

International Journal of Childhood and Development Disorders

E-ISSN: 2710-3943

P-ISSN: 2710-3935

IJCDD 2022; 3(2): 10-16

© 2022 IJSA

www.rehabilitationjournals.com

Received: 08-05-2022

Accepted: 07-06-2022

Al-Hakam Mohammed Fadhil

Junior Resident Doctor,
Alexandria University,
Hospitals, Alexandria, Egypt

Maryam Kareem Al-Eqabi

Junior resident doctor, Al-
Karama Teaching Hospital,
Wasit, Iraq

Ghadaq Enad

FY2 Trainee, Blackpool
Victoria Hospital, England,
the United Kingdom

Correspondence Author;

Al-Hakam Mohammed Fadhil
Junior Resident Doctor,
Alexandria University,
Hospitals, Alexandria, Egypt

Childhood obesity and related factors among primary school children

Al-Hakam Mohammed Fadhil, Maryam Kareem Al-Eqabi and Ghadaq Enad

Abstract

Childhood obesity is still a major public health problem that affects children of all ages throughout their lives. Despite increased treatments and research, the incidence of pediatric obesity remains high. The World Health Organization defines overweight as having a BMI more than or equal to 25, and obesity as having a BMI larger than or equal to 30. Children aged two and above with a BMI between the 85th and 94th percentile on age-growth charts are deemed overweight; children with a BMI more than the 95th percentile are labelled obese.

Objectives: The aim of this study is to assess childhood obesity and related factors among Baghdad primary school children, identifying the relationship between childhood obesity related factors of children's health behaviors, dietary habits, and daily physical activity with sociodemographic characteristics and estimating the relationship between childhood obesity and related factors, gender, parental socioeconomic status, and parental body mass index.

Methodology: A descriptive cross sectional study was conducted in Baghdad city from 1st October 2020 to 30th January 2021. This research was available for students in grades one through six. Children with chronic medical conditions, mental illnesses, or physical disabilities were not included in the research. The questionnaire included questions about sociodemographic variables, socioeconomic status, health behaviors, dietary habits, and physical activity. To investigate the relationship between childhood obesity and related factors, simple linear regression was used. T-test, ANOVA, and Spearman correlation were used to explore the relationship between explanatory factors and outcome variables.

Results: The mean Body Mass Index (BMI) of obese children was (37.52). While the mean BMI of fathers was (37.96) and the mean BMI of mothers was (37.48). (3.4%) of children were low, (53.3%) were moderate and (43.3%) were high by socioeconomic status. On the other hand, (88.3%), (95.8%) and (60%) of children weren't play outside, skip meals, and drink sweet beverages, respectively. Regarding the dietary habits of children, (76.6%), (75.8%) and (80%) of them had not consumed enough high protein breakfast, fruits and vegetables, respectively. The mean of scores is low on all items of daily physical activity.

Conclusion: Obesity is more likely in children with a moderate to high socioeconomic background. Obesity status in both mothers and fathers was linked to an increase in children's BMI.

Keywords: primary school children, skip meals, mental illnesses

Introduction

Background

Childhood obesity is still a major public health issue that affects children of all ages throughout their lives. Despite advancements in treatments and research, the incidence of pediatric obesity continues to climb. According to the National Center for Health Statistics 2015-2016 statistics, the total childhood obesity rate is 18.5%, with age groups varying: 13.9% among 2–5 years old, 18.4% among 6–11 years old, and 20.6% among 12–19 years old [3].

From 11 million in 1975 to 124 million in 2016, the global population of children who are overweight or obese has more than tenfold grown [1]. The World Health Organization defines overweight as having a BMI more than or equal to 25, and obesity as having a BMI larger than or equal to 30. Children aged two and above with a BMI between the 85th and 94th percentile on age-growth charts are deemed overweight; children with a BMI more than the 95th percentile are labelled obese. Because it is the same for both genders and all ages globally, BMI is the most appropriate population-level measure of overweight and obesity [4]. Most wealth countries across the world have a high prevalence of childhood overweight and obesity [5]. In terms of childhood obesity worldwide, socioeconomic class and gender exist [2].

