



ORIGINAL ARTICLE

Overweight and Obesity Among School-aged Children and Maternal Preventive Practices against Childhood Obesity in Select Local Government Areas of Lagos, Southwest, Nigeria

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ABSTRACT

Background: Childhood obesity is an emerging epidemic in the developing countries, particularly in the urban settings. This study examines the prevalence of overweight and obesity among school-aged children and the maternal preventive practices against childhood obesity.

Methods: This is a cross-sectional study of school-aged children aged 6-13 years and mothers from two Local Government Areas of Lagos State, Southwest Nigeria. Multi-stage sampling technique was used to select study areas and participants, while data were collected using an interviewer administered questionnaire. The Body Mass Index (BMI) of children were determined using the World Health Organisation (WHO) 2007 reference charts. Chi-square test was used to analyze categorical variables and logistic regression analyses were conducted to determine the factors associated with the nutritional status and maternal childhood obesity preventive practices. All analyses were conducted using the Statistical Package for Social Sciences (SPSS) 21.

Results: In all, 440 children comprising of 232 boys (52.7%) and 208 girls (47.3%) were studied. Of these, 29 of the participants (6.6%) were overweight, while 39 of them (8.9%) were obese. Most of the children (71.2%) consumed root/tubers and processed cereals while 9 (0.02%) and (17) 0.04% consumed fruits and vegetables. BMI was only significantly related to child age and sex. In all, 243 mothers (55.2%) had good practices against childhood obesity. Levels of maternal preventive practices were not significantly associated with child BMI.

Conclusions and Global Health Implications: Overweight/obesity among school-aged children in Lagos is high. Only half of the mothers were involved in preventive practices against childhood obesity. There is need for continuous education and advocacy concerning healthy diet and other preventive strategies against childhood obesity in Lagos, and potentially other parts of the developing world.

Key words: Overweight • Obesity • School-age children • Childhood Maternal preventive practices • Lagos • Nigeria

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I. Introduction

1.1 Background

Childhood obesity is a global epidemic and is now one of the most serious challenges of public health in the 21st century¹ particularly in the urban settings.¹⁻³ The rising rate of childhood obesity in some developing countries is as high as that of developed countries² and children in low and middle-income countries are exposed to high-fat, high-sugar, high-salt, energy-dense, and micronutrient-poor foods, which tend to be lower in cost but also, lower in nutrient quality.^{2,3} These dietary patterns, in conjunction with lower levels of physical activity, result in sharp increase of obesity in children.^{3,4}

In 2013, the prevalence of overweight and obesity among children in developing countries was documented as 12.9% (12.3-13.5%) for boys and 13.4% (13.0-13.9%) in girls.⁶ Around this period, the obesity prevalence of 7.5% was reported in school children aged 6-12 years in Tamale Metropolis of Ghana⁷ while in Tanzania a prevalence of 22.6% for obesity and overweight was reported.⁸ In Nigeria, a prevalence of 3.7% was documented in 2007 among school aged children in Lagos Nigeria.⁹ However, by 2014 the prevalence of obesity among school children aged 6-11 years residing in Lagos State Island area, Nigeria had increased to 11.5%.¹⁰

Excessive weight gain during childhood can result from several factors, however, parental influence on the feeding habits of children and dietary intake has been found to be very important, amongst other factors.^{2,6-7,11} Previous studies have documented a relationship between child body mass index (BMI) and maternal behaviors, namely restrictive feeding practices, pressure to eat and concern for weight.¹² However, there is still a paucity of such studies in school-aged children and their mothers within the Nigerian context. Feeding children with calorie-dense foods/fast foods, rewarding good behavior with food are known to contribute significantly to childhood obesity.^{2,6-7,12}

In developing countries like Nigeria, a lot of attention has been paid to nutrition and assessment of nutritional status in children under the age of

five, however, nutrition in school-aged children has received less attention and scrutiny.^{13,14} Furthermore, the awareness of obesity, its negative impacts and prevention among mothers is low and there is the misperception that heavy weight status is possibly a sign of successful parenting.^{15,16} Parents play a crucial role in the formation of dietary habits and patterns of physical activity in children, thus failure of parents to recognize obesity constitute a significant barrier to its prevention.^{17,18}

1.2 Objective

This study examines the prevalence of overweight and obesity in school-aged children and the preventive practices of mothers against childhood obesity.

