

**ASSESSMENT OF SELECTED BODY VITALS IN  
CHILDREN, FREQUENTLY CONSUMING FAST FOOD**



**BY**

**AIMAN ALI**

**RABBIA SHAKEEL**

**SABA ZEENAT**

**DEPARTMENT OF EARTH AND ENVIRONMENTAL SCIENCES  
BAHRIA UNIVERSITY, ISLAMABAD**

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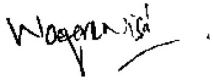
# BAHRIA UNIVERSITY

Department of Earth and Environmental Sciences

Islamabad Campus, Islamabad

## Certificate

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Committee Member	Name	Signature
Supervisor	Ms. Fiza Sarwar	
Internal Examiner	Syed Umair Ullah Jamil	
External Examiner	Dr. Waqar Un Nisa	
Head of Department (E&ES)	Dr. Said Akbar Khan	

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## ABSTRACT

In recent years in Pakistan, frequent fast food consumption with increased sedentary behavior and insufficient physical activity among children and adolescents had become considerable health concern. It has caused harmful effects on health hence, it has increased the average BMI, prevalence of childhood obesity and it is also reported as a risk factor for many other chronic diseases. The less nutritional values and more caloric intake in fast food and its rapid consumption frequency can lead to overweight individuals, contributing to issues such as over and under nutrition.

Random sampling technique was used to select the children from 5-18 years. Questionnaire survey method was used to conduct the study. Questionnaire was modified according to our research from the previous work. The study was conducted to evaluate the BMI and body vitals of children consuming fast food.

In this study we found that results showed that the total prevalence of overweight children was 11.66% and obese children were 12.5%. The majority of the children belong to the normal weight category (based on the BMI calculations). The mean systolic and diastolic blood pressure of all groups were in normal range. All groups had normal pulse rate. The 65% children consume fast food less frequently 1 or 2 times in a week and 35% consume fast food more frequently 3 or 4 times in a week. High percentages of children found in each group who consume food while watching television. majority 54.16% of Group 3 adolescents spend less than 4 hours in week doing any physical activity.

we concluded that majority of the children belongs to normal weight. Prevalence of overweight children was 11.66% and obese children was 12.5%. The blood pressure and pulse rate of children and adolescents was lying in the normal range. Hours of physical activity, diet, fast food consumption are linked with the BMI. Therefore, it was concluded that reduced physical activity, increased consumption of fast food linked with overweight and obesity.

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# CHAPTER 1

## INTRODUCTION

The research is about assessment of selected body vitals in children that are frequently consuming fast food. In recent years due to changing lifestyle preferences and dietary habits increase in BMI, childhood obesity and overweight ratio of teenage children has substantially increased by fast food consumption in Pakistan (Abeyseena et al., 2018). The average weight of child has been increased than normal weight and even more rapid increase in BMI has been observed that contribute to childhood obesity. Fast food is associated with higher body mass index and less maintenance of weight loss (Kruger, Blanck, & Gillespie, 2008). Consumption of fast food is related to weight gain in children (Vikraman, Fryar, & Ogden, 2015) . The higher BMI is correlated with higher fast food consumption and more prone to being overweight is also regarded in this concern and cause obesity (Schröder, Fito, & Covas, 2007) . The modifiable risk factors may also influence the BMI and child weight including the poor eating habits, less physical activity and prolonged Television viewing and increased sedentary behaviors (Must et al., 2009). Frequent fast food consumption significantly enhance the risk of chronic diseases in children such as childhood obesity, type 2 diabetes, hypertension and increased cardiovascular diseases (Bahadoran, Mirmiran, & Azizi, 2015)and also increase risk of insulin resistance , metabolic syndrome and systemic inflammation (Marlatt et al., 2016). Fast food contains higher caloric intake ,high fat content, more energy density and poor nutrient quality and due to its inadequate nutritional values it led to overweight children (Vikraman et al., 2015) and contributes to elevated blood pressure(Pan, Malik, & Hu, 2012). The hypertension prevalence is significantly higher in overweight children as compared to normal weight children (Kar & Khandelwal, 2015).The significant factors contributing to obesity epidemic are increased consumption of fast food and considerable changes in dietary habits(Block, Scribner, & DeSalvo, 2004). In this present study we tried to find out relationship between frequency of fast food consumption and its effect on Body Mass Index BMI and body vitals of children aged (5-18) years and additionally our study also assessed the prevalence of overweight, obesity in children and teenagers. We hypothesized there would be a strong association between increased frequency of fast food consumption

and higher BMI increasing the risk of chronic diseases and obesity prevalence with other associated multifactorial risks and sedentary behaviors in both children and adolescents.

