nutritionist who could work together with teachers or any other collaborators (e.g. Department of Education and Health) in promoting healthy eating at school, which in turn can reduce childhood obesity.

Some other important recommendations that can be adapted into policies are the revision of nutritional canteen guidelines including healthy food service in canteen handler tender, healthy recipe books, children nutritional requirements, pack lunch guidelines for parents, handy books on healthy eating options and physical activity, revising the guidelines for nutrition and physical activity at school, specific guidelines for tuck shops, forming a new scheme to provide free fruit or healthy snacks at school, and increasing the budget allocation for promoting healthy eating and physical activity at school. Teachers at schools suggested a 'fruit and vegetables day' once a week, but there is no specific guidance to guide them how to do it to gain the maximum benefit from the programme. More financial support for facilities and for implementing programmes should be put into policy as a priority for schools. Policy for mobile caterers should be clearly engaged with the city council committee to list all the order regulation. By implementing a strict policy with respect to mobile caterers outside school, the condition can be significantly improved. In conjunction with this, enforcement of the policies and rules also has to be strictly adhered to.

For interventions, it is crucial that the Ministry of Health liaises with other ministries, especially the Ministry of Education to address some of the key barriers to implementation that were identified, thereby enhancing the implementation of school policy. In summary, ideas for preventing childhood obesity that combines all of the suggestions in this study would help to change children's behaviour to be healthier in terms of diet and physical activity. School programmes and policies represent significant spheres of influence in school environments on pupil nutrition and physical activity.

STRENGTHS AND LIMITATION OF STUDY

This is a preliminary study in Malaysia investigating the whole school environment. One limitation of this study is that it was only conducted in one geographical area (Terengganu), which means that the findings cannot be generalised to represent a larger population (Malaysia). However it does provide a view on how the school environment may contribute to preventing childhood obesity by providing an environment that supports physical activity and healthy eating.

CONCLUSION

Overall, schools met the least criteria associated with the economic environment than for the physical, political and socio-cultural environments. Some of the drivers for this relatively poor criteria achievement for the economic environment were the unhealthy food sold by mobile caterers outside school together with lack of enforcement against this. Action is needed to counter this problem. However, a holistic approach which also includes improving the physical, political and socio-cultural environments is required if schools in Malaysia are to maximize their potential for promoting eating and physical activity, to play their part in

prevent childhood obesity in Malaysia. For future research, schools across the other states of Malaysia are suggested to be mapped to assess the extent schools meet the criteria for a supportive environment

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Table 1: Number of schools meeting the criteria for physical environment.

	Curriculum and education resources	Urban n=6 schools	Rural n=6 schools	Total number of schools meeting criteria
1	Health and nutrition are taught in the curriculum	6	6	12
2	Physical education and activity are taught in the curriculum	6	6	12
3	Education Resources : Food pyramid, food models, etc.	6	6	12
4	Using educational resources (e.g.: Food pyramid & food models, systematically)	0	0	0
	% of criteria met			(36)75.0%
	Health, nutrition and physical activity programme			
5	Health professional involvement (Doctor or nurse visits)	6	6	12
6	Programme involving health professionals. (e.g. nutritionist & dietitian) Motivation /promoting healthy eating and physically active	6	6	12
7	Young Doctor programme-to empower students with health knowledge and skills in order to improve their own health and also their peers'	6	2	8
8	Health education for healthy eating (promotion,information and programme conducted by school teachers)	6	6	12
9	Health education for physical activity (promotion, information and programme conducted by school teachers)	6	6	12

10	Visit to sports centre	4	0	4
11	Visit to farm or food factory	4	0	4
12	Annual Sports event	6	6	12
13	Simple exercise (stretching / warm-up) available before class	3	3	6
14	Walking / riding bicycle to school encouraged	0	4	4
15	Cycling at playtime	0	0	0
16	Information along the corridor about a healthy lifestyle.	6	6	12
17	Food calorie guidelines or other leaflets / books to students	0	0	0
	% of criteria met			(98)62.8%
Facilities at school				
18	Equipment/toys to encourage physical activity (balls, skipping ropes, badminton etc)	6	6	12
19	Indoor Hall (use for any programmes at school, indoor game like badminton, etc)	6	0	6
20	Sport centre (specific place for playing game/sport at school e.g. : badminton court and netball space instead of using assembly hall.)	0	0	0
21	Gymnasium	0	0	0
22	Leisure room- specific for health promotion	1	0	1
	% of criteria met			(19)31.7%
Break time, canteen environment and menu provision				
23	Break time available at schools for eating	6	6	12
24	Sufficient break time for children	0	0	0
25	Pleasant, calm, relaxing, attractive and cheerful canteen	4	6	10