2. Methods

2.1. Study variable

This was a community based cross-sectional study carried out over a nine-month period (March to November 2017) in Lagos, South Western Nigeria. The study population consisted of pairs of apparently healthy children aged 6 to 13 years and their mothers.

The sample size was determined using the Cochran's formula¹⁹ for prevalence studies. The minimum sample size was calculated using 39.4% prevalence of malnutrition among school-aged children in Sagamu area in Lagos, Nigeria,²⁰ with 95% confidence interval, 5% degree of absolute precision with 1.96 as standard normal deviation, and 20% assumed attrition. The minimum sample size was determined to be 440.

Multistage sampling technique was used to determine the respondents. Mother-child pairs and two local government areas (LGAs) were selected from the 20 LGAs in Lagos State using simple random sampling method (balloting). Two wards were then selected from each LGA by the same method, to obtain four wards. Thereafter, five streets were selected from each of these wards by simple random sampling technique to obtain 20 streets. Subsequently, 22 houses were selected from each street by a similar technique (balloting) for the study. In a situation where there was more than one household in the selected house, simple random sampling was employed to choose one household and

the index child and his/her mother were included in the study. The index child was the youngest child in the family. The study was carried out using anonymous, self-administered and interviewer-based structured questionnaires which was in English Language. The non-English speaking respondents had translations from interviewers who understood Yoruba, the predominant local language. The questionnaire was designed to assess the nutritional status of the children and elicit information from their mothers about preventive practices against obesity in their children. Information obtained using the questionnaire included the socio-demographic characteristics, food consumption pattern, physical activity level, preventive practices of the mothers using excerpts from Birch and Fisher's child feeding questionnaire (CFQ).¹¹ CFQ is a validated and accepted tool which has been used to examine the relationship between parental feeding practices, child's weight and dietary intake.¹¹ The CFQ contains four factors that determine how parents can control the child's diet or feeding namely: (1) Perceived Feeding Responsibility, (2) Perceived Parent Overweight, (3) Perceived Child Overweight, (4) Concerns about Child Overweight) and three factors that assess dimensions of control in child feeding: (1) restriction, (2) monitoring, and (3) pressure to eat.¹¹

The CFQ has a reliability of up to 86% and validity of more than 70%.²¹ Age- and sex-specific prevalence of overweight and obesity were determined by BMI-for-age Z-scores using the criteria defined by the World Health Organization (WHO) growth reference (2007) for children aged 5-19 years.²²

The questionnaire was pretested amongst 20 mothers in Mushin LGA, one of the two study LGAs, and the feedback was used to correct all ambiguities. The questionnaire was validated by experts in the Department of Epidemiology/Community Health for use prior to the commencement of the study. The variables included in the preventive practices were excerpts from the Birch and Fisher's CFQ.¹¹ and included components of restriction of the child's diet, pressure to eat, and concern for child's weight (Appendix I).

The researchers designed a scoring system to determine the level of preventive practices of

mothers against childhood obesity following review of previously documented systems.

The maximum possible score from the questionnaire was 75. A score of 0 to 25 was defined as "poor preventive practice;" scores of 26 to 50 were defined as "fair preventive practice;" and scores of 51 to 75 were defined as "good preventive practice."

2.2 Statistical Analysis

The data were analyzed using the Statistical Package for Social Sciences (SPSS) version 21.²³ Frequencies, proportions, means, and standard deviations [SD]) were calculated for all of the items on the questionnaire. Categorical variables were compared using the chi square test. Logistic regression analysis was used to determine the factors associated with BMI and levels of maternal preventive strategies against childhood obesity controlling for covariates. The level of significance was set at $p < 0.05$.