## **1.1 Background**

Several studies have investigated associations between consumption of fast food and body mass index in children and mixed results were reported (Braithwaite et al., 2014) whereas some studies have demonstrated small but significant associations between increased BMI and fast-food consumption (Thompson et al., 2004) while others studies were unsuccessful to show a significant association between frequency of fast food consumption and BMI (Alfawaz, 2012). In some studies fast food consumption effects have been observed in association with body weight and energy balance, detrimental consequences were found on health through fast food intake such as higher BMI, increase in weight which leads to development of chronic diseases (Fraser, Edwards, Cade, & Clarke, 2011). A study has accessed that fast food consumption at evening and night time was significantly associated with high BMI along with insufficient physical activity and soft drinks consumption (Shah et al., 2014)

The considerable evidence in study is found on correlation between the consumption of fast food and obesity, the role of fast food has been difficult to demonstrate. A recent review concludes relationship between obesity and fast food consumption (R. Rosenheck, 2008). From observational studies the findings obtained are still unable to demonstrate a linkage between consumption of fast food and obesity or weight gain. A positive association in Western countries has been demonstrated between frequent consumption of fast food and weight gain in adults (Zhao, 2017), (Duffey, Gordon-Larsen, Steffen, Jacobs Jr, & Popkin, 2009) and mixed and limited evidence found for children, where as in some studies a small association has shown between fast food consumption and increased BMI (Niemeier, Raynor, Lloyd-Richardson, Rogers, & Wing, 2006), while the significant association was not detected by others (Boutelle, Fulkerson, Neumark-Sztainer, Story, & French, 2007). Several other studies accessed that the intake of fast food might be linked with other factors such as individual food choices and dietary preferences, accessibility to fast food outlets, social and income constraints which influence individual eating behaviors. (Poti, Duffey, & Popkin, 2014) Thus, the studies also have reported fast food

consumption directly might not be related with weight gain and high energy intake instead might be indicator for unhealthy behaviors related with outcomes (Rosenheck, 2008).

A study has reported a decline in breakfast consumption during adolescence and it was found that proportion of energy consumed from fast food has significantly increased and rapid decrease was observed in home meals during this age period (Bauer et al., 2009) Other studies have also found similar associations between the breakfast skipping and consumption of fast food whereas, with frequent breakfast less BMI and with frequent consumption of fast food increase in BMI was reported .Consumption of fast food and skipping of breakfast are significant metabolic syndrome biomarkers that responsible for chronic disease in adolescents (Marlatt, Farbakhsh, Dengel, & Lytle, 2016) . Insufficient breakfast consumption is associated to increase BMI (Maki, Phillips-Eakley, & Smith, 2016) .Some study has demonstrated the skipping of breakfast and its effect on BMI and it was found that breakfast skipping increase the appetite that results in overeating and consumption of high calories and it is associated with increase in body mass index leading to overweight or obesity (Fatima, Noor, & Shafique, 2020).

Studies demonstrated various results on physical activity and its effects on BMI, and found modest association between overweight and physical activity in children (Janssen & LeBlanc, 2010). In other studies, in children with normal weight modest effects were confirmed whereas, stronger associations were observed in overweight children and it was identified for combating obesity physical activity is considered as a valuable tool(J. Mitchell et al., 2013). It was demonstrated in previous studies that high BMI and decreased physical activity are considered as modifiable risk factor for prevalence of hypertension (Jakson et al., 2014). Obesogenic environment that refers to accessibility of fast food, reduced physical activity and sedentary lifestyle might be related with increased BMI and obesity (Mackenbach et al., 2014).

There has been an increasing evidence that sedentary behavior is accompanied with many negative outcomes on health such as (NCDs) and premature mortality (Biswas et al., 2015) . SB have negative outcomes extending throughout the life period from childhood to adolescence (J. A. Mitchell & Byun, 2014) . It has been found that during childhood sedentary behavior such as increased physical inactivity and

television viewing are contributing key factor for adverse health outcomes in adolescence e.g. raised level of cholesterol, the issue of being overweight and poor physical fitness scores (Hancox, Milne, & Poulton, 2004) . In LMICs countries sedentary behavior is rapidly increasing during waking hours by sitting or reclining posture and energy expenditure is less or equal to 1.5 METs (Hancox et al., 2004) .The digital technologies and mechanized system thus reducing the leisure time physical activity (Malik, Willett, & Hu, 2013) . Recent studies have demonstrated the combined effect of poor eating habits and SB and their adverse health consequences among adolescents in high income countries (Fletcher et al., 2018). It was identified that SB is related with fast food, higher snacks intake and SSB which are responsible risk factors for hypertension, obesity, hypercholesterolemia (Ludwig, Peterson, & Gortmaker, 2001) . It was found in LMICS countries with increased sedentary time the rates of fast food and soft drinks are increased (Ashdown-Franks et al., 2019).

A study showed that children who have normal weight or are underweight consider themselves as overweight, continuously enhancing risk of their eating disorders, depression and unhealthy weight behaviors(Desmond, Price, Gray, & O'Connell, 1986). In contrast to the children who are overweight do not consider their actual body weight perception and are unlikely involved in physical activities and healthy weight control behaviors(Gaylis, Levy, & Hong, 2020). According to recent research, weight misperception is a strong cause of body dissatisfaction regardless of actual weight status (Knowles, Ling, Thomas, Adab, & McManus, 2015).Weight underestimation and overestimation is being related to increased health risks(Boo, 2013).