26	Clean canteen	4	6	10
27	Healthy eating information displayed	3	3	6
28	'No' energy dense savoury foods sold (nuggets, sausage, etc.)	0	2	2
29	'No' energy-dense sweet foods sold (sweets, chocolate etc.)	0	2	2
30	No' high calorie drinks sold (fizzy etc.)	2	6	8
31	Fruit sold	2	2	4
32	Healthy food choices positioned attractively at the front of the serving counter	0	0	0
33	Free drinking water (Water cooler machine etc.)	6	6	12
34	Free fruit and vegetable to all pupils Notes: Free only for Supplementary Feeding Scheme to pupils from low income family	0	0	0
35	Free food or drink during extracurricular activities in the evening to all pupils	6	6	12
	% of criteria met			(78)50.0%
	% of criteria met for physical environment overall			231/420= 55.0%

Table 2: Number of schools meeting the criteria for economic environment.

	Criteria for economic environment	Urban n=6 schools	Rural n=6 schools	Total number of schools meeting criteria
1	No mobile caterers near schools	0	1	1
2	Rules / policy to monitor food sold outside the school gates	0	0	0
3	No high calorie foods sold (nuggets, burger) at mobile caterer	0	0	0
4	No high calorie drinks (fizzy) at mobile caterer	0	0	0
5	Fruit sold	2	2	4
6	Tuck Shop available at schools	6	6	12
7	Specific rules /policy to monitor tuck shop at school	0	0	0
8	Promotion leaflets of healthy eating/physical activity at tuck shop	0	0	0
% of criteria met for economic environment overall				17/96=17.7%

Table 3: Number of schools meeting the criteria for political environment.

	Criteria for political environment	Urban n=6 schools	Rural n=6 schools	Total number of schools meeting criteria
1	National nutrition guidelines and Food policy use for school canteen guideline and others related to food	6	6	12
2	Awareness of national nutrition guidelines by teachers	6	6	12
3	Awareness of national nutrition guidelines by canteen handlers	6	6	12
4	Adherence to national nutrition guidelines by canteen handler	0	2	2
5	Sufficient manpower to enforce national nutrition guidelines	0	0	0
6	Rules and information to families to prepare healthy meals at home and lunch box	0	0	0
7	Policy for nutrition education	6	6	12
8	Policy for physical activity (Specific) Note: No specific policy but have the rules and physical activity guideline	0	0	0
	% of criteria met for political environment overall			50/96=52.1%

Table 4: Number of schools meeting the criteria for socio-cultural environment.

	Criteria for socio-cultural environment	Urban n=6 schools	Rural n=6 schools	Total number of schools meeting criteria
1	Food not used as a reward	0	0	0
2	Leading by example- (training teacher as a role model)	6	6	12
3	Implementation (healthy eating rules) from teachers and canteen handler who attended the training	3	4	7
4	Celebrities invited for promoting healthy lifestyle	0	0	0
5	Growing Food at school	0	4	4
6	Collaboration with the private sector on diet/physical activity	6	6	12
7	Activities involving public, family and community	6	6	12
8	Network with other schools to promote healthy eating and physical activity	6	6	12
9	Committee / working group for school health promotion	6	6	12
10	Articles about healthy lifestyle for the school newsletter/website	0	0	0
	% of criteria met for socio-cultural environment overall			71/120 = 59.2%

Table 5: Proportion of schools meeting the criteria for the different components of the environment.

Whole school mapping	Number of criteria	Total possible score ^a	Total score ^b	% criteria achievement ^c
Physical environment	35	420	231	55.0
Economic environment	8	96	17	17.7
Political environment	8	96	50	52.1
Socio-cultural environment	10	120	71	59.2
Average	15.3	183	92.3	46

a Total Possible Score = Number of Criteria x 12 schools

b Total Score = Taken from Table 1 to Table 4

c Criteria achievement rate= Total score / Total Possible Score x 100%