2.3 Ethical approval

Ethical approval for this study was obtained from the Health Research and Ethics Committee of Lagos University Teaching Hospital. Permission was obtained from the office of the two chairmen of the LGAs selected for the study. Informed consent was obtained from each respondent after the nature and the purpose of the study was explained. The confidentiality of the information obtained was also ensured by anonymous coding of the personally-identifying details of each study participant.

3. Results

A total of 440 mother-infant pairs were interviewed in the study. Based on the responses, interviewers completely and appropriately filled all the 440 questionnaires. Thus, the response rate for this study was 100%.

3.1 Socio-demographic characteristics

Four hundred and forty children comprising of 232 boys (52.7%) and 208 girls (47.3%) were enrolled in the study. The male-female ratio was 1:1 and the mean Standard Deviation (SD) age of the participants was 9.4 (2.2) years. In all, 269 mothers (61.1%) were aged

between 34 and 41 years with a mean SD maternal age of 36.2 (4.5) years. Four hundred and 12 mothers (93.6%) were married and 260 mothers (59%) had at least secondary education. One hundred and seventy four participants (39.5%) were unemployed. Similarly, 384 mothers (70.9%) were low income with income less than 80,000 naira/month.

3.2 Frequency of meals and patterns of food consumption in the children.

Twenty one children (4.7%) ate more than 3 times daily, while 54 children (12.2%) skipped breakfast at least once a week. Eleven children (2.5%) children ate daily in local restaurants (called “bukkas”) while 221 children (44.5%) bought lunch at school (Table 1).

A significant proportion of the children (307, 63.8%) consumed processed cereals

Table 1: Meal frequency and food consumption pattern of the school-aged children

Variable (N=440)	Frequency (N)	Percentage (%)
Meal frequency per day		
Less than 3 times	2	0.45
3 times	417	94.77
More than 3 times	21	4.77
Breakfast frequency per week		
Never	0	0.00
1-2 days	1	0.23
3-4 days	1	0.23
5-6 days	52	11.82
Everyday	386	87.73
Feeding frequency in bukka/restaurant per week		
Never	185	42.05
1-2 days	110	25.00
3-4 days	118	26.82
5-6 days	16	3.64
Everyday	11	2.50
Meal at school		
Child buys lunch in school	127	28.86
Child takes food from home to school	150	34.09
Both	69	15.68
Neither	94	21.36

(e.g., noodles, spaghetti and cornflakes), while 359 children (81.8%) consumed bakery products which include cake, meat-pie, doughnut and other salty snacks daily. Roots and tubers were consumed by 317 children (71.2%) daily. The recommended daily fruits and vegetable consumption of 2 servings was achieved by 0.02% and 0.04% of the children respectively. Dairy products were consumed by 0.03% of the children daily. In all, 66 children consumed sweets and chocolates; 20 children consumed beverages; and 3 children consumed carbonated soft drinks.

3.3. Physical activity and sedentary activities of the children.

Table 2 shows the patterns of physical activity of the children in the study. In all, 284 children (64.6%) walked to school; 153 children (34.8%) used the school bus/public transport and 26 children (6%) were driven to school by their parents/guardians. Majority of the children (399, 90.9%) participated in games that involved physical activity and jogging/walking. In all, 426 (97.0%) of children met the recommended duration (at least 1 hour per day) of physical activity. Watching television and staying idle in doors were the prevalent sedentary activities among the children.

3.4. Nutritional status of the children

Table 3 outlines the nutritional status of the children in the study. The prevalence of overweight among the school-aged children was 6.6%, while the prevalence of obesity was 8.9%. Table 3 shows the BMI categories and sex distribution. In the study, 75 female children (17.2%) were overweight and 46 of them (10.6%) were obese compared to 26 males.

3.5. Maternal Preventive practices

Table 4 shows the preventive practice of mothers against childhood obesity. Specifically, 111 mothers restricted their children from eating too much sweet while 22 mothers (5.2%) offered sweets as reward for good behavior. Few mothers (1.6%) pressurized their children to finish all the food while eating. Majority of the mothers (414) were at least sometimes concerned about their child becoming overweight.