A research study on obesity showed adverse trends in normal cardiovascular health among children and adolescents and also indicators were observed which are worsening health problems like high blood pressure (Dong et al., 2017) .The ideal level of matrixes such as body mass index, diet and blood pressure has decreased among children according to Strategic Goals of American Heart Association. The elevated BP was common in obese children (Yi, LI, Chong, Frank, & Shi, 2015) . It was found that fast food intake have might contributed in the increase of obesity and hypertension. Study has demonstrated that the obese children and adolescents with increased BMI had apparently four times higher risk of developing hypertension than normal weight

(Menghetti et al., 2007). Childhood obesity is multifactorial which can be caused by behavioral, environmental and genetic factors(Sahoo et al., 2015).

Some study has reported more sodium intake from processed fast food was associated with high systolic and diastolic blood pressure among children and adolescent (Zhang et al., 2013) .A previous study indicated that sodium consumption in children from fast food restaurants is considered more than average amount to be consumed leading to pre-high blood pressure in children , later on it might develop to hypertension and heart diseases when reaching in there adolescence stage. Evidence has shown the fast food consumed have a high sodium content (Zain, 2018). The fast food high consumption among adolescent is leading a significant role in the increase of sodium intake exceeding in recommended levels, thus contributing in high risk of cardiovascular diseases (Zain, 2018).

In studies it have been identified that higher resting heart rate was correlated with high blood pressure in obese children and adolescents without depending on age and ethnicity (Fernandes et al., 2011) but it was not clear that resting heart rate can be used to cover other risk factors like dyslipidemia and hyperglycemia, but youth obesity was related to the health risk like high BP, insulin resistance, hyperglycemia and dyslipidemia contributing to metabolic risks (ogden et al., 2014).

A previous study has suggested that television viewing has been positively associated with increased body mass index in children (Avery, Anderson, & McCullough, 2017) . On basis of research study it has been showed that children experiencing hypertension have higher mean BMI than children without having hypertension (Pardee, Norman, Lustig, Preud'homme, & Schwimmer, 2007) . Hypertension and obesity both have been associated with television viewing in obese children (Pardee et al., 2007) . It has was determined in study that increased viewing of television consumed the time spent undertaking a physical activity which leads to low energy expenditure and results in weight gain (Dietz, 2001). Other ways in which TV viewing has been associated to increase weight in children is through its influence on children diet in form of advertisements of fast food (Andreyeve et al., 2011) , it also promotes mindless eating during TV viewing (Ogden et al., 2013) and increased the consumption of junk food and snacking and it's also includes higher consumption of sugar sweetened beverages (Avery et al., 2017) . In literature previously associations

have been confirmed between childhood obesity (Stamatakis et al., 2010) and socioeconomic status but with a less clear evidence that how TV watching and diet quality are affected by low socioeconomic status.

In previous literature the relation between SSB and SUI has been identified.(Nguyen, Choi, Lustig, & Hsu, 2009) Consumption of high sugar sweetened beverages has significant effect that contributes to increased levels of Body Mass Index, blood pressure, increased bodyweight and Serum Uric Acid SUA in children when reaching their adolescence (Alper Jr et al., 2005) .The study has accessed that metabolic syndrome was observed in children and teenagers who were experiencing weight abnormalities and abnormal increase in (SUA) levels.(Ebrahimpour-koujan, Saneei, Larijani, & Esmailzadeh, 2020) This syndrome increases risk of cardiovascular disease and metabolic abnormalities. Fructose found in SSB plays a contributory role in incident hypertension and increases systolic blood pressure in adolescents (Ebrahimpour-koujan et al., 2020).

A relevant past study has shown an interrelation between fast food habits, changes in body weight BMI and insulin resistance and a strong positive association were observed between consumption of fast food with insulin resistance and weight gain thus, increasing risk of type 2 diabetes and obesity (Pereira et al., 2005). Recent study has demonstrated association of dietary behaviors in childhood and its effect on adiposity and insulin resistance in age of adolescence ,positive link was found with fast food consumption and adiposity and associations of eating while television viewing with insulin resistance and adiposity in adolescence(Gingras, Rifas-Shiman, Taveras, Oken, & Hivert, 2018).

In the context to previous study (Carroll-Scott et al., 2013) , another associated risk factor for obesity, poor diet quality and increased BMI was observed from nearby neighborhood fast food restaurants (Moore, Diez Roux, Nettleton, Jacobs, & Franco, 2009) , that are closely located in areas with minimum walking distances that are often more approachable to children including young adolescents, this can exposed children to high accessibility and increased frequency of fast food consumption. Higher BMI was observed in children with a walking distance of 5 minutes from fast food outlet, and more frequent unhealthy eating and less healthy eating was also reported (Carroll-Scott et al., 2013), In study healthy behaviors were linked with socioeconomic

environment where as unhealthy behaviors were linked with environmental inhibitors such as fast food restaurants.

