ORIGINAL ARTICLE

Obesogenic Characteristics of Primary Schools in an Urban Philippine Municipality: A Descriptive Study

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ABSTRACT

Background. With childhood overweight and obesity becoming widespread in the Philippines, there is an increased risk of developing non-communicable diseases at a younger age. The school environment, found to be associated with body mass index, offers an avenue to address and prevent school-aged obesity. However, the lack of data on the current school environment poses a barrier to improving these conditions.

Objective. This study aimed to describe the physical, political, and sociocultural environment characteristics of primary schools in the Municipality of Pateros (Philippines) that affect nutrition and physical activity of school-aged children.

Methods. Self-administered questionnaires for key school personnel and observational checklists were used to examine available resources, policies, and current practices for obesity prevention in five public schools in a municipality. The role perceptions of all school personnel on childhood obesity prevention were also gathered. Descriptive statistics was used to describe the number and categories of food items, functional spaces and equipment for physical activity, policies and scores of attitude toward obesity prevention. Data were collected in May to June 2019 and were analyzed descriptively.

Results. Majority of the schools serve food items that contain high amounts of saturated fat, sugar, or salt, provide excess calories, and are not recommended to be sold at school canteens based on guidelines by the Department of Education. While all schools have areas and functional equipment for physical activity, students have limited access to these. Policies and guidelines for nutrition were present but sparse for physical activity and obesity prevention. Positive attitude towards childhood obesity prevention was seen across all school personnel respondents.

Conclusion. Participant primary schools are eager to address childhood obesity, however, the physical, political, and sociocultural environments do not seem to enable this. This situation may promote, rather than prevent, overweight and obesity among school children. This points to the need of reorientation and implementation of policies on obesity prevention to the schools as well as developing the skills of both teaching and non-teaching personnel in healthy eating and physical activity to students. School-based healthcare workers like school nurses and doctors would have critical roles in supporting schools in this regard.

Keywords: obesity, obesogenic characteristics, primary schools, non-communicable disease

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INTRODUCTION

The prevalence of overweight and obesity among children aged 0-5 years old and 5-10 years old in the Philippines have been increasing at an average of 0.17% points for the past 24 years and 0.33%-0.34% points for the past 10 years, respectively.[1] This translates to a two-fold increase of children 0-5 and 5-10 years screened as overweight in the past 10 years. The regions which have the highest prevalence of obesity includes the National Capital Region.[2] These statistics are important from a public health perspective because a child who is considered as overweight or obese has an increased chance of being overweight and obese as an adult resulting in an increased overall risk of developing non-communicable diseases like cardiovascular diseases and diabetes mellitus at an earlier age.[3–9]

Since most of the children spend most of their time at school, such a setting becomes ideal for health promotion interventions.[10] While the school curriculum providing for health education can promote or create a barrier for healthy behavior, studies have shown that this does not necessarily translate to good eating behavior suggesting the importance of other factors such as the school environment itself.[11–15] In fact, previous studies have demonstrated the association of school food and physical activity environment with the eating behavior, physical activity, and BMI of school children.[16–19] It was said that the physical environment affects the diet of children[20–22] since a large portion of school children buy foods and beverages at school[15] or buy elsewhere such as vending machines within schools, choosing alternative options in school canteens, sourcing food during the commute to and from school[22].

The school environment also plays a role in promoting physical activity. It was found that available and accessible recreational facilities for leisure-time physical activity are associated with higher levels of physical activity.[23] Likewise, resource availability or quality and supportive school climate, was second to time, as being the most prevalent influencing factor among the other 22 unique factors when it comes to implementing school-based PA models.[24] This supported the notion that physical activity is important, and the longer and more frequent physical activity is done, the better is the effect in preventing childhood obesity as well.

School policies enable and provide a context from which health-promoting programs are established. In the Philippines, the Department of Education (DepEd) has formulated and implemented school-based policies and health maintenance programs. These policies have provisions on healthy and safe school environment, physical education, nutrition services, and health services.[25] Specifically, it comprises policies focused on water sanitation, school canteen management, and educational facilities guidelines.[26–29] For physical education, it comprises policies geared to promote and implement nationwide fitness programs and workshops in teaching physical education.[30] In nutrition services, it comprises policies in implementing nationwide school-based feeding programs and compliance in proper food safety.[31–34] DepEd has also released an order aimed at eliminating unhealthy food and limiting food advertisements. The same order classified food into green, yellow, and red categories based on their saturated fat, trans fat, sugar, and salt content. It recommends that only food under the green category be made available in schools, food under the yellow classification in moderation, and food under the red classification be never sold inside.[34] Lastly, health services comprise policies directed in implementing annual weight and height screening of students and check-ups.[29,35]

While there have been school-based interventions implemented to curb obesity, there is limited local literature looking into the school environment that can influence behavior of children. To contribute to this gap in literature, we will describe in this paper the physical, political, and sociocultural environment characteristics of primary schools in an urban municipality. Specifically, our objectives were:

- To describe the availability of food and beverage products sold inside and outside of the primary schools;
- To describe the availability and accessibility of resources and time-allotment for physical activity;
- To describe the schools' policies and programs that direct the frequency, content, and participants of obesity prevention programs; and
- To describe the attitude of the schools' teaching and non-teaching staff on the causes, seriousness, adequacy of management, and their roles in preventing childhood obesity.