Table 5 shows the levels of the maternal preventive practice and the relationship with the

Table 2: Physical activities and sedentary activities of the school-aged children

Variable (N=440)	Frequency (N)	Percentage (%)
Means of getting to school		
Walk to school	284	64.6
Driven in car to school	24	6.0
Ride bicycle to school	2	0.4
Joins school bus/public transport	130	34.8
Physical activities		
Playing football	190	43.1
Swimming	0	0
Skipping	37	8.4
Jogging/Walking	403	91.5
Dancing	20	4.5
Games involving physical activity	400	90.9
Chores involving physical activity	165	37.50
Duration of sedentary activities per day		
< 1 hour	13	2.9
1-3 hours	272	62.2
3-6 hours	145	33.1
>6 hours	7	1.6
Sedentary activities		
Watching TV	393	89.3
Playing video games	73	16.5
Spending time on computer/tablet/phone	131	29.7
Staying indoors idle	339	77.0
Playing card/ludo games	36	8.1
Duration of sedentary activities per day r of meals per daytransport		
< 1 hour	3	0.6
1-3 hours	240	54.7
3-6 hours	162	36.9
>6 hours	33	7.5

Means of getting to school=transportation to school.

Table 3: Nutritional status of school-aged children in lagos state based on BMI-for-age

BMI Category	Female	Male	Total
	n %	n %	n %
Severe Thinness (< -3SD)	15 7.21	27 11.6	42 9.6
Thinness (-3SD to <-2SD)	9 4.33	21 9.0	30 6.8
Normal (-2SD to 1SD)	147 70.67	153 65.9	300 68.2
Overweight (>1SD to 2SD)	15 17.21	14 6.0	29 6.6
Obese (>2SD)	22 10.58	17 7.3	39 8.9
Total	208 100	232 100	440 100

Notes: BMI=Body Mass Index; SD=Standard deviation; N=Number; %=Percentage

child nutritional status. There were 242 mothers (55.2%) who had good dietary practice against obesity in their children. However, there was no statistically significant association between the levels of preventive practices of mothers and the nutritional status of the children.

3.6. Determinants of the nutritional status and maternal preventive practices against childhood obesity.

Table 6 presents our evaluation of the possible determinants of the nutritional status of study

Table 4: Mothers' Preventive practices against childhood obesity through restriction

Variable	Never (%)	Rarely (%)	Sometimes (%)	Often (%)	Always (%)
Maternal Restriction					
Ensure child does not eat many sweets	3 (0.68)	73 (16.59)	207 (47.05)	112 (25.45)	45 (10.23)
Ensure child does not eat many high fat food	0 (0.00)	22 (5)	120 (27.27)	247 (56.14)	51 (11.59)
Ensure child does not eat too much of favorite food	1 (0.23)	29 (6.59)	105 (23.68)	231 (52.50)	74 (16.82)
Keep some food out of child's reach	3 (0.68)	78 (17.73)	166 (37.73)	154 (35.00)	39 (8.86)
Offer sweets as reward for good behavior	78 (17.73)	236 (53.64)	103 (23.41)	23 (5.23)	0 (0.00)
Offer favorite food as reward for good behavior	29 (6.59)	217 (49.32)	170 (38.64)	24 (5.45)	0 (0.00)
Child eating too much junk food if not regulated	1 (0.23)	87 (19.77)	264 (60.00)	84 (19.09)	4 (0.91)
Child eating too much favorite food if not regulated	0 (0.00)	31 (7.05)	247 (56.14)	154 (35.00)	8 (1.82)
Pressure to Eat	65 (14.77)	287 (65.23)	81 (18.41)	7 (1.59)	0 (0.00)
Child eats all food on table					
Ensure child eats enough	112 (25.45)	156 (35.45)	131 (29.77)	36 (8.18)	5 (1.14)
Making child eat even when not hungry	263 (59.77)	120 (27.27)	48 (10.91)	9 (2.05)	0 (0.00)
Child eats less if not regulated	244 (55.45)	143 (32.50)	38 (8.64)	15 (3.41)	0 (0.00)
Concerns about child weight					
Concerns about child eating much	4 (0.91)	115 (26.14)	260 (59.09)	57 (12.95)	4 (0.91)
Concerns about child dieting for desirable weight	3 (0.68)	54 (12.27)	229 (52.05)	150 (34.09)	4 (0.91)
Concerns about child becoming overweight	2 (0.45)	23 (5.23)	149 (33.86)	245 (55.68)	21 (4.77)