## **1.2 Statement of the Problem**

Over the last century, due to nutritional transition and unhealthy food preferences across the country; the drastic increase is observed in consumption and frequency of fast food among children and young adolescents which is a noticeable concerning health issue in Pakistan. The changing lifestyle accompanied with sedentary behavior and Obesogenic environment contribute to increased BMI and also have significant adverse effect on body vitals such as higher resting heart rate and high blood pressure with increased prevalence of hypertension that is root cause of many other non-communicable diseases.

## **1.3 Objectives**

The main aim of the study was to investigate the close association of body mass index related to fast food consumption and to determine the links between prevalence of obesity with frequent fast food consumption in children and adolescents aged 5-18 years.

The specific objectives of study are;

- To investigate changes in weight, height, selected body vitals (blood pressure and pulse rate) by frequently consuming fast food.
- To investigate whether consumption of fast food is associated with high BMI and body vitals in childhood and adolescence.

## **1.4 Delimitation**

This research study has its limitation in area of Rawalpindi and Islamabad. This study is limited to specific age group of 5-18-year children and adolescents.

## **1.5 Significance of the Research**

This type of research study is important to be considered because of increasing trends in nutrition transition and sedentary lifestyle the frequency of fast food consumption is increased and replacing the traditional diet and promoting unhealthy eating behaviors. The changing food patterns are contributing to increase BMI in children and present childhood obesity in children and adolescents in Pakistan.

Increased frequency of fast food that contain poor nutritional values also leads to malnutrition, nutritional disorder and chronic diseases in children which is considered an emerging health concern in Pakistan. This is an important responsibility to address the problem in order to reduce disease burden.

There is probably a limited literature available on this research topic as compare to western and high-income countries that have advanced literature about BMI and its association with fast food. In Pakistan the research work that is available on BMI, body vitals and frequency of fast food is very limited, especially on children and young adolescents. Mostly, vigorous research work available is related to adult obesity. In fact this topic is of extreme importance but it is most far neglected therefore, serious efforts are to be needed to highlight increasing trends of fast food consumption and risk of rising chronic diseases and address its concerns.

To minimize this concern our research will help to discourage consumption of fast food through significant awareness by setting a limitation factor in frequent and regular fast food consumption in order to prevent other chronic diseases and childhood obesity. Further our research extends interventions in promoting awareness of health education in schools and homes (by providing information for adapting healthy eating practices and awareness about disadvantages related to fast food consumption and their impacts on children health) and in local communities (purposely to build behaviors change strategies and social support) which will provide benefit to number of children to help them keep track of their physical fitness score, healthy weight maintenance and healthy food patterns.



## **CHAPTER: 2**

### **METHODOLOGY**

#### **2.1 Sample and Design**

##### **Sample Site**

A study was conducted in Islamabad and Rawalpindi, on July 2020.

##### **Sample Type**

A simple random sampling was used to select the children of age from 5 to 18, frequently consuming fast food. Through random sampling scheme representative data was collected.

##### **Sample Size**

Total 150 samples were approach, 130 were responded and out of 130, the incorrect and missing information was removed, and final sample size was 120 children. Survey questionnaire with incomplete or incorrect information of weight, height, blood pressure and pulse rate were excluded. The research was online survey based. It was not possible for us to go on fast food outlets.

The sample was divided into three groups according to their age;

- I. 5-10 age group
- II. 10-15 age group
- III. 15-18 age group

#### **2.2 Participants**

150 children were selected through simple random sampling. For the children of mostly from age 5-12 data was submitted by their parents and for the adolescents aged 13-18, data was submitted by adolescents themselves.

#### **2.3 Questionnaire**

Standard questionnaire were modified for the undertaken research (Hancox et al., 2004; Schröder et al., 2007; Shah et al., 2014; Sun et al., 2020). The questions were modified according to our research. Data questionnaire was designed which contain

questions to assess the BMI (through weight and height), body vitals and information about the consumption of fast food. The general description and clear instruction given by the supervisor to prepare the questionnaire. Due to the COVID- 19 lockdown, the survey questionnaires were filled online.

The questionnaire consists of 20 questions including questions of weight, height, vital signs (blood pressure and pulse rate), related habits and frequency of fast food consumption. As due to pandemic we were not able to take the measurements of vital signs (weight, height, blood pressure and pulse rate) therefore, we added these vital signs blanks in the questionnaire.

The selected participants were requested to filled out the questionnaire regarding their habits of consuming fast-food and about their vital signs. The habits include the consumption of fast food, watching television while eating and other related information. Before filling it, the participants were instructed to fill the information completely and truthfully. Main outcomes of questionnaire were the vital signs of body, frequency of fast food consumption and related habits.

The first 4 questions in questionnaire including age group, weight, height, blood pressure and pulse rate. The participants were instructed to measure the weight and height at least twice. The height would be measured using ruler, scale or tape and weight should be measured without shoes and wore light clothing. It would be wise to wait for some time before taking a reading of blood pressure. The child should be relaxed and comfortable before attempt to record blood pressure.