A variety of variables have been linked to overweight/obesity in school-age children, according to studies [6, 7].

Obesity in parents may be a major risk factor for childhood obesity. Family characteristics, such as socioeconomic status (SES), influence parent weight. It is essential to understand how shared family variables influence child weight [8].

This impact is mostly explained by a combination of genetic and behavioral variables, since mothers have a considerable influence on their children's eating and drinking habits, as well as their exercise levels [9].

Insufficient physical activity is one of the variables related with overweight and obesity in preschool children [10].

In response to the growing problem of childhood obesity and other health issues associated with television viewing, the American Academy of Pediatrics (AAP) has issued national guidelines advising parents to limit their children's total media time (with entertainment media) to no more than 1 to 2 hours of quality programming per day for children aged 2 and higher. BMI is the preferred measure for population-based screening of children for obesity; nevertheless, it has been shown to be a poor predictor of body fat in individual children [11].

Screen-based sedentary behaviors include activities such as watching television (TV), playing video games, or using a computer. Access to these display sedentary activities has grown at an alarming rate in recent decades, and this has been related to a substantial rise in sedentary time. Sedentariness as a result of increasing screen time may be a major public health risk. Longitudinal studies have found a relationship between display sedentary habits and increasing body mass index (BMI) in children, even after controlling for physical activity levels [12].

Identifying and methodically presenting existing research on the risk factors and morbidities associated with pediatric obesity will aid in the development of more evidence-based and sustainable solutions. Fruhstorfer and colleagues conducted a systematic review, however their study was limited to socioeconomic status and overweight or obesity in school-age children in Sub-Saharan Africa [13].

Methodology

Setting and design of the research

From the 1st of October 2020 to the 30th of January 2021, descriptive cross-sectional research was performed in Baghdad. This research was available for students in the first through sixth grades. The study excluded children with chronic medical conditions, mental illnesses, and physical disabilities.

Sample size and sampling technique

The sample size was determined to be (120) students from Almahj primary school in the Al-Rusafa district. It is made

up of (60) males and (60) females. It was made up of (20) students from each grade level. To choose research participants, a random sampling method was utilized. We applied the questionnaire approach as well as anthropometric measurements (height and weight).

Tools for data collecting and internal control

As a technique of obtaining data, data were gathered using a questionnaire and a structured interview (36). The questionnaire included questions about socio-demographic variables, socioeconomic status, health behaviors, food habits, and physical activity. In school uniform outfits, the children's weight was assessed using a smart weight measurement scale. The height measurements were taken barefoot. Body Mass Index (BMI) was computed by dividing person's weight in kilograms (kg) by its height in meters squared (m²).

Validity and reliability of the instrument

The content validity of the constructed questionnaire is decided through the utilization of a panel of (8) experts. They're given copies of the questionnaire and that they are asked to review it for the determination of its clarity and content adequacy. Their responses have indicated that the questionnaire is obvious and adequate. Internal consistency reliability for the instrument decided through the utilization of the split-half technique and therefore the computation of the Cronbach alpha coefficient of correlation for (10) obese grade school children. The finding reveals that the Cronbach alpha coefficient of correlation is $r=0.89$ which indicates that the instrument is an adequately reliable measure.

Methods for data processing and analysis

SPSS (Version 26) statistical software was used to analyze the data. Knowledge analysis strategy descriptive statistics of frequencies, percentages, mean of scores, range, and total score to investigate the relationship between childhood obesity and related factors, simple linear regression was used. T-test, ANOVA, and Spearman correlation were often used inferential statistical data analysis procedures to evaluate the relationship between explanatory factors and outcome variables.

Total scores are measured as poor (10-16.66), fair (16.67-23.33), good (23.34-30) for overall evaluation of health behaviors; poor (17-28.33), fair (28.34-39.66), good (39, 67-51) for overall evaluation of dietary habits; poor (8-13.33), fair (13.34-18.67), good (18.86-24) for overall evaluation of daily physical activity.