%- Percentage

Table 5: Levels of preventive practices of mothers and nutritional status of children

Preventive practice level	Frequency (n)	Percentage (%)	N (%)
Poor	0	0	0
Fair	197	44.8	197 (44.8)
Good	243	55.2	243 (55.2)
**Preventive Practice level	Undernutrition N (%)	Normal N (%)	Obese N (%)
Poor	0 (0)	0 (0)	0 (0)
Fair	34 (17.26)	131 (66.50)	32 (16.24)
Good	38 (15.64)	169 (69.55)	36 (14.81)

Notes: % = Percentage; P<0.05 (significant), ** P value of preventive practice level and nutritional status=0.792

participants using multivariate analysis. Child age (reference category >10 years; odds ratio (OR)=0.6, p=0.002) and sex (reference category female: OR= 0.2, p=0.029) of the child were significantly associated with the nutritional status. The possible determinants of the maternal preventive practices were also evaluated using the same technique. Only child gender (reference category -female, OR=1.97, p=0.004) was significantly related to the maternal preventive practices.

4. Discussion

4.1 Discussion

In this study, 68.1% of the children had normal BMI while the prevalence of overweight and obesity were 6.5% and 8.9%, respectively. The prevalence of under nutrition and over nutrition were similar (16.3% and 15.4%, respectively). This reflects the present pattern in the developing countries with double burden of undernutrition and overnutrition.^{9-10,13-15,17}

Table 6: Logistics regression analysis of determinants of child nutritional status and maternal preventive practices against childhood obesity

Child Nutritional status					
Variable	β	SE	Odds Ratio	95% CI	P-value
Age	-0.40	0.13	0.668	0.515-0.868	0.002
Sex	-1.22	0.56	0.295	0.099-0.880	0.029
Maternal education	-0.55	0.82	0.574	0.116-2.841	0.496
Maternal Occupation	-0.33	1.16	0.773	0.881-1.005	0.716
Income	0.67	0.59	1.96	0.610-6.330	0.258
Maternal BMI	-0.03	0.05	0.964		0.964
Food consumption	1.05	0.91	2.85	0.482-16.916	0.248
Duration of Sedentary activities	-0.32	0.50	0.728	0.271-1.954	0.728
Maternal obesity preventive practices					
Parameter	β	SE	Odds ratio	95% CI	P-value
Child's Age	-0.09	0.05	0.92	0.825-1.015	0.094
Child's Gender	0.68	0.23	1.97	1.248-3.124	0.004
Maternal Education	0.055	0.34	1.06	0.540-2.064	0.873
Maternal Occupation	-0.162	0.45	0.85	0.354-2.044	0.707
Income	0.153	0.27	0.58	0.682-1.991	0.576
Marital status					0.819
Single	0.364	1.59	1.44	0.063-32.806	
Married	1.080	1.48			
Religion	0.21	0.28	1.23	0.710-2.132	0.461
Child BMI	-0.59	0.52	0.26	0.198-1.550	0.554

Notes: Food consumption=Number of meals/day; BMI=Body Mass Index

Presently, a triple burden is now being described with the additional issue of micronutrient deficiency otherwise known as hidden hunger.^{9-10,13-15,17}

The observed prevalence of obesity of 8.9% in this study is higher than 3.7% documented in Lagos in 2001⁹ demonstrating the rising trend in obesity in the state. Similar observations have been reported from the south eastern states of the country namely Enugu, Enugu State (10.7%)²⁴ and Uyo, Akwa Ibom State (11.3 %).^{17,25} The prevalence of over nutrition observed in our study (15.5%) is also higher than the documented figures from other African countries, namely 11.8% in Benin,²⁶ 9.7% in Ghana, and 10.8% in Malawi.²⁶ However, some other countries report higher prevalence rates, including Djibouti (24%),²⁶ Egypt (40.7%),²⁶ Mauritania (27.7%),²⁶ Morocco (20.2%) and Kenya (19%).²⁷

