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Relationship between Childhood Obesity and Pupils' Participation in School Physical Activities in Lower Primary Schools in Nairobi County, Kenya

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Obesity is a condition of abnormal or excessive fat accumulation in the adipose tissue to the extent that health may be impaired. Globally it is estimated that approximately 155 million children are obese. Studies have also revealed that childhood obesity has become a serious health epidemic, where more than a third of children aged 2-19 years are obese. The purpose of this study was to investigate the relationship between childhood obesity on pupils' level of participation in school physical activities. The study objectives were to establish the prevalence of childhood obesity among pupils in lower primary schools and its influence on pupils' participation in physical activities among grade three pupils in Kasarani Sub County, Nairobi County. The study was guided by the Looking Glass Self Theory that was developed by Charles Horton Cooley. A mixed-method study design was employed. The target population was headteachers, teachers and grade three pupils in Kasarani Sub-County. Simple random sampling and purposive sampling techniques were employed to select the sample schools and pupils, respectively. Interview schedules, anthropometric datasheets and questionnaires were used to collect data. Data were analysed by both qualitative and quantitative procedures. The findings showed that the prevalence rate of childhood obesity was 11.6 %. The findings also indicated that childhood obesity had no statistical significance on the level of participation in physical activities.

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INTRODUCTION

Good nutrition can contribute to healthy children, who are generally productive in different aspects of life. Good nutrition is therefore very important for any country's general development, this is because children with good health tend to perform well in school learning activities this would result in adults who are brilliant, dependable and productive socially, economically, and in other aspects of life (Kovacs et al., 2018; Li et al., 2013; Onywera, 2010; Slowik et al., 2019). Obesity being one of the nutritional childhood illnesses, may hinder a child from achieving this. Studies further report that the environment in which the child lives generally determines the food patterns and quality of nutrition consumed (Davison et al., 2015; Ochoa-Aviles et al., 2017; Pearce & Langley-Evans, 2013; Truesdale et al., 2019). Each household thus plays a key responsibility in feeding a child; therefore, the kind of food offered to the child influences the nutritional health of a child objectively. Patro and Szajewska (2010) further reported that a high intake of energy foods and refined foods might predispose an individual to obesity. Similarly, the provision of too many snacks has been largely associated with increased rates of obesity (Azadbakht, 2016; LeCroy et al., 2019). Therefore, there was a need to ensure that children are free from childhood obesity by ensuring that proper nutrition and an active lifestyle are observed both at school and at home.

Obesity is a health condition where an individual has abnormal or excessive fat accumulation in the adipose tissue which may impair a person's health. Childhood obesity is also defined as a Body Mass Index at or above the 95th percentile for children of the same sex and age (Putre, 2013; Schantz, 2010; Wijnhoven et al., 2015). To assess a child's body

weight, the BMI of the child has to be measured. BMI is calculated using a child's weight and height. A child's classification of body weight is then established based on age and gender percentiles. Hence, the BMI for children was measured to establish the prevalence of obesity among the sampled population

Globally, childhood obesity has recorded increasing rates over the years. It is becoming a global epidemic according to Wijnhoven et al. (2014). Similarly, as stated by Ogden and Flegal (2010), the likelihood of childhood obesity continuing into adulthood is estimated to have increased from 20% at 4 years of age to 80% by adolescence. The increased rate of obesity among children in recent years involves both its prevalence and development at earlier ages leading to increased occurrence of other lifestyle illnesses such as cardiovascular diseases, diabetes mellitus type 2, and hypertension (Beynon & Fone, 2017; Gomez-Pardo et al., 2016). Further, studies have reported that obesity is also associated with diseases such as insulin resistance, hyperlipidaemia, respiratory problems, hypertension and orthopaedic complications (Alissa et al., 2017; Kaneko et al., 2011; Pastucha et al., 2010; Raghuveer, 2010; Roy, 2017; Savino, Pelliccia, Chiarelli, & Mohn, 2010; Thiruvengadam et al., 2015). The current study, however, focused on the trends in obesity among young children and not related illnesses.