METHODS

Study Design

This is a descriptive study that used self-administered questionnaires to assess the physical, political, and socio-cultural environment characteristics of primary schools in an urban municipality. Physical environment included the availability and accessibility of food and beverages inside and outside of primary schools, and available spaces and equipment for physical activity. Political environment included the school's policies and programs that affect the frequency, content, and participants of obesity prevention programs, while sociocultural environment included the attitudes of the school's teaching and non-teaching staff on the causes, seriousness, adequacy of management, and their roles in preventing childhood obesity. The researchers used descriptive statistics to summarize the quantitative data collected. This study was approved by the UP Manila Research Ethics Board (UPMREB 2019-019-UND).

Study Setting

The municipality of Pateros was chosen as the study site because it has been shown to have one of the highest burden of obesity for children in Metro Manila for several years.[36–39]

While Pateros has been a site for pilot implementation of several programs addressing non-communicable diseases (NCDs), their local statistics show that mortality from NCDs is still prevalent.[40]

Study Participants

We looked at the entirety of the school as a unit of analysis. The entirety of each school was represented by different respondents such as members of the school administration, the faculty members, and the school officials responsible for the management of school food resources and environment. The respondents for each school included the principal, canteen manager, canteen cooks, Music, Arts, Physical Education, and Health (MAPEH) head or Physical Education (PE) coordinator, school clinic head, and teachers and non-teaching administration staff.

Sampling Technique

The study utilized total purposive sampling. There are a total of 11 primary schools in the municipality. In the 11 schools, this did not include primary schools catering for special children and those classified as integrated schools, and annex or extension schools. We invited all 11 primary schools to participate in the study, however, only five responded affirmatively, while six schools deferred participation. In the five participating schools, all teaching and non-teaching personnels employed for at least one month were invited to participate in the study.

Research Instrument

We used six self-administered questionnaires (SAQs), each answered by different respondents, and two observational checklists. The questionnaires were based in part from literature review and some parts were adopted from the "Measuring the Food and Activity Environments in Primary and Intermediate Schools tool" by Swinburn, Egger, & Raza[41] and Carter & Swinburn[42]. To ensure contextualization of the tools in the local setting, we pre-tested the tools in August 2018 at a private and a public school in Makati. We made necessary revisions based on the feedback during the pre-test.

The first tool was a self-administered questionnaire (SAQ_1) accomplished by the school principal. This tool gathered school details and policies about obesity prevention. The SAQ_1 has four parts: school details, school staff, school policies, and records review. The first two parts were made for profiling purposes of the school. As for the school policies part, general statements or description of policies based on the standard set by the Department of Education (DepEd) Order no. 13 s. 2017 and the wellness scoring criteria from the WellSAT: Assessment Tool.[43]

The second tool was a self-administered questionnaire (SAQ_2) answered by the canteen manager. It had four parts: school canteen management, other food sources/outlets, food and beverage accessibility, and food and beverage availability and consumption. Most of the content of this tool was adopted from the actual tool from Carter and Swinburn's study.[41]

The third tool (SAQ_3) was accomplished by the cook of the school canteen. This tool was created to supplement SAQ_2. While the SAQ_2 described the most available and accessible packed food and beverage products, and classified them accordingly, SAQ_3 aims to describe the most available and accessible food and beverage products from other food sources/outlets such as private concessionaires or cooperatives, and also focus on the recipe and serving size of the cooked foods.

The fourth tool (SAQ_4) was accomplished by the school clinic head. This asks about the current practices and programs regarding the school's obesity management.

The fifth tool (SAQ_5) was accomplished by the teachers, administration staff, cooks, and health professionals in the school. The purpose of the fifth tool was to collect perceptions of the said personnel about childhood obesity.

The sixth tool (SAQ_ 6) was accomplished by the MAPEH Head. The tool helped collect information regarding the physical environment for physical activity and time allotments, and levels of participation for curricular, extracurricular, and co-curricular activities in the school.

The first observational checklist (OC 1) aimed to describe the physical environment influencing nutrition and physical activity inside the school while the second observation checklist (OC 2) was used to observe the environment in the immediate vicinity outside the school.