Mean of scores was considered as a cut-off point poor, fair, good for evaluation on Items of health behaviors, dietary habits and daily physical activity. Mean of score ranges are measured as Low (1-1.69); Moderate (1.7-2.39); High (2.4-3).

Results

Table 1: Distribution of Children’s Sociodemographic Characteristics (N=120)

| Items | | Frequency | Percent |
|--------------------------------|----------------------|-----------|---------|
| Age | 6 years old | 20 | 16.7% |
| | 7 years old | 20 | 16.7% |
| | 8 years old | 20 | 16.7% |
| | 9 years old | 20 | 16.7% |
| | 10 years old | 20 | 16.7% |
| | 11 years old | 20 | 16.7% |
| Gender | Male | 60 | 50% |
| | Female | 60 | 50% |
| Grade | First Year | 20 | 16.7% |
| | Second Year | 20 | 16.7% |
| | Third Year | 20 | 16.7% |
| | Fourth Year | 20 | 16.7% |
| | Fifth Year | 20 | 16.7% |
| | Sixth Year | 20 | 16.7% |
| Parental Socio-economic Status | Low (9-22.3) | 4 | 3.4% |
| | Moderate (22.4-35.6) | 64 | 53.3% |
| | High (35.7-49) | 52 | 43.3% |

#: Percent; Socioeconomic Class Range: Kuppuswamy scale 2018

Parental socio-economic characteristics

During this study, a total of 120 child-parent pairs were determined. The rate of response was (100%). The mean monthly family income was 851,000 Iraqi dinars. 67 (55.8%) of fathers and 41 (34.1%) of mothers are graduated. By occupation, 41 (34.1%) of mothers were housewives. 4 (3.4%) of oldsters were low, 64 (53.3%) were moderate and 52 (43.3%) were high by socioeconomic status.

Children’s socio-demographic characteristics

There were 60 (50%) males and 60 (50%) females among the 120 children. The average age of the children was (8.5) years. As regards children’s grades level 20 (16.7%) children were selected from 1st to 6th grade (Table 1).

Magnitudes of obesity

The body mass index (BMI) of all of the children (100%) was more than 30. Meanwhile, 32 (26.7%) of mothers were more obese than fathers 22 (18.3%). In spite of that, 62 (51.76%) and 36 (30%) of fathers were more morbid obese and super obese than mothers 56 (46.6%) and 32 (26.7%), respectively (Table 2).

Table 2: Body Mass Index of Children and their Parents

| Items | | Range | Mother | | Father | |
|----------------|--------------|---------|-------------|-------|---------|-------|
| BMI of Parents | Obese | 30-34.9 | 32 | 26.7% | 22 | 18.3% |
| | Morbid Obese | 35-39.9 | 56 | 46.6% | 62 | 51.7% |
| | Super Obese | >40 | 32 | 26.7% | 36 | 30% |
| Children’s BMI | Items | Range | Frequencies | | Percent | |
| | Over Weight | 25-29.9 | 0 | | 0% | |
| | Obese | >30 | 120 | | 100% | |

BMI: Body Mass Index; BMI Range: “WHO Criteria” BMI Cut-off; #: Percent.

Factors related to childhood overweight and obesity

Most of the kids have fair health behaviors 68 (56.6%) and every one of them have good dietary habits 120 (100%) and poor daily physical activity 120 (100%) (Table 3)

Health Behaviors

All of the children spend their leisure time watching

television 120 (100%). Almost all of them eat healthy snack 91 (75.8%), have healthy meals 108 (90%), use computer 113 (94.1%), and sleep for eight hours a day 119 (99.1%). On the other hand, 106 (88.3%), 115 (95.8%), and 72 (60%) of children weren’t play outside, skip meals, and drink sweet beverages, respectively (Table 4).