Over nutrition is an emerging problem in the developing world^{27,28} and the rapid increase in this

phenomenon has been attributed to the increasing urbanization, rapidly changing eating practices, increasing sedentary lifestyle and reduction in physical activity which is now predominant in many developing countries.²⁷ Children's eating habits and behaviors are often acquired from their parents and the family environment and parents may engage in practices that either stimulate or depress their child's eating habits and behaviors.²⁷

In this study, majority of the children were consuming pastries, processed cereals, roots and tubers, while only a few were eating fruits and vegetables. Additionally, the mothers found it difficult to quantify the amount of food their children were actually eating. The dietary pattern observed may be related to the socioeconomic status of the children as most of the mothers were in the low income earning group and a significant proportion were unemployed and had less than secondary school

education. Low socioeconomic status is known to influence dietary choices such that children from such families are given food that are cheaper, irrespective of their nutritive values.²⁸ Regarding diet type, meal frequency is also known to contribute to the occurrence of obesity.²⁸ This condition is less prevalent when three or fewer meals are consumed daily but a higher BMI has been associated with consumption of snacks and skipping of breakfast.²⁸ Majority of the participants in our study ate only three times a day and only a few of them ate more than 3 times daily or ate in restaurants, while over a 10th skipped breakfast at least once in a week.

Other determinants of the BMI and obesity were the sedentary lifestyles and physical activities of the children and the duration of these activities. Time spent on sedentary behavior has been linked to child overweight and obesity.^{28,29} Children who walk to or from school are classified into a higher physical activity category than those who use transport to travel to school.^{28,29} In our study, the predominant sedentary activities identified in majority of the children were watching television and staying idle indoors. However, other positive lifestyles such as walking to school were prevalent among the majority of the participants (64.6%) and only a few (6%) were driven in the car to school. In contrast, a report from Kuwait³⁰ documented that most of the children (76.5%) went to school by car or school bus and only 12.3% go to school by walking, this is a common finding in many developed countries.³⁰ Children's physical activity and sedentary behavior was significantly determined by the environment and familial influence.^{28,29} In our study, the sedentary activities and physical activity in the children in the study were not significantly related to their nutritional status (BMI).

Maternal preventive practices against childhood obesity, has been poorly studied in the developing countries; thus, there remains a significant paucity of data on the subject. In our study, the mothers appeared to be strict with the children's diet and were not rewarding good behavior with junk food or sweets. Mothers were sometimes concerned about overweight in the children. About half of the mothers had good practice against childhood obesity. This is in contrast to what was observed in Congo where only 25.6% of the

parents studied engaged in good preventive practices against childhood obesity and 14.8% of these parents had obese children.³¹ The mothers in our study with good practice against obesity had at least secondary school education and tertiary education. This finding is also in line with previous observations, thus affirming that right attitudes and good practices may be related to the parental education and socioeconomic status.^{16,29,31} A good understanding of the impact of socioeconomic status on the development of obesity is necessary for the implementation of good preventive practices. Compliance with good preventive practice is poor even in the developed countries and more so in the developing countries where walking and sporting activities are of secondary importance to parents who are still concerned with getting enough and regular income to provide food and other essential amenities for the family.

However, in Congo Brazzaville, good knowledge of obesity was reported to not always translate to good practices.³¹ Nevertheless, the role of parents and mothers in particular in reducing and preventing the scourge of obesity in children cannot be overemphasized and effective preventive strategies should be family based. In our study, the only significant predictor of maternal preventive strategies against obesity was child's sex. The reason for this finding, however, remains unclear and thus supports the need for larger studies to explore gender differences on this subject.