Data Collection Procedure

Upon gaining approval from the Department of Education Bicutan and UPM Research Ethics Board (UPM-REB) in April 2019, the researchers prepared and went to the participating schools to obtain permission from school principals to collect data. With the principal's approval, we distributed the self-administered questionnaires to the designated respondents such as the school principals, canteen managers, MAPEH heads, cooks, school clinic teachers, primary school teachers, and other staff working under the school administration. We left a sealed box with a single hole in a designated area so that the respondents could drop their accomplished SAQs inside without compromising the privacy of the respondents' data. During the data collection, we also observed the school canteen for two days and another two days were allocated for the observation outside the school. Data collection was done in May to June 2019.

Data Analysis

Descriptive statistics was used to analyze all the data gathered in the study. The frequency and percentage of food and beverage sold inside and outside the school was computed. The ranking of the top five most consumed food and beverage products inside the school was also noted. The frequency and percentage of physical activity resources in terms of availability and accessibility was also done. The mean of operational

Table 1. Profile of Primary Students in Pateros according to their BMI-for-Age (5-19 years) of SY 2018-2019

Grade Level	Total number of students screened	Frequency (%)			
		Underweight (<-2 SD)	Normal (Median)	Overweight (+1 SD)	Obese (>+2 SD)
Grade 1	635	35 (5.5)	566 (89.13)	25 (3.93)	9 (1.42)
Grade 2	514	27 (5.25)	462 (89.88)	21 (4.0)	4 (0.78)
Grade 3	550	15 (2.72)	440 (80)	84 (17.0)	11 (2)
Grade 4	600	21 (3.5)	498 (83)	28 (4.67)	12 (2)
Grade 5	559	15 (2.68)	487 (88.91)	47 (8.41)	9 (1.61)
Grade 6	606	22 (3.63)	541 (89.27)	37 (6.11)	5 (0.83)
Total	3464	135 (3.9)	2994 (86.43)	242 (6.99)	50 (1.44)

hours of physical activity facilities and accessible time of hard surface, athletic equipment, and functional equipment for physical activity was also done. We also described using the mean time allotment and participation of students in physical activity during co-curricular and extra-curricular classes. We described the policies and programs on obesity prevention through frequency and percentages. The perception of school teachers and administration regarding practices towards obesity prevention was described using item analysis of the five-point Likert scale.

RESULTS

Profile of Participating Schools and Respondents

All the participating schools are public schools with a mean student population of 837 and a mean total teaching and non-teaching staff (i.e., canteen staff, security, floor managers) of 32. None of the participating schools had a physician, a school nurse, a school dentist, a nutritionist, nor a clinic. Instead, they had a designated representative for the school health coordinator or school health teacher.

Table 1 shows the BMI classifications of students based on the records review using BMI-for-age (5-19) for boys and girls. Although the majority of students were categorized as normal in BMI classifications, overall rates of students in overweight and obese classification (8%) are still higher compared with underweight children (3.9%).

There were a total of 104 respondents recruited and given the questionnaire, 103 (99%) of whom accomplished the questionnaire. Respondents were 43 (SD= ±10.68) years old on average, mostly female (84.62%), married (64.42%), and were college graduates (89.42%). In total, 81 (77.88%) of the respondents were teachers, 5 (4.81%) of each were principals, canteen managers, cooks, and health coordinators, and 3 (2.88%) were clerks. A majority did not receive any training (42.31 %) on proper nutrition, food safety and health preparation techniques, or obesity prevention within the last 12 months. Table 2 shows the sociodemographic profile of respondents.

Table 2. Profile of School Staff in Primary Schools in Pateros, 2019 (N=104)

Sociodemographic Parameters	Frequency (%)
Age	
Mean, (SD)	42.78 (10.68)
Min, Max	23, 62
Sex	
Male	16 (15.38)
Female	88 (84.62)
Marital status	
Single	29 (27.88)
Married	67 (64.42)
Widow/Widower	7 (6.73)
Separated	1 (0.96)
Highest educational attainment	
Elementary Graduate	1 (0.96)
High School Graduate	2 (1.92)
College Undergraduate	5 (4.81)
College Graduate	93 (89.42)
Master's Degree	2 (1.92)
Doctoral Degree	1 (0.96)
Role of personnel	
Principal	5 (4.81)
Teacher	81 (77.88)
Canteen Manager	5 (4.81)
Cook	5 (4.81)
Health Coordinator	5 (4.81)
Clerk	3 (2.88)
Training received within the last 12 months*	
Proper nutrition for grade school student	9 (8.65)
Food safety and healthy preparation techniques	14 (13.46)
Obesity prevention	3 (2.88)
Other training	11 (10.58)
No training	44 (42.31)
No response	26 (25)
Years in service	
0-5 years	23 (22.12)
6-10 years	31 (29.81)
11-15 years	8 (7.69)
16-20 years	14 (13.46)
More than 21 years	28 (26.92)

**Multiple response question*

Availability and Choices of Food and Beverage Products inside the School

All five schools have self-managed canteens as their only source of food and beverages. All schools delivered food items to the students via food tray services, two with canteen services, and four allowing for packed food or *baon*. Also, four schools catered only during AM and PM snack breaks, while one school catered for both snack breaks and lunch.

