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## School Policies and Environment in Promoting Physical Activity and Nutrition toward Prevention of Overweight and Obesity among Primary School Age Children in Moshi Municipality, Tanzania

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### Abstract

**Background:** Currently, overweight and obesity are the most threatening problem to children; the prevalence of childhood obesity has increased worldwide in the past three decades. The aim of this study was to assess the school policies and environment on promoting physical activities and nutrition in primary schools in Moshi municipality.

**Methods:** This was a cross sectional study conducted in Moshi municipality. Multistage sampling was used to select participating schools. School policies were assessed through interviews with head teachers; information collected was on school policy, physical education and nutrition. School environment: playgrounds, competitive foods and sport equipment were assessed using an observation checklist.

**Results:** Tanzania has a well-defined school policy on physical education and science. School environments were conducive to allow different types of games to take place. 88% of the schools had playgrounds and 80% of the pupils from government schools were participating in physical activities, however in some schools the quality of playgrounds was poor in terms of size and environment. Surprisingly, in some private schools there were no play grounds at all. In all schools surveyed, there was a school lunch program with varied food stuffs. Competitive foods including fried foods, biscuits and candies were found either within or nearby school compounds.

**Conclusion:** Tanzania school policy on curriculum needs to be restructured to include physical activity practical sessions as recommended by World Health Organization (WHO). Nutrition subject with healthy lifestyle sessions need to be included in school curriculum to promote good lifestyle behaviors.

**Keywords:** Moshi Municipal; Overweight and obesity; Physical activity; Nutrition

### Introduction

Globally, in 2013 more than 42 million infants and young children were overweight with more than 2 standard deviations of weight for height according to WHO child growth standards. Approximately, 31 million of these overweight children are living in developing countries [1,2]. In Africa the prevalence was 10.3% the same year (2013), in which is expected to rise to 12.7% by 2020 [2]. This indicates a fastest growing trend of the epidemic among children in low and middle income countries [1].

Obesity is a serious health problem with long term consequences which increases the number of risks for noncommunicable diseases (NCDs). Childhood obesity is associated with increased risks of premature illness and death, high cholesterol levels and high blood pressure. Obese children experience breathing difficulties, increased risks of accidents such as fractures, hypertension, and early markers of cardiovascular diseases, insulin resistance and psychological effects [3].

### School policies in physical education and nutrition

Schools are important sites for prevention of obesity epidemic through provision of the best support to improve physical activity and healthy eating for children regardless of their ethnicity or socio demographic background [4]. Children spend most of their time in schools and with teachers than in any other environment away from home. Schools are

excellent venues for building skills that supports active lifestyle behaviors including opportunities to perform daily physical activity and learn the health benefits of regular physical activity [5].

Physical inactivity and poor dietary habits are the main contributors to the rising levels of childhood obesity. Studies highlighted the importance of school policies on physical education as a public health strategy to prevent the rapid emergence of obesity epidemic in school children [6].

A review on site specific policy and intervention to promote physical activity (PA) and nutrition in schools reported a significance increase in physical activity (PA) levels in school children through increasing opportunities for physical education (PE) classes and use of specialized PE teachers. Importance of nutrition education in school curriculum was emphasized as a strategy in shaping pupils eating behaviors [7,8].

In most developing countries, schools focus most on good test scores, and little effort is put on physical and nutrition education [9]. Ministry of education with teachers associations are the role models towards successful creation of healthy school environment [10].

### The role of school environment in physical education and nutrition

School environment has a role to play towards obesity prevention strategies by ensuring healthy food standards and physical activity

environment [10]. Healthy school environment need to facilitate PA such as provision of bicycle storage facilities, sports equipment such as balls, skipping ropes and play grounds. Strategies to promote healthy eating behaviors such as limiting sale of competitive foods within or nearby school surroundings should be considered, and enough time should be allowed for eating and recess [11].

Recent review on built in school environment and weight status in sub sample analysis of school children found an evidence of an association between weight status and school environment, this studies did not test for any possible confounders such as school type which might be also related to the change in weight status [12]. Another obesity review reported the importance of availability of play grounds and sport equipment in relation to obesity outcome [13], however it is not clear which built environment can provide promising results toward obesity prevention. Further longitudinal studies are recommended as a good approach to explore this relationship [13].