### **2.3.1 Fast food consumption:**

The participants were asked about the questions related to fast food consumption “ how many days in a week they spend in visiting the restaurants?” they could respond once in a week, two days in a week, three days a week, four days a week. Then participants were asked that “which fast food restaurant they prefer the most?” (KFC, Mc Donald, Pizza hut, Others). Another question was what they order most at fast food restaurants? (burger, hot wings, pizza, others). The percentage for each option was calculated separately for each age group. The next participants were asked about that have they ever gone through illness consuming fast food? (Yes, No). the participants were asked about to have they ever experienced night craving. (yes, no, sometimes). The participants were asked about that were they satisfied with the hygiene

of fast food? (yes, no, not much sure, it does not matter at all). Participants were asked about does branding effect the chosen fast food. (agree, disagree, neutral, no opinion).

### **2.3.2 Leisure time activities:**

The participants were asked about their leisure time activities to know about their physical activity they performed. The participants were asked about the leisure time activities that included “what mostly you prefer in leisure time?” (sports, television watching, listening to music, indoor activities). Then participants were asked about the hours they spend in doing physical activity in their leisure time (1-4 hours, 2-8 hours, 8-12 hours, more than 12 hours).

### **2.3.4 Food consumption during television viewing:**

The participants were asked about how many times a day they consumed a food during television watching? (everyday, sometimes in a week, less than once a week, never). The next question related to food consumption during television watching was that how frequently they eat snacks during television watching? (Everyday, sometimes in a week, less than once a week, never).

### **2.3.5 Perception about weight and calories intake:**

The participants were also asked about what their perception about their weight. (have a right weight, too heavy, too light, other). Next question was do you have an idea of how much calories you consumed from fast food? (less than 295cal, 315-510cal, 510-770cal, more than thousand).

### **2.3.6 Regular checkup and body vitals stable:**

The participants were asked about how often they visited their doctor for regular checkup? (once a month, after three months, after six months, once a year). Next the participants were asked about were their body vitals stable. (yes, no, hormonal imbalance, some other disease).

## 2.4 BMI (Body Mass Index)

The weight and height were used to analyze the BMI of the children using formula;

$$= \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}$$

It was used to find out the weight status of body. Due to Covid-19 pandemic we were not able to go for body measurements. Therefore, the parents were asked about the height and weight of the children. The adolescents were self-reporting their height and weight.

We converted the height in feet or inches into meters to use this formula. Then we calculated the BMI from the given information. According to the WHO (World Health Organization) and National Institutes of Health Guidelines, the weight status categorized into the four classes (Irfan, Jabbar, & Hameed, 2019):

<b>Weight Status</b>	<b>BMI Range</b>
Underweight	≤ 18.5
Normal weight	18.5-24.9
Overweight	25-29.9
Obese	≥ 30

After calculating the BMI for each age group, average and standard deviation was calculated.

## 2.5 Body Vitals

In body vitals, the body functions were measured that included blood pressure and pulse rate. The pulse rate is how many times a heart beats per minute. Normal range for the blood pressure and pulse rate is given in the table 2.2 (Fernandes et al., 2011).

<b>Table 2.2 Normal ranges of Body vitals</b>			
<b>Age Group</b>	<b>Systolic BP (mmHg)</b>	<b>Diastolic BP (mmHg)</b>	<b>Pulse Rate (bpm)</b>
Group 1 (5-10)	80-120	45-80	60-130
Group 2 (10-15)	80-120	50-80	50-120
Group 3 (15-18)	90-130	60-80	50-110

Due to covid-19, the participants were asked to give information about the parameters of body vitals (blood pressure and pulse rate) truthfully. Then the average and standard deviation of blood pressure and body vitals was calculated separately for each age group. The percentage was calculated for the other questions related to fast food consumption, separately for each group.

## CHAPTER 3

### RESULTS AND DISCUSSION

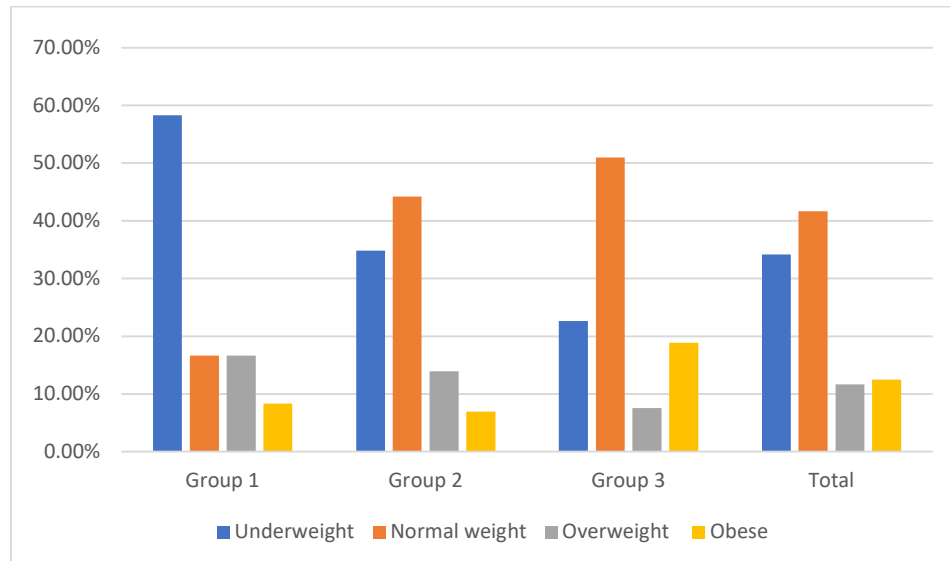
#### 3.1 General Information about Participants