Research studies have also reported that obesity affects not only the health of a child but also the school's learning processes. Morita et al. (2016) complemented this by stating that both young children and adolescents that are obese score generally low in test scores than those of average weight. Obese children due to issues with weight

may participate less in physical activities and register frequent absenteeism that may affect their learning achievement (Anwar et al., 2010; Arora et al., 2012; Bhargava, Kandpal, & Aggarwal, 2016).

Children should generally be encouraged to be physically active at all times; if they are physically inactive, childhood obesity increases as well, and proper nutrition is also advised (Bhargava et al., 2016). Within the past 20 years, rates of obesity in children have doubled, and currently, according to research, one in three children is either overweight or obese (Kristensen et al., 2014). Research further indicates that childhood obesity may also affect cognition and therefore academic achievement and other school learning activities' performance (Hayes, Eichen, Barch, & Wilfley, 2018; Knai & McKee, 2010; Martin et al., 2018); this includes participation in physical activities (Eichen, Barch, & Wilfley, 2018; Knai & McKee, 2010; Martin et al., 2018).

Regionally, high trends of childhood obesity have also been observed, an indication that Africa has similar issues (Adom et al., 2017; Muhihi et al., 2013; Musa, Toriola, Monyeki, & Lawal, 2012; Timaeus, 2012). For instance, in a study conducted among pre-school children from several African countries, it was reported that South Africa had a prevalence rate of 31.9%, Algeria 21.6%, Seychelles 25%, Malawi 8.4%, Mauritius 5.6% and Kenya 4.6% (Aballa, 2010). Similarly, locally done studies have reported that in Kenya, there has been an increase in levels of overweight and obesity (Muthuri, Wachira, Onywera, & Tremblay, 2014), in the study, pre-schoolers were tested and it was established that 18% of pre-schoolers were overweight while 4% are obese. However, we still have limited representative data available in African countries on these trends in childhood obesity (Rodgers, Dietz, & Lavizzo-Mourey, 2018). Therefore, the need to establish prevalence rates of childhood obesity objectively necessitated this study.

One key focus area of Kenya Vision 2030 is the health sector, and most importantly, to improve the overall livelihood of each Kenyan by providing efficient, high quality and affordable health care services with the priority being preventive care at the community and family level. As such,

addressing prevention measures for childhood obesity falls well within this vision, Kenya's Report Card on the Physical Activity and Body Weight of Children and Youth (2011).

Statement of the Problem

Good nutrition is fundamental for the survival, health and development of all human beings. Children who are well-nourished perform better in school, later grow into healthy adults and in turn, give their children a better start in life. Nutritional status is a major factor that can affect the learning achievement of school children (Moon, 2020; Yin et al., 2012). Similarly, according to Rush et al. (2016), nutritional status in school-going children has always had significant adverse effects on school progress. Obesity is a nutritional disease among children and may, therefore, affect children's learning achievement in school including their participation in physical activities as well as attendance (Learmonth et al., 2019).

Obesity has equally become a public health concern in Kenya, especially among children living in urban areas (Muthuri et al., 2014). This could be attributed to the changes in lifestyle; for instance, many children seem to have shifted from being physically active to a sedentary lifestyle, with many changes in their diet (LeBlanc, 2016; Pirgon & Aslan, 2015). Food mostly eaten are carbohydrates and fats, which provide more calories than what is needed in the body. The current study was, however, not exploring causes of childhood obesity, but rather, its influence on children's level of participation in physical activities at school.

Studies further report that in Kenya, there is a lack of obvious national representative data on the prevalence rates of childhood obesity and levels of participation in physical activity among school-going children. Few studies are not nationally representative and have further revealed that prevalence rates of childhood obesity are on the increase due to inadequate physical activity levels, especially among children living in urban areas (Muthuri et al., 2014). For that reason, the current study was done in an urban area.

The study sought to establish the prevalence rate of childhood obesity among pupils in lower primary schools in Kasarani Sub County and to find out the

relationship between childhood obesity on pupils' participation in physical activities among pupils in lower primary schools in Kasarani Sub County.

THEORETICAL FRAMEWORKS

The study was guided by the looking-glass theory by Charles Horton Cooley (1902). This theory was developed by Charles Horton Cooley (1902). The concept of the looking-glass self demonstrates that a child's self-relation and how the child views oneself is dependent on others' perception of them too; thus, many studies state that a child who is obese will view self-dependence on how he/she is perceived by others, either positively or negatively. Cooley further states that people have an inborn way of interacting with other people within their environment.