Advertisements and marketing of high calorie snacks or foods and sugary beverages within school premises was found to influence food choices and lead into preference of junky foods. Strong nutrition standards for foods and beverages sold in schools have been recommended as an important and promising strategy in prevention of obesity [14].

School children are exposed into low costs unhealthy foods with too much fat, too much sugar and salt, energy dense and micronutrient poor foods in school surroundings which make them to be at risk of overweight/obesity and other NCDs [15].

Early awareness of lifestyle risk factors is an important step for school children in prevention of NCDs, several studies have found an association between lifestyle and behavior patterns which are largely adopted right from young age, and evidenced prevalence of metabolic and cardiovascular risk factors among school adolescents. School policies should put efforts to support interventions at younger ages and make appropriate strategies to motivate children to make appropriate healthy choices and modifications [16].

The Tanzanian policy on physical education has changed several times over the years. In 70s and 80s there was PE as a subject and it was not examinable subject. In 90s with the change of administration the subject was completely removed from the curriculum. The curriculum was reintroduced again in 2005, but little is known if the curriculum is adhered by the primary schools in Tanzania. This study aims to improve understanding of the current curriculum in primary schools for supporting physical activity and nutrition.

## Methods

### Study design and study area

A cross sectional survey was conducted which involved an assessment of school policies on nutrition and environment. The study was conducted in Moshi municipality (urban) in Kilimanjaro region. The municipality is one of the seven districts in the region. The municipal has a large number of schools which are easily reachable. Specifically, Moshi municipality has a total of 48 primary schools of which 35 are public owned (government) and 13 are private.

### Study population and sampling

Multistage sampling was employed to sample schools from nineteen wards of the municipality. A systematic random sampling procedure was used to select different school categories that is, government and private/religious owned in each ward according to probability proportion to size (PPS). In total 25 schools were selected out of 48, of which 20 of them were government schools and five were privately owned.

Primary school head teachers/representatives were recruited from selected primary schools. Interviews were conducted on private room and lasted approximately 45 minutes. Head teachers reported on school policy and environment on nutrition and physical activity, and school environment was observed.

### Data collection methods and tools

**School policies and environment assessment questionnaire:** A pretested questionnaire was administered in Swahili (local language) for data collection. The questionnaire was developed from other instruments of the same nature used in previous studies to suit the Tanzanian context [17]. All study procedures were observed and approved.

**Observation of school environment:** School environment checklist was used to assess the availability of 1) street vendors and competitive foods: soda, sugary beverages and fast foods 2) Physical activity environments: outdoor play areas, sports grounds and sports equipment.

**Preparation for survey and training of research assistants:** Prior data collection, meetings were done with head teachers to set the date and time for interviews. Research assistants underwent one-day training prior fieldwork focusing on data collection and interviewing techniques.

**Reviewing school policies:** School policy documents were reviewed basing on curriculum and school timetables on physical activity and nutrition.

### Statistical analysis

Analyses were performed by using STATA IC version 12.1 (Stata Corp, College Station, TX, USA). Descriptive analysis was done on general school characteristics, availability of play grounds and equipment, competitive foods and opportunities for extra curricula activities.

## Results

### Prevalence of overweight and obesity

Overall, the prevalence of overweight and obesity was 7.4%. The prevalence varied from government and private schools, with private schools being higher (18.6%) than in government schools which were 4.8%.

### Availability of school policies in physical education and nutrition

The policy on curriculum for physical education and science (nutrition) is available in primary which entails different topics to be covered. Physical education curriculum includes specific topics on Personality, development and sports (PDS) while science includes health topics and nutrition as a subtopic. All surveyed schools have similar curriculum which addresses same topics allocated in their yearly timetables.

In Tanzania, PDS (Haibana Michezo) involves mostly theoretical part with limited physical exercise. PDS is taught in all classes, aiming at increasing knowledge on benefits of physical activities, build competences and positive behavior among pupils of Tanzania. In PDS, the time allocated for physical activity (practical sessions) is short 30–80 minutes per week for lower classes, and 60–80 minutes for higher classes. Nutrition subtopic in science subject is also taught from all classes. The aim is to help pupils to maintain good health and understand the importance of balance diet.