Table 3: Overall Evaluation of Obesity Related Factors (N=120)

| Items | Poor | | Fair | | Good | |
|-------------------------|------|-----|------|------|------|------|
| | F | % | F | % | F | % |
| Health Behaviors | 0 | 0 | 68 | 56.6 | 52 | 43.4 |
| Dietary Habits | 0 | 0 | 0 | 0 | 120 | 100 |
| Daily Physical Activity | 120 | 100 | 0 | 0 | 0 | 0 |

F: Frequencies; #: Percent;

Food preferences and dietary habits

In terms of children's eating habits, 92 (76.6%), 91 (75.8%) and 96 (80%) of them had not consumed enough high protein breakfast, fruits and vegetables, respectively. All of them 120 (100%) reported having sweets, pastries, candies, potato chips, drinks beverages and soda, bread and cereal, meat, poultry and fish. The majority 118 (98.3%), 113 (94.1%), 118 (98.3%), 119 (99.1%), 118 (98.3%), 115 (95.8%) and 117 (97.5%) of them take breakfast every morning, breakfast contains a minimum of one or more of the food groups, eats rice, pasta, spaghetti, dairy products, snack within the morning, snack within the afternoon and snack within the evening (Table 5).

Physical activity and sedentary lifestyle

The majority of the kids 106 (88.3%), 115 (95.8%), 118 (98.3%), 107 (89.1%), 118 (98.3%), 108 (90%), 110 (91.6%), and 113 (94.1%) had no physically active life, exercises, five hours of leisure per week in physical activity, pass by walking to high school, pass by cycling to high school, bike riding, football games, and swimming, respectively. The mean of scores is low on all items of daily physical activity (Table 6).

Table 4: Mean of Scores on Items of Health Behaviors (N=120)

| List | Items | Always | Sometimes | Never | M.S | E. |
|------|--|--------|-----------|-------|------|----------|
| 1 | How often does one have breakfast? | 118 | 2 | 0 | 2.98 | High |
| 2 | How often does one play outside? | 0 | 14 | 106 | 1.12 | Low |
| 3 | How often does one eat healthy snacks? | 91 | 29 | 0 | 2.76 | High |
| 4 | How often does one watch television? | 120 | 0 | 0 | 3.00 | High |
| 5 | How often does one have healthy meals? | 108 | 12 | 0 | 2.90 | High |
| 6 | How often does one skip meals? | 1 | 4 | 115 | 1.05 | Low |
| 7 | How often does one use a computer? | 113 | 7 | 0 | 2.94 | High |
| 8 | The child sleeps for eight hours each day. | 119 | 1 | 0 | 2.99 | High |
| 9 | How often does one drink water? | 46 | 74 | 0 | 2.38 | Moderate |
| 10 | How often does one drink sweet beverages? | 9 | 39 | 72 | 1.48 | Low |

M.S: Mean of Scores; E: Evaluation.

Table 5: Mean of Scores on Items of Dietary Habits (N=120)

| List | Items | Always | Sometimes | Never | M.S | E. |
|------|---|--------|-----------|-------|------|----------|
| 1 | The child takes breakfast every morning. | 118 | 2 | 0 | 2.98 | High |
| 2 | The breakfast contains at least one or more of the food groups. | 113 | 7 | 0 | 2.94 | High |
| 3 | The child eats high protein breakfast. | 28 | 92 | 0 | 2.23 | Moderate |
| 4 | The child eats fruits twice a day. | 29 | 91 | 0 | 2.24 | Moderate |
| 5 | The child eats vegetables twice a day. | 24 | 96 | 0 | 2.20 | Moderate |
| 6 | The child eats rice, pasta and spaghetti. | 118 | 2 | 0 | 2.98 | High |
| 7 | The child eats bread or cereal. | 120 | 0 | 0 | 3.00 | High |
| 8 | The child eats dairy products. | 119 | 1 | 0 | 2.99 | High |
| 9 | The child meat, poultry and fish. | 120 | 0 | 0 | 3.00 | High |
| 10 | The child eats fast food. | 64 | 56 | 0 | 2.53 | High |
| 11 | The child eats sweets, pastries and candies. | 120 | 0 | 0 | 3.00 | High |
| 12 | The child eats potato chips. | 120 | 0 | 0 | 3.00 | High |
| 13 | The child drinks sweet beverages and soda. | 120 | 0 | 0 | 3.00 | High |
| 14 | The child has lunch. | 120 | 0 | 0 | 3.00 | High |
| 15 | The child has snack in the morning. | 118 | 2 | 0 | 2.98 | High |
| 16 | The child has snack in the afternoon. | 115 | 4 | 1 | 2.95 | High |
| 17 | The child has snack in the evening. | 117 | 1 | 2 | 2.96 | High |

M.S: Mean of Scores; E.: Evaluation.