As for the extent to which students purchase their food and beverage in their canteens, two schools stated all students participated in purchasing in the canteen, while two schools with more than 50% participation, and one school with less than 50% student participation. In planning daily food services, all five schools utilized a weekly menu regulated by DepEd nutritional guidelines based on the Philippine Dietary Reference Intakes of 2015, with three schools also taking into consideration the children's preferences. All five schools' weekly menu planning is headed by their canteen managers, with one school headed by both canteen manager and cook.

The DepEd guidelines, adapted the 2015 Philippine Dietary Reference Intake, categorized food items according to their saturated fat, trans fat, sugar, and salt content –

Table 3. Number of Schools in Pateros Selling Packed and Non-packed Food and Beverage Products Based on Department of Education Category (N=5)

Nutritional Facts *Categories and definition based on Department of Education, DO 13, s. 2017*	Food Product Availability (n)	Beverage Product Availability (n)
Packed Foods		
Green Category Contains wide range of nutrients and at the same time: • Saturated fat <3 grams per serving • No trans fat • Added sugar <10g per serving • Sodium <120 mg per serving	Cookies C (1)	Tetra Pack Juice (1)
Yellow Category May contain some nutrients but at the same time contains: • Saturated fat >3-5 grams per serving or • No trans fat • Added sugar >10 grams but <20 grams per serving or • Sodium >120 mg to 200 mg per serving	Crackers B (4) Cookies B (3) Shortbread (1)	0
Red Category • Saturated fat >5 grams per serving or • Contains trans fat no matter how insignificant the amount is • Added sugar or total carbohydrates (in the absence of dietary fiber) >20 grams per serving or • Sodium >200 mg per serving	Cracker A (3) Cookies A (2) Shortbread A (1) Wafer (1) Cupcakes (2) Tree Nuts (1) Bread (3) Chips (1) Fudge (4)	0
Non-packed Foods		
Green Category • Contains wide range of nutrients • Saturated fat <3 grams per serving • No trans fat • Added sugar <10g per serving • Sodium <120 mg per serving	Sopas A (3) Lugaw A (3) Nilagang itlog (1) Arroz Caldo (1) Champorado A (1) Sotanghon Soup (1) Ginataang Mais (1)	Water (2) Calamansi Juice A (1) Chocolate Drink (1) Buko Juice (1)
Yellow Category May contain some nutrients but at the same time contains: • Saturated fat >3-5 grams per serving or • No trans fat • Added sugar >10 grams but <20 grams per serving or • Sodium >120 mg to 200 mg per serving	Champorado (3) Nilagang Saging (1)	Buko Juice B (1) Pineapple Juice (1) Melon Juice (1) Chocolate Drink B (1) Calamansi Juice B (1)
Red Category • Saturated fat >5 grams per serving or • Contains trans fat no matter how insignificant the amount is • Added sugar or total carbohydrates (in the absence of dietary fiber) >20 grams per serving or • Sodium >200 mg per serving	Sopas B (2) Lugaw B (2) Macaroni Spaghetti (1) Lomi (1) Champorado C (1) Giniling (1) Ice Candy (1)	Mango Juice (1)

green category should be made available in schools, yellow category should be made available in moderate quantities, and red category should never be sold inside the school. Table 3 summarizes the inside school food items according to the DepEd categories. Results show that only one (1) school served green category packed food items, and the other four (4) with yellow category packed food items. The packed green category food item lacks a variety of products as it is confined only to cookies C, while yellow category items include three product types, and the red category offers the most variety as it includes nine food product types. As for packed beverages, the schools included bottled mineral water and tetra packed juices, which were all under the green category.

Although red category non-packed food items were still served by two schools, the majority of the schools served more varied green and yellow non-packed food than their packed food counterpart. Moreover, similarly titled food items differ in categories because the meal recipes vary from school to school. Thus, the amount used per ingredient is inconsistent, just like the salt content consequently changing the food item category.

For non-packed beverages, all schools offered water from common dispensers, water fountains, and taps. Four schools sold green and yellow category beverages, with the yellow category having more variety than the green, and only one school served red category non-packed beverages.