4.2 Limitations

One of the limitations of the study is that it is cross-sectional. It would have been desirable to study a larger cohort of subjects which was not possible because of logistic difficulties. Documentation of the quantity of the food consumed by the children was also difficult to ascertain due to the uncertainty of the mothers. Future studies should examine maternal report closer to the events. Larger longitudinal cohort studies are needed to evaluate obesity in school-aged children and other determinants of maternal preventive strategies to combat childhood obesity in the sub-Saharan continent. This will provide robust evidence on the subject and also enable appropriate intervention plan too.

5. Conclusion and Global Health Implications

The prevalence of over nutrition among school-aged children in Lagos, Nigeria, is unacceptably high. Majority of the children consume root/tubers, processed cereals and pastries whilst the consumption of dairy foods, fruits and vegetables was low. Children's nutritional status was not significantly associated with their food consumption pattern, physical activities, or sedentary activities. About half of the mothers had good level of preventive strategies against childhood obesity which is unacceptably low. There is need to further explore determinants of maternal preventive strategies of childhood obesity in the sub-Saharan African population.

Compliance with Ethical Standards

Conflicts of Interest: The authors declare that they have no conflicts of interest regarding this work.

Financial Disclosure: None. **Funding/Support:** None.

Ethics Approval: Ethical approval for this study was obtained from the Health Research and Ethics Committee of Lagos University Teaching Hospital. Informed written consent was obtained from the –parents of the children and confidentiality of all the information obtained from the study participants was maintained.

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Key Messages

- The prevalence of overweight and obesity in school-aged children in Lagos is high and may be a reflection of the global epidemic of childhood obesity.
- The determinants of childhood obesity and overweight were child's age and sex; however the subject still requires further evaluation.
- The level of maternal preventive strategies against childhood obesity in Lagos is unacceptably low and there is need to elucidate the reasons behind these as well as identify strategies to support families and build their self-efficacy.

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APPENDIX I

QUESTIONNAIRE

S/NO

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

CHILD INFORMATION

1. Age of child (last birthday): []
2. Sex of child: (a) Male [] (b) Female []
3. Number of siblings of child: []
4. The child was exclusively breastfed: (a) Yes [] (b) No []
5. How old was the child when the mother stopped breastfeeding?
(a) 3-6 months [] (b) 6-9 months [] (c) 9-12 months [] (d) 12-24 months []
(e) More than 24 months
6. Type of food for complementary feeds:
(a) Locally available foods [] (b) Processed Foods [] (c) Both []

MOTHER'S INFORMATION

1. Age (last birthday): []
2. Marital Status: (a) Single [] (b) Married [] (c) Divorced []
(d) Widowed [] (e) Separated []
3. Religion: (a) Christian [] (b) Islam [] (c) Traditional [] (d) Others _____
4. Ethnic group: (a) Yoruba [] (b) Igbo [] (c) Hausa [] (d) Others _____
5. Highest level of education: (a) Primary [] (b) Secondary [] (c) Tertiary []
(d) Vocational [] (e) Quranic [] (f) None []
6. Occupation:
7. What is the net average monthly income of your family (in Naira)?
(a) <20,000 [] (b) 20,001–80,000 [] (c) 80,001–200,000 [] (d) >200,000 []
8. Weight (kg): []
9. Height (m): []
10. BMI (kg/m²): []

SECTION B: FOOD CONSUMPTION PATTERN

1. How much is spent on food per week for the family?
(a) <2,000 [] (b) 2,001–10,000 [] (c) 10,001–100,000 [] (d) >100,000 []

2. What factors affect food selection in the family? (Select all that applies)
- (a) Availability of food [] (b) Taste of food [] (c) Price of food [] (d) Family menu []
 (e) Ease of preparation [] (f) Parents favorite [] (g) Community choice []
 (h) Others _____
3. How often are the following foods eaten by the child?