**Availability of trained teachers for physical education and nutrition:** In all schools surveyed, only 5 (22%) had trained teachers for physical education who either attended a short course or received on job training. Ten schools (43.5%) reported to have trained teachers for science with some topics in nutrition.

**Assessment of physical education and nutrition:** Formal assessment was reported for both subjects. Pupils are supposed to understand the

importance of physical activity and describe different games through a written examination. There is no practical assessment while pupils are playing to monitor their skills and involvement, and also there is no health promotion message on healthy eating.

### School environment on physical activities and nutrition

**Grounds and equipment:** Eighty-eight percent of schools had playgrounds within school premises. Football (76%) and netball (56%) grounds were the most common in almost all schools. However, some playgrounds were not conducive to support some types of games to take place. Some grounds were of poor quality with rocks and the size was limited to accommodate all pupils.

Availability of equipment for football also mirrored the availability of grounds with 76% of the schools observed to have balls, nets or posts. Teachers reported that pupils do come with their own balls, or make balls using local materials.

A third of the schools (32%) had a designated area for parking bicycles; however students are not allowed to use the bicycles at school. Some schools do not allow pupils to come with bicycles due to lack of cycling paths which increases the risk for accidents (Figure 1).

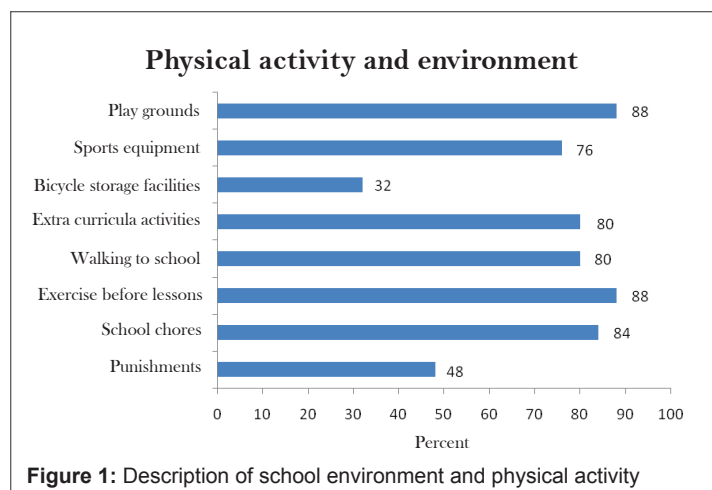
**Extra curricula activities:** Most of schools (88%) start with brief morning exercises before classes such as parade, running/‘mchakamchaka’, and aerobics before classes. Teachers reported that their pupils participate in inter school competition and sometimes between classes.

Some schools reported to have clubs for different physical activities. Football, netball, tradition dances (ngoma), choir, school band and wrestling were among the mentioned clubs for physical activity.

Teachers from government schools reported on school chores which make pupils to exercise which includes; cleaning the school surroundings, gardening, mopping, and watering flowers. However, punishments such as pushups, squats, running around the block of buildings, watering flowers or digging waste disposal pits were used as a form of exercise by 48% of the government schools.

Most pupils spend their recess time for playing different types of games. For example, most of the girls were engaged in skipping ropes while boys were involved in football.

**Transport to school:** Nearly 80% of the pupils from government schools walk to and from schools. In contrary, most of the pupils (90%) in private/religious schools are brought to schools by the school buses.



### School environment and nutrition

**Provision of lunch, fruits and vegetables at schools:** All schools had school lunch program with varied types of foods. In government schools mostly consumed food is stiff porridge ‘ugali’ with beans and/or meat, or traditional food called ‘makande’ which is a mixture of beans and maize. In private schools there was a wider variety including; makande, rice with different sauces, potatoes with sauces and spiced rice ‘pilau’.

Consumption of fruits and vegetables varies from school to school. In general, 24% of schools provided with fruits and vegetables once or twice a week. Fifty two percent of schools provide only vegetables with lunch once or twice a week without fruits; and 40% provides vegetables every day.

Seven schools (28%) have a well-structured and modern dining room for lunch while others use classrooms or eat outside during lunch time. All schools had safe drinking and hand washing water facilities.