A total of 120 children were selected as a represented sample in the study. The children were categorized into three groups; Group 1 (5-10 years), Group 2 (10-15 years) and Group 3 (15-18 years). The number of children in each group are 24, 43 and 53 respectively as shown in table 2. The percentage of adolescents belong to group 3 (15-18) was higher than other groups.

<b>Children</b>	<b>Age</b>	<b>Number of children</b>	<b>Percentage</b>
<b>Group 1</b>	5-10	24	20%
<b>Group 2</b>	10-15	43	35.83%
<b>Group 3</b>	15-18	53	44.17%

#### 3.2 Body Mass Index (BMI) Among Children Groups

In this study we found that the total prevalence of overweight children was 11.66% and obese children were 12.5%. The majority of the children belong to the normal weight category (based on the BMI calculations) (Fig 3.1). The prevalence of overweight was high in group 1 (5-10) and the prevalence of obese children was high among adolescents of group 3.



**Figure 3.1 Relationship between BMI categories and Groups of Children**

	<b>Group 1 (5-10)</b>		<b>Group 2 (10-15)</b>		<b>Group 3 (15-18)</b>	
	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>
<b>BMI (kg/m<sup>2</sup>)</b>	20.54	6.38	22.20	11.13	23.73	8.74

The mean Body Mass Index (BMI) of group 1, group 2 and group 3 was 20.54, 22.20 and 23.73 respectively (Table 3.2). The mean BMI of children groups were lying in normal weight category of BMI however, Group 3 has higher mean than other two groups. The group 2 has standard deviation of 11.13 higher than other two groups i-e Group 1 has 6.38 and Group 3 has 8.74 (Table 3.2). It means that the BMI of group 2 has much different BMI of children than other groups. This group has more spread out or dispersed BMI of children. The lower standard deviation of group 1 means it has more consistent BMI of children. The reason of high mean BMI among Group 3 adolescents could possibly be due to the increased intake of calories than required or due to the less physical activity.

### 3.3 Vital Signs

The vital signs considered in the study are pulse rate and blood pressure of children. The mean and standard deviation were calculated of each group separately in the table 3.3.

<b>Body vitals</b>	<b>Group 1</b>		<b>Group 2</b>		<b>Group 3</b>	
	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>
<b>Systolic BP</b>	100.33	6.06	113.77	9.66	118.26	7.72
<b>Diastolic BP</b>	69.25	7.07	72.93	7.99	75.36	8.48
<b>Pulse rate</b>	70.75	6.26	87.40	12.59	88.29	7.26

The mean systolic blood pressure for Group 1 was 100.33mmHg, for Group 2 was 113.77mmHg and for Group 3 was 118.26mmHg. The mean diastolic blood pressure was 69.25mmHg, 72.93mmHg and 75.36 mmHg in Group1, Group 2 and Group 3 respectively (table 3.3). Group 3 had high mean systolic blood pressure as 118.26mmHg and Group 1 had lower mean systolic blood pressure as 100.33 mmHg. Whereas mean diastolic blood pressure was also higher in Group 3 as 75.36 mmHg and lower in Group 3 as 69.25mmHg. The Group 2 of children has higher systolic B.P standard deviation of 9.66 compare to the Group 1 and Group 3 (table 3.3). This means Group 2 has higher dispersion values of systolic B.P. Contrary to this, diastolic B.P has higher standard deviation 8.48 of Group 3 which means that the diastolic B.P in Group 3 varies more from children to children. However, Group 1 has lower diastolic B.P standard deviation of 7.07. This means the Group 1 has more consistent diastolic B.P.

The mean pulse rate of Group 1 was 70.75 bpm, for Group 2 mean was 87.40 bpm and for Group 3 was 88.29. This means that average of all children groups (1,2, and 3) have normal heart rates.