The theorist suggested that this self-feeling and social feeling should be harmonised as it may have effects on how such a child socialises and plays freely with other children. ; An obese child who believes that others view him unfavourably tends to either withdraw from activities such as outdoors physical and general play activities or may portray aggressive behaviour towards others.

Similarly, an obese child that feels that the social environment is being judgemental of his or her weight will have a problem with his or her body image, thus, may not be present and willing to participate in physical/play activities and interaction with others will be unhealthy one; just like a looking glass, perceptions tend to reflect reality.

For a child having a negative perception of his or her social environment, self-stigmatisation would crop in, which may lead to a child's unwillingness to participate in physical activities and deliberate absenteeism from school to evade such stigmatisation (Puhl & Moher, 2009). This unwillingness to participate in such activities may lead to increased rates of obesity due to lack of or less involvement. These mental perceptions have three principal elements; these are; i) the mental image we have of our appearance to other people; ii) the thought of one's judgement of what is seen; iii) self-feelings such as pride or shame.

In a nutshell, an obese child who is psychologically unstable in his or her social system may be affected

in his/ her general learning and academic performance either negatively by having low self-esteem in everything done or by withdrawing from the social domain, such as absenteeism at school or participation of physical activities. This is why this study focused on the influence of childhood obesity and the level of participation in physical activities in school.

RESEARCH DESIGN AND METHODOLOGY

Study Area

Nairobi is the smallest County in Kenya and covers an approximate area of 693 square kilometres. Nairobi is cosmopolitan and has purposely been chosen because obesity is rampant in urban areas and the presence of a variety of people with varied social, cultural, economic and religious backgrounds there. The study was conducted in public schools within Nairobi County, specifically in Kasarani Sub-County.

Research Design

The researcher employed a descriptive survey research design because it helps to draw valid general conclusions from the findings discovered. Ader (2008) also describes a descriptive survey as a collection of data to test hypotheses or to answer questions concerning the subject of the study. A descriptive survey design has been chosen because it is appropriate for finding out facts and also yields a great deal of information that is accurate. The current study aimed to gather accurate information concerning the prevalence rates of childhood obesity and the level of participation in school physical activities among lower primary school pupils.

The study investigated dependent and independent. The independent variable was the level of involvement in physical activities at school. The dependent variable was the presence/ prevalence rate of obesity. This was established by measuring the BMI of children in grade three in the sampled schools. This was accurately obtained against the gender, age, weight and height measurements of the children.

Target Population

The target population comprises 25 public primary schools in Kasarani Sub County and entails grade three pupils inclusive of both genders. Grade three class level was selected because children at this level are in a position to explain themselves more accurately on how they view their body images, whether favourably or unfavourably, and their willingness to participate in physical activities. The class teachers of the selected classes were also included in the sample as key respondents.

Sampling Techniques and Sample Size

The study was concerned with establishing the influence of childhood obesity on pupils' level of participation in physical activities in a lower primary school in Nairobi County, Kasarani Sub County. Purposive sampling was used to select Nairobi County and Kasarani Sub County. As for the schools in respective educational zones, multi-stage sampling was employed to select the schools and participants. The multi-stage sampling technique also allowed the purposive selection of the study schools and the participants. For a relatively large population, Sutter (2011) suggests that the use of a 30% to 60% sample of the total population is appropriate in education-related studies. Therefore, purposive sampling was used to select 30% of the total number of schools and children to be involved in the study. The schools were numbered and then simple random sampling was used to select 30% of the schools expected to be sampled. One class teacher per school was included in the study. Besides, all head teachers from the sampled schools were included in the study.

The sample size of this study was four schools in Kahawa educational zone and four schools in Ruaraka educational zone. Eight teachers for grade three from each sampled school were thus selected.