The study revealed that there was a highly significant association between children’s health behaviors relative to their age (P = 0.000) and grades (P = 0.000). Likewise this study, realized that there was no significant association between children’s dietary habits relative to any of the

characteristics age (P = 0.092), grades (P = 0.092), gender (P = 0.228), and socioeconomic status (P = 0.391). Current study showed that the significant association for children’s daily physical activity were age (P = 0.001), grades (P = 0.001), and gender (P = 0.000) (Table 7).

Table 6: Mean of Scores on Items of Daily Physical Activity (N=120)

| List | Items | Always | Sometimes | Never | M.S | E. |
|------|--|--------|-----------|-------|------|-----|
| 1 | The child lives a physically active life. | 1 | 13 | 106 | 1.13 | Low |
| 2 | The child exercises. | 0 | 5 | 115 | 1.04 | Low |
| 3 | The child spends a minimum five hours of leisure time per week in physical activity. | 0 | 2 | 118 | 1.02 | Low |
| 4 | Travel by walking to primary school. | 0 | 13 | 107 | 1.11 | Low |
| 5 | Travel by cycling to primary school. | 0 | 2 | 118 | 1.02 | Low |
| 6 | Bike riding. | 0 | 12 | 108 | 1.10 | Low |
| 7 | The child plays football games. | 0 | 10 | 110 | 1.08 | Low |
| 8 | The child swims. | 0 | 7 | 113 | 1.06 | Low |

M.S: Mean of Scores; E: Evaluation.

Table 7: Distribution of Related factors Consistent with Sociodemographic Characteristics

| Variables | Age* | Grades* | Gender** | Socioeconomic Status* |
|-------------------------|---------------------|---------------------|---------------------|-----------------------|
| | P | P | P | P |
| Health Behaviors | 0.000 ^S | 0.000 ^S | 0.086 ^{NS} | 0.688 ^{NS} |
| Dietary Habits | 0.092 ^{NS} | 0.092 ^{NS} | 0.228 ^{NS} | 0.391 ^{NS} |
| Daily Physical Activity | 0.001 ^S | 0.001 ^S | 0.000 ^S | 0.337 ^{NS} |

* ANOVA Test; ** T-test; P: P-value; S: Significant; NS: Not Significant; Level of Significance at $p \leq 0.05$.

Children’s BMI wasn’t significantly related to related factors (P = 0.496) and gender (P = 0.079). The study showed a highly significant association between children’s

body mass index and their parents’ body mass index along with their socioeconomic status (Table 8).

Table 8: Distribution of Childhood obesity Consistent with Related factors, Gender, Socioeconomic Status, and Parental BMI

| Variables | | Children's BMI | |
|-------------------------|--------|-------------------|---------------------|
| | | R | P |
| Related factors* | | 0.063 | 0.496 ^{NS} |
| Gender** | | t-test | P |
| | Male | 1.771 | 0.079 ^{NS} |
| | Female | 1.771 | 0.080 ^{NS} |
| Socioeconomic Status*** | | P | |
| | | .011 ^S | |
| Parental BMI*** | | Coefficient | P |
| | Father | 0.481 | 0.000 ^S |
| | Mother | 0.409 | 0.000 ^S |

* Simple Linear Regression Test; ** t-test; *** Spearman Correlation; R: Regression Coefficient; P: P-value; S: Significant; NS: Not Significant; Level of Significance at $p \leq 0.05$.