<b>Table 3.4: Percentages of Fast Food Consumption among Children</b>				
<b>Statement</b>	<b>Group 1 (5-10) %</b>	<b>Group 2 (10-15) %</b>	<b>Group 3 (15-18) %</b>	<b>Total %</b>
<b>Consumption of fast food in a week</b>				
Once in a week	41.60	39.53	49.06	44.16
Two days in a week	29.17	23.26	15.09	20.83
Three days in a week	20.83	23.26	18.87	20.83
Four days in a week	8.30	13.95	16.98	14.16
<b>Most preferred fast food restaurant</b>				
KFC	26.42	44.19	26.42	35
McDonald	16.67	27.91	28.30	25.83
Pizza hut	20.83	93.02	18.87	15.83
Others	25.00	18.60	26.42	23.33
<b>Most preferred fast food at restaurant</b>				
Burger	45.83	20.93	35.85	32.5
Hot wings	8.33	23.26	7.55	13.33
Pizza	25.00	37.21	30.19	31.67
Other	20.83	18.61	26.42	22.5
<b>Consumption of calories from fast food</b>				
Less than 295 Cal	29.16	11.63	16.98	17.5
315 - 510 Cal	41.66	51.16	28.30	39.17
510 - 770 Cal	20.83	23.26	22.64	22.5
more than 1000 Cal	8.33	13.95	32.08	20.83
<b>Degree of satisfaction from quality and hygiene of fast food</b>				
Yes	37.50	27.91	32.08	31.67
No	25.00	48.84	16.98	30
Not much sure	29.10	11.63	39.62	27.5
It doesn't matter at all	8.33	11.63	11.32	10.83
<b>Illness from fast food consumption</b>				
Yes	75.00	30.23	56.60	50.83

No	25.00	69.77	43.40	49.17
<b>Midnight fast food cravings</b>				
Yes	25.00	30.32	41.51	34.17
No	54.16	46.51	28.30	40
Sometimes	20.83	23.26	30.19	25.83
<b>Follow TV advertisement of highly processed food</b>				
Every time	16.66	44.19	13.21	25
Sometimes	50.00	27.19	49.06	41.67
Never	20.83	6.98	22.64	16.67
Other	12.50	20.93	15.09	16.67
<b>Effect of fast food branding chosen</b>				
Agree	29.16	23.26	28.30	26.67
Disagree	20.83	41.86	20.75	28.33
Neutral	33.33	20.93	32.08	28.33
No opinion	16.66	13.95	18.87	16.67
<b>Consumption of food during TV watching</b>				
Everyday	29.16	30.23	35.85	32.5
Sometime weekly	12.50	11.63	20.75	24.17
Less than once a week	33.33	25.58	26.42	27.5
Never	25.00	93.02	16.98	15.83
<b>Frequency of snack eating during TV watching</b>				
Everyday	20.83	11.63	30.19	21.67
Sometime weekly	41.66	44.19	22.64	34.17
Less than once a week	25.00	32.56	28.30	29.17
Never	12.50	11.63	18.87	15
<b>Most preferred leisure time activities</b>				
Sports	16.66	18.60	15.09	16.67
Watching Television	58.33	39.53	33.96	40.83
Listening to music	8.33	18.60	22.64	18.60
Indoor activities	16.66	23.26	28.30	24.17
<b>No. of hours of physical activity</b>				
1 - 4 hours	49.06	32.56	54.16	44.17

4 - 8 hours	25.00	18.60	26.42	18.33
8 - 12 hours	12.50	46.51	18.87	40.83
More than 12 hours	8.33	2.33	5.66	24.17
<b>Perception about weight</b>				
Have a right weight	54.16	44.19	13.21	33.33
Too heavy	8.33	27.91	49.06	24.17
Too light	33.33	6.98	22.64	35
Other	4.16	20.93	15.09	7.5
<b>Visit to doctor for regular checkup</b>				
Once a month	12.50	20.93	16.98	17.5
After 3 months	20.83	55.81	20.75	33.33
After 6 months	29.16	13.95	26.42	22.5
Once a year	37.50	9.30	35.85	26.67
<b>Stabilization of body vitals</b>				
Yes	62.50	67.44	64.15	65
No	20.83	9.30	13.21	13.33
Hormonal Imbalance	2.5	13.95	15.09	14.17
Some other diseases	4.17	9.30	7.55	7.5

### 3.4 Fast Food Consumption

In this study, fast food consumption was determined by answering the question by the participants, "How many days in a week you spend eating fast food?" the response choices were once in a week, two days, three days or 4 days in a week. Nearly 65% of the children consume fast food less than 3 times in a week and 35% of children consume 3 or 4 meals of fast food in a week. The 16.98% adolescents of Group 3 consume fast food more frequently 4 times in a week which mean the proportion of fast food intake was higher among obese (table 3.4). Adolescents consumed more fast food than other which is expected in this age. Overall, only 14.16% of children consume fast food more frequently 4 times in a week (table 3.4). In Beijing, Western Fast Food and the snack food were linked with the obesity and overweight among the children 2-18 aged (Braithwaite et al., 2014).