Research Instruments

The researchers used multiple data collection tools, this was to minimise the weaknesses and limitations of both qualitative and quantitative research studies. The research instruments that were used for the collection of data were interview schedules for headteachers; to determine the various types of

sports and games children were involved in and types of food carried by children and types of foods prepared at the school if they had a school feeding program and grade three pupils to determine their level of participation in specific physical activities. Questionnaires were administered to grade three teachers to provide more information on the level of involvement in the physical activities of the children. The weights and heights of children were taken and recorded on the anthropometric datasheet to get the pupil's BMI, where the pupil's height was taken using a height board. The child was expected to remove excessive clothing such as heavy cardigans and then stand on the weighing bathroom scale, the measurements of weight and height were read concurrently. These measurements were recorded twice to cater for any arising errors and also ensure accuracy.

Data Collection and Analysis

The researcher used interview schedules, questionnaires, and anthropometric measures datasheets as data collection techniques. Data collection procedures included getting an introductory letter from the University to authorise the data collection process. This was presented to the Kasarani Sub County Education headquarters' office. The county director then helped by providing information about the list of all public schools around, this thereafter informed the researcher on the selection of specific schools to be included in data collection before the collection of data. This also helped in planning ahead of time by visiting the schools in advance and planning accordingly. Data analysis was done using Statistical Package for Social Sciences (SPSS) version 20 to analyse the anthropometric data to determine the BMI, which was graded according to (WHO, 2000) age-specific cut-off points for age and gender to analyse the relationship between variables under study. Relationships between the variables were tested using chi-square and Pearson's Product Moment Correlation. Qualitative data were summarised according to similarities and common themes and were used to complement the quantitative information. Analysis of the qualitative interview data involved was also analysed into various defined themes according to the interview schedules and questionnaires in line with the study objectives into a written format, coding and then entry of the

data into a computer database. Inferential statistical analysis was involved in testing all relationships at a 0.05 level of confidence and the probability value was established using SPSS. The analysis also involved a discussion summary, presentation (chart, pie chart and tables) as well as appropriate content analysis.

Logistical and Ethical Considerations

A letter from the University authorising the collection of data was obtained, and a permit was issued by the National Council for Science and Technology (NACOSTI) as a requirement by the Ministry of Higher Education, Science and Technology. Permission to collect data was sought from Kenyatta University Graduate School, Nairobi City Council and the Ministry of Education by obtaining an introduction letter from the County Education Director, Kasarani Sub-County. Research participants were assured that they had the right to pull out from the study research at will if they felt like they wanted to withdraw at any point in the research process. In the event of withdrawal, the researcher would replace the participant from the sampled school through a simple random

sampling technique. Safeguarding participants' protection was in full disclosure of the intention of the study to them besides the approval by the County Director of Education, the Parents, Headteachers and the Teachers. The researcher sought informed consent from the entire research participants, namely; the parents, the headteachers, grade three teachers and the Sub-County Director officer. The researcher informed the participants that it was their right to raise any information or queries and complaints regarding their participation in the research either personally or through their teachers for pupils. The participants were also informed accordingly on any information that came up in the course of the research and which was pertinent to their participation in the research.

RESULTS AND DISCUSSIONS

Prevalence Rate of Childhood Obesity

The BMI of the respondents was also established for accurately categorising the participants. This involved establishment of the following categories; obese, overweight, normal, moderate underweight and underweight. As presented in *Table 1*.

Table 1: Prevalence of Obesity in the Study Population

BMI	Frequency (n)	Per cent (%)
Obese	34	11.6
Overweight	51	17.3
Normal	185	62.9
Moderate underweight	20	6.8
Underweight	4	1.4
Total	294	100.0

Data collected were categorised according to the accepted age-specific cut-off points for children (WHO, 2002). For BMI to be done accurately, the age, gender and weight of the respondents were taken and computed; thus, the frequency levels of the 294 participants were analysed in different BMI categories of weight, and their respective percentages were computed. *Table 1* therefore revealed that 34 (11.6%) of the population was obese, 51 (17.3%) overweight, 185 (62.9%) normal, 20 (6.8%) moderate underweight and 4 (1.4%) were underweight. In a research study done in Kenya by Aballa (2010), the prevalence rate of obesity among school-aged children was found to be 25.6%. These

findings had a higher prevalence rate compared to the current study, which was at 11.6%. Despite the current study rating lower than the findings of Aballa (2010), obesity prevalence is still high.

In another study research done in Nairobi by the International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE, 2013), it was reported that 14.4% of the population were overweight, and 6.4% of them turned out to be obese. These findings recorded a low rate compared to the current study, a further indication that obesity prevalence in Kenya is still on the rise.