Availability and Choices of Food and Beverage Products Outside the School

Many of the food outlets observed outside were sari-sari stores and typically, a sari-sari store sells yellow and red category food items like chips, candies, and packed juice. Independent food stalls offering *kikiam*, hotdogs, and fish balls were the second most available. The third prominently observed food outlet was the *carinderia* offering combinations of rice meals paired with different viands. Ambulatory food services were not frequently seen but observed to appear upon the end of classes. Bakeries and fastfood outlets were equally less available around the participating schools' vicinity.

Availability and Accessibility of Hard Surface Areas for Physical Activity

The majority of the participating schools have space for physical activity. Two schools have a multipurpose court, two schools with a paved playground, and one school with an open grass playground. The measurements of these spaces vary depending on the school's expanse. Of the two schools that have multipurpose courts, one school court is available for students to use all day while the other is not available for use at all. The school with the open glass playground only has it available for students before school hours. For the paved playgrounds of the two schools, one is available during snack time, lunchtime, and after school hours, while the other school is not available for use. Table 4 shows the students' access to hard surface spaces for physical activity.

Availability and Accessibility of Equipment for Physical Activity

The equipment examined were categorized into functional/recreational and athletic equipment. A diverse set of functional and recreational equipment was observed in all schools. Only two schools have playground-related equipment such as seesaws, monkey bars, and slides. For athletic equipment, only two of the schools have such equipment available. It was noted that three schools have their equipment for use only at lunchtime for some students, one school has their equipment for use during snack time for some students, and one school has their equipment for use for all students after school hours.

Time Allotment and Participation of Students in Physical Activity

Each student from the participating schools averaged 28 minutes of physical activity per physical education class, although the time allotment duration of physical education classes in a single meeting varies. The longest duration of PE classes was of Grade 3 students averaging 50 minutes. The shortest duration with Grades 1, 2, and 5. All schools held a physical education class weekly for their students in Grades 1-3. Four schools held physical education classes once weekly for their Grades 4-6 students. One school held a physical education class twice weekly for their students in Grades 4-6.

As shown in Table 5, the estimated level of participation in PE is rated Very High for most schools. Moreover, extra-curricular and co-curricular activities were conducted in all schools. Exercise-related activities were done daily in

Table 4. Number of Schools and Accessible Time for Usage of Spaces for Physical Activity in Pateros, 2019 (n=5)

Accessible Time	Frequency (%)		
	All students	Some Students	No Students
Lunch Time	-	3 (60)	2 (40)
Snack Time	-	1 (20)	4 (80)
After School	1 (20)	2 (40)	2 (40)
Before School	1 (20)	1 (20)	3 (60)

Table 5. Number of School and Estimated Level of Participation in Physical Education in Pateros, 2019 (n=5)

Grade Level	Estimated Level of Participation in Physical Education, Frequency (%)				
	Few	Some	Moderate	High	Very High
Grade 1	1 (20)	-	-	-	4 (80)
Grade 2	1 (20)	-	-	-	4 (80)
Grade 3	1 (20)	-	-	-	4 (80)
Grade 4	-	-	1 (20)	-	4 (80)
Grade 5	-	1 (20)	-	-	4 (80)
Grade 6	-	-	1 (20)	-	4 (80)

all schools providing the students other means of physical activity outside PE. Table 6 shows the annual occurrence of co-curricular and extra-curricular activities in the schools.

Furthermore, all schools reported having sports-related, dance-related, exercise-related activities, and *Palarong Pinoy* and other games as co-curricular and extra-curricular activities but with varying frequencies. Exercise-related activities and *Palarong Pinoy* and other games were conducted frequently in most schools with very high participation among students, as noted in Tables 6 and 7.

Policies on Obesity Prevention

All five schools implemented policies promoting a healthy diet. These provisions covered a balanced diet and good nutrition in the curriculum; healthful food offerings; elimination of unhealthy food inside schools; and foodservice staff training on healthy, proper, and safe food preparation. Only one school has no policies regarding the limitation of unhealthful food in food outlets inside the school, the marketing of unhealthy food inside and outside schools, and the banning of specific kinds of food such as sugar bans. Although, four schools were guided by the DepEd order no. 13 s. 2017 on regulating food and marketing inside and outside the school, one school has a policy banning junk food inside the school and monitoring of street vendors.

All schools have only one policy promoting recommended physical activity, which can be found in the curriculum. And only one school has a policy on weight control programs on overweight and obese students. Two schools implemented physical fitness programs which include a wellness program adapted by the DepEd.