Discussion

According to this study, the bulk of the kids were watching television 120 (100%) and using computer 113 (94.1%). This was almost like studies wiped out Brazil [29], Poland [30], and Iran [31]. Results of the reviewed studies have revealed a controversial attitude about the influence of television and computer on obesity and minimizing time spent watching TV and engaging in other forms of media, such as video games and social networking. Watching TV and playing computer games may reduce the amount of time you spend doing outside games, which may result in weight increase [32].

All of the children 120 (100%) reported having sweets, pastries, candies, potato chips, drinks beverages and soda, bread, and cereal. This was the same findings as the recent study in Poland [30], which identifies numerous diseases that are an instantaneous consequence of obesity because of bad eating habits and lack of workout among Poles.

Almost all of the kids had no physically active life and this was the same as study worn out in Brazil [33], Ethiopia [34], and Ghana [35].

In contrast to the findings of this study, a South Korean study found that children aged 8 to 9 years have the ability to intentionally choose and adopt health-related actions [15]. This didn't correspond with a study conducted in China which showed the dietary habits of school-age children varied by sociodemographic characters [25].

This finding confirms the finding from a comparative study conducted within the United States which estimated that Healthy habit formation at an early age is important in obesity prevention [27].

On the other hand a cross-sectional study imparted in Portugal, positive associations between physical activity and gender were observed in both boys and girls [28].

There are several probable causes for the link between obesity in parents and their children. Obesity susceptibility is shared by both parents and their children due to a common genetic predisposition [20]. Because parents and their children share a living environment, they may be exposed to common obesogenic variables such as poor diet and a sedentary lifestyle [21].

This assumption is consistent with the findings of Svensson, V. *et al.*, who discovered that parental obesity is a major risk factor for childhood obesity [22]. Similarly, this study found substantial, positive associations between father-child weight statuses [23].

Another study found that mother obesity, but not paternal obesity, was associated with a larger increase in childhood

obesity. Obesity in both mothers and fathers was associated with a larger increase in their children's BMI ($P = 0.01$ for both). The relationships were greater in mother-child relationships than in father-child ones [24].

There was a strong link between childhood obesity and socioeconomic status. Primary school students with moderate to high parental socioeconomic level are more likely to acquire bad dietary behaviors (sweets, pastries, candies, potato chips, drinks beverages, and soda, bread, and cereal).

This was kind of like different studies drained in South Korea [15], Jordan [16], Malaysia [17], Argentina [18], and the United States [19]. Primary school students living in higher-income homes have a broader selection of eating options, including meals offered in restaurants. Restaurant meals are often higher in fat and salt content, as well as greater in calorie density. Furthermore, greater daily pocket cash for the child may lead to less rigorous parental regulation of the child's eating behavior, which will result in increased consumption of calorie-dense food [26].

Children's BMI did not correspond with a study conducted in China that revealed Childhood obesity prevention in China should be gender-focused, particularly for boys who reported an unhealthy diet but were less likely to depict they were fat, despite the fact that more boys were overweight or obese than girls [26].

Conclusions

There was a strong link between childhood obesity and socioeconomic level. Obesity is more likely in children with a moderate to high socioeconomic background. Obesity status in both mothers and fathers was linked to an increase in children's BMI.

Recommendations

1. It's important to avoid harmful consequences of being overweight or obese by paediatricians and primary health care providers throughout promoting a healthy lifestyle of children and their parents throughout obesity prevention oriented health education to avoid harmful consequences of being overweight or obese.
2. Emphasize the need of expanding our understanding of obesity-related issues, as well as the importance of implementing actions and policies targeted at reversing this trend, such as encouraging good eating habits and physical exercise.
3. Parents of obese children should be oriented towards promoting intake of healthy foods, physical activity and weight management.