Prevalence Level of Obesity Based on Gender and Age

Obesity related to the gender of the respondents who participated in the study was established. The results are presented in *Table 2* below.

Table 2: Prevalence Level of Obesity Based on Gender

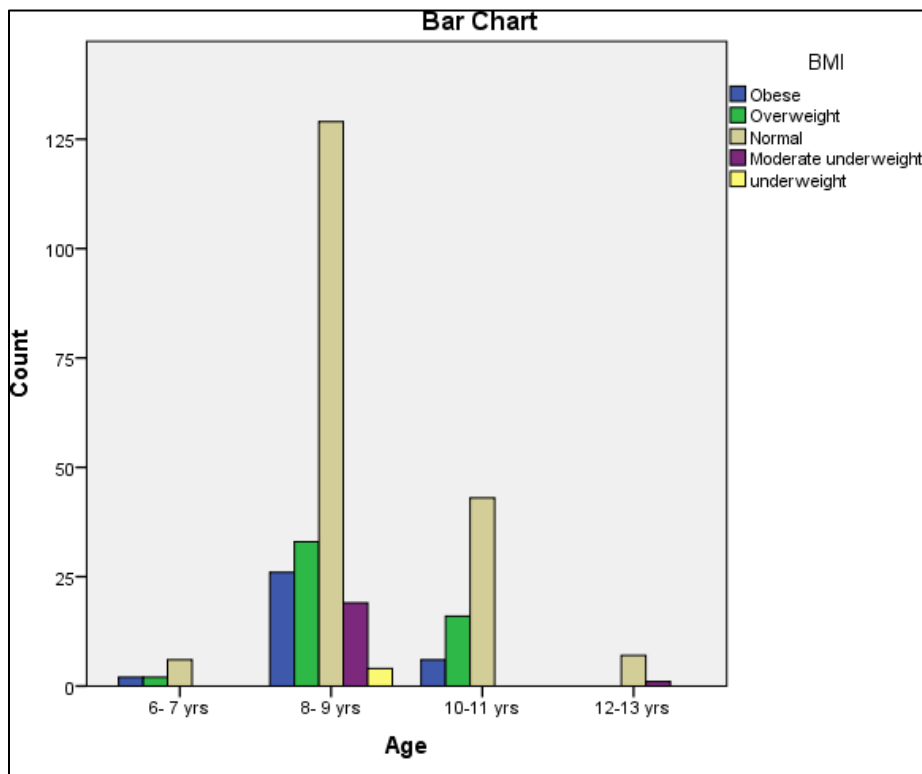
Gender	BMI						Total
	Obese	Overweight	Normal	Moderate Underweight	Underweight		
Male	n	20	27	92	10	1	150
	%	13.30	18.00	61.30	6.70	0.70	100.00
Female	n	14	24	93	10	3	144
	%	9.70	16.70	64.60	6.90	2.10	100.00

The findings in *Table 2* showed that 20 out of 150 boys were obese at 13.3% (with a BMI of 58.8%), while 14 out of 144 girls were obese at 9.7% (with a BMI of 41.2). A study done by Malla (2004) among pre-adolescents in private schools in one division in Nairobi Province, Kenya, contradicted these results since the prevalence of obesity in the study was 38.1% with more girls being obese than boys; a sample of 120 was used. The current study, therefore, differed since boys had a greater percentage comparatively on obesity values and the prevalence rate was also less by 16.5%.

In another study, the prevalence rate of obesity among school-aged children was also found to be 25.6% with more boys (27%) being obese than girls (26%) Aballa (2010). The findings thus concurred with the current study because boys' prevalence rate was higher at 13.3% compared to girls' at 9.7%, although the prevalence rate was lower by 14% comparatively.

Obesity related to the age of the respondents who participated in the study was also established. The results are presented in *Figure 1* below.

Figure 1: Prevalence Level of Obesity Based on Age



The findings show that the age category of the respondents ranged between 7-13 years. According to the findings, the mean age of respondents was 9 ± 1 years. Findings further reported that the age category of between 6-7 years was obese at 20.0%, between 8-9 years category 12.3% were obese, between 10-11 years category 9.2% were obese, and between 12-13 years category, none of the respondents was obese. Subsequently, respondents in the age category of between 6-7 years had a greater percentage, while those between 12-13 years had none of the pupils falling into the category of obesity.