Obesity Prevention Programs

Different programs on obesity prevention were held in primary schools. Three schools implemented monthly afterschool programs for all students helping them choose and maintain healthy lifestyles. All five schools were engaged in creating and maintaining the use of school gardens. Physical examination and assessment of the nutritional status of students were done in four schools while screening for obesity risk factors was done annually in only three schools. Moreover, one school performed health talks about a healthy diet, physical activity, and maintaining a healthy weight. And three schools implement themed nutrition and physical activity competitions at least once a year.

Perceived Roles in Preventing Childhood Obesity

The school's role in addressing childhood obesity was measured by the level of agreement of the respondents regarding the school's actions in fulfilling the said role. Most of the respondents perceived that the schools performed their role in addressing childhood obesity. Table 8 shows statement ratings about the school's role in the prevention and treatment of childhood obesity.

Most respondents perceived that they are role models in maintaining a normal weight, school nurses obligated to counsel parents about their obese children, and recommended weight loss. Table 9 summarizes the frequency of statement ratings regarding staff roles in the prevention and treatment of childhood obesity.

DISCUSSION

School environments are considered as an important setting to the development of eating behavior and physical activity of children due to the amount of time they spend here.[44,45] In the physical environment for nutrition, the findings of the study revealed the primary schools in Pateros served and offered a variety of packed and non-packed food and beverage products belonging to the yellow and red categories of the

Table 6. Number of Schools and Early Occurrence of Co-curricular and Extra-curricular Activities in Pateros, 2019 (n=5)

Grade Level	Co-curricular and Extracurricular Activities, Frequency (%)				
	Daily	At least once a week	At least once a month	At least once a year	Not at all
Sports-related activities	-	4 (80)	-	1 (20)	-
Dance-related activities	-	2 (40)	1 (20)	2 (40)	-
Exercise-related activities	5 (100)	-	-	-	-
Palarong Pinoy and other games	1 (20)	1 (20)	2 (40)	-	1 (20)

Table 7. Number of Schools and Estimated Level of Participation of Students in Co-curricular and Extracurricular Activities in Pateros, 2019 (n=5)

Type of Activity	Estimated Level of Participation in Co-curricular and Extracurricular Activities, Frequency (%)				
	Few	Some	Moderate	High	Very High
Sports-related activities (e.g., Basketball varsity)	-	4 (80)	-	-	1 (20)
Dance-related activities (e.g., Zumba)	-	2 (40)	-	-	3 (60)
Exercise-related activities (e.g., Stretching)	-	-	-	1 (20)	4 (80)
Palarong Pinoy and other games (e.g., Patintero, Chess clubs)	-	-	-	1 (20)	4 (80)

Table 8. Ratings of Statements about the School's Role on the Prevention and Treatment of Childhood Obesity in Pateros, 2019

Statements	Frequency (%)					
	n	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Schools are doing enough to help alleviate childhood obesity.	103	1 (0.97)	3 (2.91)	26 (25.24)	39 (37.86)	34 (33.01)
A comprehensive health curriculum with units on nutrition and weight control is available in every school.	103	1 (0.97)	9 (8.74)	32 (31.07)	37 (35.92)	24 (23.3)
Schools are able to eliminate "junk food" machines.	102	3 (2.94)	4 (3.92)	18 (17.65)	35 (34.31)	42 (41.18)
Schools are able to offer special low-calorie lunches.	103	2 (1.94)	2 (1.94)	22 (21.36)	50 (48.54)	27 (26.21)
Schools are able to offer onsite weight control treatment programs for students.	103	2 (1.94)	3 (2.91)	24 (23.3)	55 (53.4)	19 (18.45)
Physical education classes especially for overweight children are available in every school.	103	1 (0.97)	2 (1.94)	29 (28.16)	40 (38.83)	31 (30.1)

Table 9. Ratings of Statements about the School Personnel's Role in the Prevention of Childhood Obesity in Pateros, 2019

Statements	Frequency (%)					
	n	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I believe school personnel (i.e., admins, teachers, cooks, and health professionals) should be role models by setting an example as people who maintain their normal weight.	103	3 (2.91)	4 (3.88)	8 (7.77)	34 (33.01)	54 (52.43)
School nurses are obligated to counsel the parents of obese children concerning the health risk of obesity.	103	2 (1.94)	2 (1.94)	11 (10.68)	40 (38.83)	48 (46.6)
I usually recommend treatment for weight loss for all children who are obese.	102	2 (1.96)	4 (3.92)	16 (15.69)	42 (41.18)	38 (37.25)
I usually recommend treatment for weight loss only for children (or parents of children) who ask for help.	103	30 (29.13)	45 (43.69)	18 (17.48)	8 (7.77)	2 (1.94)
I usually recommend treatment for weight loss only for children with a health problem affected by their obesity.	103	30 (29.13)	48 (46.6)	13 (12.62)	9 (8.74)	3 (2.91)
I usually do not recommend treatment for weight loss.	103	25 (24.27)	25 (24.27)	17 (16.5)	20 (19.42)	16 (15.53)