References

1. Alexa B, Carmen M, Aurino E, Sassi F. The impact of Childhood Obesity on Human Capital in High-income Countries: A Systematic Review. *Obesity Reviews*. 2021;22(1):e13104.
2. Iguacel I, Gasch-Gallen A, Aleli M, *et al.* Social Vulnerabilities as Risk Factor of Childhood Obesity Development and Their Role in Prevention Programs. *International Journal of Obesity*, London. 2021;45(1):1-11.
3. Renee L, Quinn M, Mary E, Jill F, Michele L, Karen G. Childhood Obesity: Evidence-based Guidelines for Clinical Practice-part two. *Journal of Pediatric Health Care*. 2021;35(1):120-131.

4. Antwi F, Fazylova N, Garcon M, Lopez L, Rubiano R, Slyer J. The Effectiveness of Web-based Programs on the Reduction of Childhood Obesity in School-aged Children: A Systematic Review. *JBI Library of Systematic Reviews*. 2012;10(42):1-14.
5. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: A pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults. *The Lancet*. 2017;390:2627.
6. Gualdi-Russo E, Zaccagni L, Albertini A, *et al.* Risk Factors of Overweight and Obesity among Preschool Children with Different Ethnic Background. *Endocrine*. 2015;49(1):25.
7. Talih M, Rossen L. Social Determinants of Disparities in Weight among US Children and Adolescents. *Annals of Epidemiology*. 2014;24(1):13.
8. Harrington J, Keane E, Kearney P, Perry I. Measured Parental Weight Status and Familial Socioeconomic Status Correlates with Childhood Overweight and Obesity at age 9. *PloS One*. 2012;7(8):e.43503.
9. Schrijvers C, Ansem V, Rodenburg G, Van D. Maternal Educational Level and Children's Healthy Eating Behavior: Role of the Home Food Environment (Cross-sectional Result from the INPACT Study). *International Journal of Nutrition Behavior and Physical Activity*. 2014;12(11):113.
10. Sijtsma A, Koller M, Pieter J, Corpeleijn E. Television, Sleep, Outdoor Play and BMI in Young Children: the GECKO Drenthe Cohort. *European Journal of Pediatrics*. 2015;174(5):631.
11. Jason A, Fred J, Dimitri A. Television Viewing, Computer Use, Obesity, and Adiposity in US Preschool Children. *International Journal of Behavioral Nutrition and Physical Activity*. 2017, 44(4).
12. Marsh S, Mhurchu C, Maddison R. The Non-advertising Effects of Screen-based Sedentary Activities on Acute Eating Behaviors in Children, Adolescents, and Young Adults. *A Systemic Review. Appetite*. 2013;71:259-273.
13. Danquah, Frederick Inkum, Monica Ansu-Mensah, Vitalis Bawontuo, Matilda Yeboah, Roseline H Udoh, *et al.* Risk factors and morbidities associated with childhood obesity in sub-Saharan Africa: A systematic scoping review. *BMC nutrition*. 2020;6(1):1-14.
14. Katzmarzyk P, Chaput J, Fogelholm M, Hu G, Maher C, Maia J, *et al.* International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE): contributions to understanding the global obesity epidemic. *Nutrients*. 2019;11:848.
15. Yong-Sook E, Ji-Soo K. Factors Affecting Health Related Behaviors in Younger School-age Korean Children. *Journal of Pediatric Nursing*. 2020;51:e1-e5.
16. Mahmoud A, *et al.* Socioeconomic Status, Perceptions and Obesity among Adolescents in Jordan. *Pan African Medical Journal*. 2019, 148(34).
17. Ahmad A, Zulaily N, Shahril MR, Syed Abdullah EFH, Ahmed A. Association between socioeconomic status and obesity among 12-year-old Malaysian adolescents. *PloS one*. 2018;13(7):p.e0200577.
18. Alicia B, Muriel S, Maria C. Trend in childhood obesity reflects socioeconomic status in Argentina. *Annals of Human Biology*. 2019;46(7):531-536.
19. Robert C, Sean M. Obesity among US Urban Preschool Children: Relationship to Race, Ethnicity, and Socioeconomic Status. *JAMA Pediatrics*. 2006;160(6):578-584.