According to Ogden, Carrol, Curtin, McDowell, Tabuk and Hagan (2006), it was reported that as children grow older, so is the likelihood of their ratings falling under the obesity category. These findings, however, differ from the current study

since the trend implied that the younger the pupil, the more likelihood of being obese and not the older child, as implied by the previous study. This could likely be attributed to the fact that young children are less active comparatively due to their inability to be vigorously engaged in most physical-related activities to older children whose growth and development give them an upper hand in their advancement in engagement in most physical activities, hence reduction rates in childhood obesity.

Prevalence Level of Obesity Based on Height and Weight

Obesity related to the height of the respondents was established to be able to categorise individuals in their respective BMI cut-off points accurately as presented in *Table 3* below.

Table 3: Prevalence Level of Obesity Based on Height.

Height		BMI					Total
		Obese	Overweight	Normal	Moderate Underweight	Underweight	
111-120 cm	Count	5	1	17	2	0	25
	% within Height	20.0	4.0	68.0	8.0	0.0	100.0
	% within BMI	14.7	2.0	9.2	10.0	0.0	8.5
Above 121 cm	Count	29	50	168	18	4	
	% within Height	10.8	18.6	62.5	6.7	1.5	100.0
	% within BMI	85.3	98.0	90.8	90.0	100.0	91.5
Total	% within BMI	100.0	100.0	100.0	100.0	100.0	100.0

The height of the respondents ranged between 113 (the least height in centimetres) to 150 centimetres (the highest measurement in height). According to the findings, the mean height of the respondents was 132.3 ± 7.3 centimetres. Respondents under the category of 111-120 cm that were obese had 20% (with a BMI of 14.7%), while the category of 121cm and above of respondents who were obese had a 10.8% (with a BMI of 85.3%).

The findings, therefore, imply that the taller the child was the least likelihood of falling under the obese category and the opposite was true. Contrary

to the current study, it was reported by Freedman, Khan, Ferula, Dietz, Srinivasan & Berenson (1939) that the height of an individual is somewhat dependent on the person's current body fatness and weight. That study further stated that the height of an individual has a consistent positive association with obesity status

Obesity related to the weight of the respondents was also established. This has been presented in *Table 4* below.

Table 4: Prevalence of Obesity Based on Weight

Weight		BMI					Total
		Obese	Overweight	Normal	Moderate Underweight	Underweight	
15-19 kgs	Count	0	0	2	1	0	3
	% within weight	0.0	0.0	66.7	33.3	0.0	100
20-24 kgs	Count	0	1	30	16	4	51
	% within weight	0.0	2.0	58.8	31.4	7.3	100
25-29 kgs	Count	3	8	75	3	0	89
	% within weight	3.4	9.0	84.3	3.4	0.0	100
30-34 kgs	Count	5	8	59	0	0	72
	% within weight	6.9	11.1	81.9	0.0	0.0	100
35-39 kgs	Count	16	30	17	0	0	63
	% within weight	25.4	47.6	27.0	0.0	0.0	100
40-44 kgs	Count	5	4	1	0	0	10
	% within weight	50.0	40.0	10.0	.0	0.0	100
45 kgs +	Count	5	0	1	0	0	6
	% within weight	83.3	0.0	16.7	0.0	0.0	100
Total	Count	34	51	185	20	4	294
	% weight	100	100	100	100	100	100

The weight of the respondents ranged between 19-49 kgs. According to Table 4, the mean weight of respondents was 30.3 ± 6.6 kgs. The findings further showed that the respondents in the category of 15-19kg, 20-24 kg, 25-29kg, 30-34kg, 40-44kg and above 45kg had 0%, 0%, 3.4%, 6.9%, 25.4%, 50% and 83.3% respectively in the obese category.

The results thus implied that the heavier a pupil was, the more likely he/she fell under the obesity category. This was because pupils that were

categorised to be weighing above 45 kgs rated at 83.3%, while those that were in the category of between 15-19 kgs had none of the respondents falling under the obesity category.