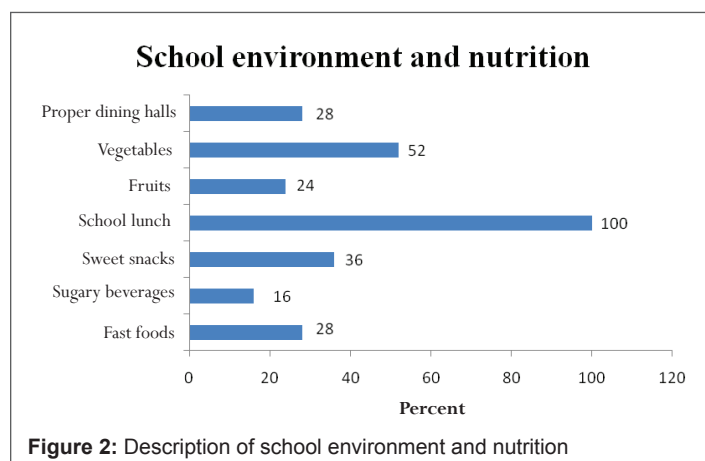
**Competitive foods and marketing advertisements:** Fast foods such as chips, fried cassava, samosas, fried bananas, sugary snacks and beverages such as doughnuts, biscuits, candies, sweetened juices were sold in all schools. However, none of the schools had misleading or marketing advertisements on high energy nutrient dense and fast foods, or sugary drinks within the school environment. Some pupils were buying these foods from street vendors during break time (Figure 2).

### Discussion

This study gives an insight of the current situation of the school policy on physical education and nutrition in primary schools’ curriculum of Tanzania. Our findings indicated that, the school policy (curriculum) is implemented in both government and private schools. School policy on physical education and healthy eating has been recommended in other studies as one of the promising strategy in decreasing rates of overweight and obesity in school children [18].

School lunch program is a strategy which is practiced in all schools in Tanzania to prevent short term hunger for pupils during school hours. Despite of the government effort to maintain the school lunch program, provision of fruits and vegetables everyday was below the recommended guidelines. Findings from similar studies indicated that, healthy school meals including fruits and vegetables, and promoting healthy food choices are the key towards promoting healthy eating behaviors [19].

The findings confirmed that, in some schools, the environment was conducive with sports fields to facilitate physical activities. However, the time allocated for physical activity in Tanzania primary schools is inconsistency with the recommendation from WHO (60 minutes of moderate to vigorous physical activity daily) [20].



It was observed that; physical activity levels were higher than expected for most of the pupils especially in government schools. Historically, in Tanzania pupils used to walk to school and until today this behavior is still practiced and maintained by most of the pupils especially in government schools which help them to compensate the daily activity levels. However, most of the government schools are within communities which make it easier for pupils to walk to and from school for less than 15 minutes a day.

The study observed that, extra time for physical activity in government schools is compensated during recess and other opportunities for extra curricula activities. Although extracurricular activities are done, they are not organized in such a way we are sure every student is involved. Similar observation was reported in United States that apart from structured physical activity sessions pupils spend some of their recess time for maintaining their physical activity levels [21].

Competitive foods like sugary snacks and beverages which were found in some school surroundings increases the pupils' choice of unhealthy snacks (poor eating behaviors). Several studies reported the availability and accessibility of sugary beverages within school surrounding led to increase consumption of those drinks, and recommends on policy restrictions for the sale of any unhealthy drink or foods within school environment [22].

This study has some limitations. The adequate policy implementation and environment on physical education and nutrition observed in visited schools does not reflect the real situation of the region as a whole; as these schools are located in urban areas. However, the levels of physical activity and vegetables and fruit intake might not represent the actual situation, as our study did not focus on home environment where these children belong, and this makes difficulties in understanding what was happening after school hours. It is therefore difficult to generalize our findings with regard to these aspects.

In conclusion, combining nutrition and physical activity interventions will help pupils to change their lifestyle behaviors (balance the caloric intake and energy expenditure). There is a need to evaluate level of physical activity among students to corroborate if what was observed at school level reflects individual pupils. Many studies recommend on the importance of school policies in prevention of childhood overweight and obesity. More research is needed to evaluate on whether these fairly limited school policies are likely to have much of an effect on preventing the overweight and obesity epidemic, and assessing on whether tackling school children is an effective preventive strategy.

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