20. Wardle J, Carnell S, Haworth C, Plomin R. Evidence for a strong genetic influence on childhood adiposity despite the force of the obesogenic environment. *American Journal of Clinical Nutrition*. 2008;87(2):398-404.
21. Rosenkranz R, Dzewaltowski D. Model of the home food environment pertaining to childhood obesity. *Nutrition Reviews*. 2008;66(3):123-40.
22. Svensson V, Jacobsson J, Fredriksson R, *et al.* Association between Severity of Obesity in Childhood and Adolescence, Obesity onset and Parental BMI: a longitudinal Cohort Study. *International journal of Obesity*. 2011;35(1):46-52.
23. Rachel L, Adamsons K, Gorin A, Jaime S, Amy R. Investigating the Relationship of Body Mass Index, Diet Quality, and Physical Activity Level between Fathers and Their Preschool-Aged Children. *Journal of Academy of Nutrition and Dietetics*. 2015;115(6):919-926.
24. Xu R, Zhou Y, Zhang X, Wan Y. A Two-year Study of Parental Obesity Status and Childhood Obesity in China. *Nutrition, Metabolism and Cardiovascular Diseases*. 2019;29(3):260-267.
25. Su Z, Cheng H, Zhao D, Duan J, Wang L, Hou D, *et al.* Dietary Habits of School-age Children and its Associations with Blood Pressure Level in Beijing, China. *Chinese Journal of Preventive Medicine*. 2014;48(5):340-344.
26. Zhang J, Zhai Y, Qi Feng X, Rong Li W, Bin Lyu Y, Astell-Burt T, *et al.* Gender Differences in the Prevalence of Overweight and Obesity, Associated Behaviors, and Weight-related Perceptions in National Survey of Primary School Children in China. *Journal of Biomedical and Environmental Sciences*. 2018;31(1):1-11.
27. Ruopeng A. Diet Quality and Physical Activity in Relation to Childhood Obesity. *International Journal of Adolescent Medicine and Health*. 2017;29(2):45.
28. Pedro B, Analiza M, Berria J, *et al.* Sedentary Patterns, Physical Activity and Health-related Physical Fitness in Youth: a Cross-sectional study. *The International Journal of Behavioral Nutrition and Physical Activity*. 2017;14(1):25.
29. Paul A, Carla T, Cristina D, Marcelina H, Marina L, *et al.* Prevalence of Overweight and Obesity and Related factors in School Children and Adolescents in a Medium-size Brazilian City. *Clinics*. 2018;73:438.
30. Rosiek A, Maciejewska N, Leksowski K, *et al.* Effect of Television on Obesity and Excess of Weight and Consequences of Health. *International Journal of Environmental Research and Public Health*. 2015;12(8):26.
31. Samira P, Alireza O, Ali M, *et al.* Television Food Advertisements and Childhood Obesity: a Systematic Review. *International Journal of Vitamin and Nutrition Research*. 2021;91(2):3-9.
32. Desalew A, Mandesh A, Semahegn A. Childhood overweight, obesity and associated factors among primary school children in dire dawa, eastern Ethiopia; a cross-sectional study. *BMC obesity*. 2017;4(1):1-10.

33. Neto A, Pereira T, Carletti L, Molina C. Active and Sedentary Behaviors in Children aged 7 to 10 Years Old: the Urban and Rural Contexts, Brazil. *BMC Public Health*. 2014;14:1174.
34. Alemu E, Atnafu A, Yitayal M, Yimam K. Prevalence of Overweight and/or Obesity and Related factors among High School Adolescent in Arada Sub City, Addis Ababa, Ethiopia. *Journal of Nutrition and Food Science*. 2014;4(2):4-10.
35. Mogre V, Patience K, Rashida N. Overweight, Obesity and Thinness and Related factors among School-aged Children (5-14 Years) in Tamale, Northern Ghana. *European Scientific Journal*. 2013;9(20):160-75.
36. Bodhani A, *et al.* Partnering, Home Environment, and Child Obesity: A Survey of Parents and Children Attending a Pediatric Clinic: Electronic Theses and Dissertationa, 2006, 2162.