Association of Childhood Obesity to the Level of Participation in School Physical Activities.

A correlation between childhood obesity and the level of participation in physical facilities was established, as presented in *Table 5*

Table 5: Association of Obesity to Level of Participation in Physical Activities

BMI	Correlation	95% CI	p-value
Activity	-0.0790	0.0420 to -0.2040	0.1750

There was a significant negative correlation between BMI and level of participation in physical activities among grade three pupils ($r = 0.0790$ -, 95% CI 0.0420 to -0.2040: $p = 0.1750$). This study contradicts the study done by John & Hill (2003) who reported that obese and overweight children are usually less active in sports and games than children with normal range weight because of their BMI, as there is no association between obesity and level of participation in physical activities.

CONCLUSION

First, obesity prevalence was at 12%; more boys were obese compared to girls at 20% and 14%, respectively. It was also ascertained that all respondents that were obese had no issue relating with others and enjoyed being engaged in physical activities, contrary to many studies that state otherwise. It was also noted that when asked to state their best food, the majority of obese children preferred the intake of proteins (meat -both white and red and beans), carbohydrates (ugali, rice and

chapati) and chips. This could be the reason why they were obese because too much of the above-mentioned food is not healthy.

Secondly, all the respondents needed to be involved in physical activities in all selected schools as per their school directives. It was also noted that a majority of the obese children interviewed listed athletics, football and dancing as their favourite sports and games, and only a handful preferred indoor games such as play station-related activities. The findings also reported that the heavier the child weighed, the greater the chances of being obese. Similarly, respondents who weighed 45 kgs and above had 83.3%, while none were registered obese in the category of between 15-19 kgs and 20-24 kgs, respectively. Physical Education lessons in all the sampled schools were allocated in the school timetable and all pupils were required to be actively involved in all activities scheduled for that particular lesson. Physical education lessons were therefore compulsory, ensuring every child participated in at least one game or sport. It was also established that there was no association between the engagement of a child's physical activities and their weight; therefore, other factors could be contributing towards a child being obese other than their level of physical activities.

Third, all the schools sampled had at least four outdoor physical facilities. All of them, being public schools, had an adequate playground to cater for all pupils. However, it was also noted that despite most schools having play facilities such as slides and climbing frames/ ladders, among others, these facilities were majorly meant for pre-school and grade one pupils.

Recommendations

Therefore, based on the findings of this study, the following recommendations were drawn for different key stakeholders to take part in:

Teachers should spearhead advocacy for childhood obesity. The school could be doing BMI checks, possibly termly, and where needs are communicated to parents of children with obesity or those under the overweight category.

Schools should also promote physical activity by incorporating a variety of recreational activities and

more time and make it compulsory for every child to participate in any game or sport. During P.E lessons, children should be allowed to go out and be guided through the lesson by a teacher. School feeding programs should also be encouraged in all schools, and meals provided be balanced if possible. Fatty foods and those very rich in carbohydrates should be minimised.

Nutritional health education should be provided to both parents and children to create awareness of good nutrition and wise choices when selecting meals and snacks. For those parents that pack snacks and meals for their children, healthy snacks such as fresh vegetables, whole fruits, milk and its products, fresh fruit juices, sandwiches and sugar-free biscuits should be encouraged. Parents should also encourage their children the consumption of water all through the day.

Parents should also be educated on being advocates of common school feeding programmes about the provision of healthy food to their children at school; for that reason, total support on their part is paramount.

The School Management Boards (SMBs) should be tasked to organise education awareness meetings and workshops for other community members and parents. This will help them understand the importance of preventing childhood obesity based on its negative implication on children's growth and development.

The Ministry of Education should facilitate the integration of health education in the curriculum as one of the major subjects in schools, for example, the re-introduction of home science, where proper nutrition will be taught at length. This will also be for equipping teachers and parents with knowledge on good nutrition and the importance of a balanced diet which is vital for mitigating childhood obesity if well adhered to.

The Ministry should also partner with other development bodies, NGOs and GOK ministries to identify obese and overweight children and put them on special programs.

The county government of Nairobi should also spearhead mobilisation and awareness for its community to empower them and enlighten them on

the importance of good nutrition and how failure to observe that can lead to childhood obesity and its adverse implication.

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