	Daily	Once in a week	Two times in a week	More than twice in a week	Once a month	Never
Cereal Rice, wheat, corn, custard, pap, oat						
Processed cereal Noodles, spaghetti, cornflakes, golden morn						
Roots and Tubers Yam, Cassava (Garri, Fufu, Lafu),Potatoes, Cocoyam, Plantain						
Fruits Pineapple, pawpaw, orange, watermelon, banana, etc						
Leafy vegetables Bitter leaf, spinach, water leaf						
Non-leafy vegetables Okro, tomato, cucumber, carrot, cabbage						
Dairy products Milk, cheese, yoghurt, ice-cream, skimmed milk/ 0-2% fat milk						
Meat & Products Red meat (Beef, goat/bush meat, pork), Poultry and products (Chicken, turkey, egg), Fish and products (Fish, crayfish, shrimps)						
Bakery Products Bread, Biscuit, cake, meat-pie, doughnuts and other salty snacks						
Fats and Oil Red palm oil, Vegetable/Groundnut oil, Margarine, butter						
Confectionaries Sweets, chocolates						
Beverages Cocoa, milo, bournvita						
Carbonated soft drinks Coke, malt, fanta, pepsi, teem, la casera, etc						
Caffeine (Coffee, tea)						

4. How many meals does your child eat daily?
 (a) Less than 3 times [] (b) 3 times [] (c) More than 3 times []
5. How often does your child eat breakfast (in the morning) in a week?
 (a) Never [] (b) 1-2 days [] (c) 3-4 days [] (d) 5-6 days [] (e) Everyday []
6. How often does your child eat in a buka/ fast food restaurant?
 (a) Never [] (b) 1-2 days [] (c) 3-4 days [] (d) 5-6 days [] (e) Everyday []
7. Select the most appropriate option: (a) My child buys lunch in school []
 (b) My child takes food from home to school [] (c) Both [] (d) Neither []
8. How can you describe your child's eating habit?
 (a) Eats a lot [] (b) Does not eat well [] (c) Eats normal []

SECTION C: PHYSICAL ACTIVITY OF CHILD

- How does your child go to school? (a) Walk to school [] (b) Driven in a car to school []
(c) Ride bicycle to school (d) Joins school bus/ public transport
- What kind of activities does your child engage in often? (Select all that applies):
(a) Playing football [] (b) Swimming [] (c) Skipping [] (d) Jogging/Walking []
(e) Dancing [] (f) Playing games which involves physical activity []
(g) Chores which involves physical activity []
- How long does your child spend on these choice of activities above daily?
(a) < 1 hour [] (b) 1-3 hours [] (c) 3-6 hours [] (d) > 6 hours []
- Which of the following does your child engage in often? (Select all that applies):
(a) Watching TV [] (b) Playing video games [] (c) Spending time on computer/tablet/phone []
(d) Staying indoors Idle [] (e) Playing card/ludo games []
- How long does your child spend on these choice of activities above daily?
(a) < 1 hour [] (b) 1-3 hours [] (c) 3-6 hours [] (d) > 6 hours []

SECTION D: MOTHERS PREVENTIVE PRACTICES

Please tick where appropriate:

CHILD FEEDING QUESTIONNAIRE

Never Rarely Some Often Always
Times

Restriction

- I have to be sure my child does not eat too many sweets
- I have to be sure my child does not eat too many high fat foods
- I have to be sure my child does not eat too much of her favorite food
- I intentionally keep some foods out of my child's reach
- I offer sweets (candy, ice cream, cake, pastries) to my child as a reward for good behavior
- I offer my child her favorite foods in exchange for good behavior
- If I did not guide or regulate my child's eating, she would eat too many junk foods
- If I did not guide or regulate my child's eating, she would eat too much of her favorite foods

Pressure to Eat

- My child should always eat all of the food on her plate
- I have to be especially careful to make sure my child eats enough
- If my child says "I'm not hungry", I try to get her to eat anyway
- If I did not guide or regulate my child's eating, she would eat much less than she should

Concern About Child Weight

- Are you concerned about your child eating too much when you are not around him/her?
- Are you concerned about your child having to diet to maintain a desirable weight
- Are you concerned about your child becoming overweight

SECTION E: ANTHROPOMETRIC MEASUREMENT

Measurement/ Index	1 st measurement	2 nd measurement	Average
Weight (kg)			
Height (m)			
BMI (kg/m ²)			