Department of Education, while food and beverage products under the green category were less available and varied. This finding was similar to the study of Carter and Swinburn[42], wherein the most available food offered from the school were calorie-dense. In the current study, it was observed that the majority of students purchase food from the canteen via a food tray system facilitated by their teachers. A study done by Allirot et al.[46] concluded that early purchasing involvement of children was helpful in directing their food choices and familiarization of atypical foods. This would mean that children ordering food and beverages from the schools would not develop healthy food choices and will grow accustomed to products of low nutrient quality. Another point for discussion is the various food outlets around the immediate vicinity of the schools. According to a Mexican study, there is a positive statistical association between children's BMI and the number of mobile food vendors around the school.[19] Although the current study did not correlate the BMI values of the students with the number of food outlets outside the schools, it was observed that many ambulatory food vendors and sari-sari stores are present. These food outlets were offering a wide array of food and beverages that are calorie-dense, high in sugar and salt in nature. This would imply that the physical environment outside the school premises is another area for intervention in addressing obesity.

In terms of physical environment for physical activity, according to a study done by Naylor et al.[23] that physical activity time is considered the most prevalent influencing factor followed by resource availability and supportive school climate. This supported the notion that physical activity is important, and the longer and frequent the physical activity is done, the better is the effect in preventing childhood obesity as well. It was revealed in our findings that though the majority of the schools have means of space, resources, and equipment for physical activity, it was seen that dedicated time for physical activity and play are sparse and limited. These findings suggest that schools should allocate and/or implement supplemental physical activity programs to the school-aged children. This is in line with the strong influence of the physical environment to the weight maintenance of children.[20–22]

The political environment was measured through the presence of policies and its implementation. The study revealed that the present policies of the participating schools focused on promoting healthy diet with provisions targeting themes of a balanced diet, total elimination of unhealthy food inside the schools, limiting the marketing of unhealthy food inside and outside school. However, it was seen that the food and beverage products of the schools were classified under the product category wherein the schools must not

offer such items at any point in time. Also, it was observed that there were food advertising mediums with logos of different fast food chains present inside the schools. This was contrary to the policy, as it was stated here that any forms of food advertising including the brand name or logo of food and beverage products under the red category should be prohibited in schools. Several potential reasons for this non-compliance can be inferred from poor regulation and enforcement of policy and profit interest.[47] The lack of clear enforcement measures and consequences for non-compliance may contribute to the schools' nonadherence to the policy. This could also be compounded by the lack of dedicated health professionals like school nurses, doctors, and/or nutritionists in participating schools, who could potentially play a role in monitoring and promoting such obesity preventive policies. A study by Wang et al., suggests that the benefits of having a dedicated school health service, such as improved student attendance, increased teacher productivity, and reduced healthcare costs, outweigh the costs. The same study added that to fully realize these benefits, schools need to employ full-time registered nurses.[48] Currently, developing provisions such as the Senate Bill No. 663 (2016) and House Bill No. 7824 (2018) call to hire one nurse in every public school in the Philippines to ensure students' access to basic health services.[49,50] Although limited to the nursing profession, this is step forward for healthcare professionals to school-based service. Moreover, schools may prioritize financial gain from their canteens, leading them to offer popular, high-calorie foods and beverages that students prefer, potentially contributing to obesity. The financial incentive to sell red category items may outweigh the commitment to adhering to national policy.

Aside from this, policies on promoting the regular and recommended level of physical activity were highly anchored on the provision of physical education in the curriculum. However, the current study revealed that the total amount of time allotted for actual physical activity in physical education classes was less than 30 minutes at most once a week which is less than the recommended 60 minutes of moderate to vigorous intensity of physical activity daily for school-aged children.[51] These findings are aligned with Carter & Swinburn's[42] findings that schools' policy environment is strongly centered on the food services. Additionally, the findings of this study support the need to increase the allotted time for physical activity and accessibility to resources to ensure adequate levels and intensity in school children. Moreover, since the promotion of physical activity is greatly anchored on the curriculum, it is recommended that the subject for physical education be implemented to the children weekly and be separated from other subjects such as music and arts. This is because joint implementation of these three subjects affects the actual physical activity of the children as they must rotate implementation of each, preventing them from providing regular physical activity time. Hence, a comprehensive policy addressing inadequate physical activity may be recommended for lowering and preventing the prevalence of childhood obesity.

This study also found that the delivery of health services in all the primary schools sampled was through school health coordinators and the inadequate presence of health professionals. This is contrary to the findings of a study done by Racelis[52] which showed that almost entirely of schools with a large population employ a complete set of health personnel while schools with lesser population hire a doctor only or most of the time nurses only. The present study revealed that the participating primary schools, despite differences in student population, do not have hired medical professionals. These variations on implementation can affect the care received by primary students, thus should also be looked into.

The sociocultural environment for school-age children describes the attitudes, beliefs, and values of the people involved in schools towards nutrition and physical activity. Having role models may influence that of the children. It was seen in this study that most of the school staff regard themselves as role models by setting an example as people who maintain their normal weight. It was seen that school staff perceived normal weight is important to the health of children more so with the increasing prevalence of obesity, and that addressing obesity in childhood is better than addressing obesity in adulthood. Marks, Barnett, & Allender[53] reported that perceptions of childhood obesity prevalence, low stage of readiness, and limited school capacity may hinder obesity prevention strategies. However, the present study showed a high level of perception of competence in recommending weight loss programs for children, ability of children with obesity to address conditions with proper guidance, and counseling being professionally gratifying. This was contrasting to the findings of Price et al.[54] where there was low level of perceived competence in prescribing weight loss and low report of gratification from counseling.

These findings suggest that school staff have become confident in addressing childhood obesity with increasing knowledge from training on proper nutrition for primary students, food safety and healthy preparation techniques, and obesity prevention. Although it was seen that the respondents have a high level of perceived competence in addressing obesity, evidence from the physical and political environments showed poor practice in obesity prevention. Furthermore, it was noted that counseling parents and children about weight and weight loss was inconvenient, childhood obesity was not more amenable to treatment than adult obesity, and that guidance did not have enough impact on weight loss.[55] With these, it is recommended that the school health personnel, especially the school teachers, collaborate with the parents to address obesity. It is essential that the school teachers guide the parents of obese and overweight children in establishing a goal or target weight for their children, and determining and implementing necessary interventions to achieve such a goal. It is also recommended that additional training should be given to all the school staff about the specific criteria of

the food classifications, interpretation of food labels, and its application in their practice. The use of existing resources such as the Urbani School Health Kit can also augment the teacher's ability to integrate health education contents in their teaching-learning activities.[56]

The reported nutritional practices of public elementary pupils and teachers in Pateros showed a regular consumption of healthy food despite low level of knowledge on proper nutrition and an increased concern towards consuming healthy types of food.[57] Relating these results with this study, it is shown that the school environment offers unhealthy food more often than healthy ones. Students and teachers are consistently shown to have a high positive attitude towards nutrition and prevention of obesity but these attitudes do not appear to translate into action as daily concerns are narrowed to eradication of junk food alone, excluding the responsibility of maintaining the recommended salt, sugar, and fat intake.

The political environment of the schools also inadequately supplements the need to improve the low knowledge found on pupils in Pateros. In terms of policies on nutrition, the findings show the need for better implementation and adherence to the guidelines created by the Department of Education. Continuous monitoring of the environment, especially the sources of foods, would be recommended to improve the school's adherence. Lastly, comparing baseline data with latest data on the parameters for obesity such as height and weight of children will be useful in monitoring and evaluating the effectiveness of the strategies employed in schools.

Further research is recommended on the mediating factors affecting the different types of environment to provide a deeper view on how to improve the physical, political, and sociocultural environment for the prevention of childhood obesity. It would be substantial to focus on the different types of environment and examine the antecedents of the practices and perceptions revealed in this study to provide specific recommendations on improving the implementation of policies and programs of schools to address those affected and at risk for obesity.

Limitations of the Study

The findings of the study need to be interpreted considering its limitations. First, the findings are not generalizable to other primary schools, especially private schools other than those that participated in the study may it be in other cities or regions in the country. Primary schools who did not participate may have practices that are different from those reported in this study. Second, the use of self-administered questionnaires may render the calculated sodium, fat, and sugar content of the reported food and beverages inaccurate. Third, the authors did not describe the interactions and relationships of the environmental variables inside and outside of the schools as the study design is only descriptive. Fourth, the perceptions of school personnel on obesity prevention were subject to social desirability bias but this was minimized through triangulation using observation as a method. Additionally, the methodology of the study may be subject to observer bias but was minimized through regular cross checking among the research members during data collection to abide with set standards and objectives to ensure consistency.

CONCLUSION

The findings indicate that schools are eager to address childhood obesity, but the physical, political, and sociocultural environment does not seem to enable this. This situation may promote, rather than prevent, overweight and obesity among school children. The findings point to the need to support schools in the reorientation and implementation of policies on obesity prevention as well as developing the skills of both teachers and students in healthy eating and physical activity. School-based healthcare workers would have critical roles in supporting schools in this regard.

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Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

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