During the past two decades, the rapid global trade, economic growth and exchange of culture have intended the rapid increase in fast food industry and fast food consumption mostly among young population (Alsabieh et al., 2019). In this study, we found that the most preferred fast food restaurant includes KFC, McDonald and Pizza hut as defined (Alsabieh et al., 2019). We could not able to obtain the information of fast food consumption quantity, total intake of energy and fast food's contribution to the energy intake on daily basis among the children. Therefore, it might affect the assessment of relationship between fast food consumption and Vital signs. Childhood obesity is multifactorial which can be caused by behavioral, environmental and genetic factors (Sahoo et al., 2015).

### **3.5 Leisure Time Activities**

The majority 54.16% of Group 3 adolescents spend less than 4 hours in week doing any physical activity and have high prevalence of obesity. Majority of the children of each group spent their leisure time in watching television. High percentages of children found in each group who consume food while watching television (table 3.4).

### **3.6 Fast Food Consumption and BMI**

The percentage of children with the higher BMI (overweight and obese), frequently consuming fast food shown in the table 3.5. In group 3 adolescents were consuming fast food more frequently (3 times or 4 times in a week). Children of group 2 consumed fast food less frequently, they had high percentages of overweight. group 1 children consumed fast food less frequent than group 2 and had high percentage of overweight children. The high BMI was correlated with high fast food consumption and more prone to be overweight is also regarded in this concern and cause obesity (Schröder, Fito, & Covas, 2007). The associations between consumption of fast food and BMI in children and adolescents, mixed results were reported (Braithwaite et al., 2014) whereas some studies have showed small but a significant association between increase BMI and fast-food consumption (Thompson et al., 2004) however, some others studies were unsuccessful to show a significant association between frequency of fast food consumption and BMI (Alfawaz, 2012).

<b>Fast-food Consumption</b>	<b>Group 1 (n=24)</b>		<b>Group 2 (n=43)</b>		<b>Group 3 (n=53)</b>	
	Overweight	Obese	Overweight	Obese	Overweight	Obese
<b>Once in a week</b>	8.3%	0	2.3%	2.3%	1.89%	1.89%
<b>2 times</b>	4.17%	4.17%	2.3%	2.3%	0	3.77%
<b>3 time</b>	0	4.17%	4.65%	2.3%	1.89%	5.66%
<b>4 times</b>	4.17%	0	0	4.65%	1.89%	7.55%

<b>Activity in a week</b>	<b>Group 1 (n=24)</b>		<b>Group 2 (n=43)</b>		<b>Group 3 (n=53)</b>	
	Overweight	Obese	Overweight	Obese	Overweight	Obese
<b>1-4 hours</b>	12.3%	4.2%	2.3%	2.3%	3.77%	7.55%
<b>4-8 hours</b>	0	4.2%	0	4.65%	3.77%	1.89%
<b>8-12 hours</b>	4.17%	0	6.98%	4.65%	0	3.77%
<b>More than 12 hours</b>	0	0	0	0	0	5.66%

The table 3.6 gives the relationship of BMI and physical activity among children groups. Children of Group 1 and 2 who were involve in physical activities for more than 8-12 hours in a week had less percentage of obese and overweight. The overweight children (3.77%) and obese adolescents (7.55%) were involve less in physical activity (1-4 hours). The BMI was higher of Group 3 adolescents might be due to the higher fast food consumption, less physical activities. The majority of group 3 adolescents (49.06%) have perception about their weight was too heavy and higher percentage of adolescents do not have regular checkup to doctor (table 3.4). The result could also be affected with the participants who were avoiding fast food to reduce their weight. The adolescents were likely to over reported their height and under reported their weight which might affect the result (Braithwaite et al., 2014).

<b>Table 3.7 Relationship of BMI and fast food consumption while watching television among children group</b>						
	<b>Group 1 (n=24)</b>		<b>Group 2 (n=43)</b>		<b>Group 3 (n=53)</b>	
	Overweight	Obese	Overweight	Obese	Overweight	Obese
Everyday	4.2%	4.2%	2.3%	6.96%	1.9%	3.77%
Sometime weekly	12.4%	4.2%	6.96%	4.65%	1.9%	5.66%
Less than once a week	0	0	0	0	1.9%	9.4%
Never	0	0	0	0	0	0

The table 3.7 shows the relationship of BMI and fast food consumption while watching television among groups of children. It was observed that the children of every group consumed fast food frequently during television viewing. Eating while watching television could decrease the quality of overall dietary. Children unconsciously eat while watching television consume high energy food and high fats more frequently (Sun et al., 2020). Moreover, physical activities replaced by the sitting and watching television could reduce the level of physical activities, high energy consumption that leads to the overweight and obesity. It has been determined in (Dietz, 2001) that increase in watching television consumed the time spent undertaking a physical activity which leads to low expenditure of energy and results in gain of weight.

### **3.7 Fast Food Consumption and Body Vitals**

The mean and standard deviation of blood pressure of the children with the higher BMI (overweight and obese) shown in table 3.8. The mean systolic blood pressure of groups was in high normal ranges. The children of group 2 had high BMI have high mean systolic (116.67 mmHg) and diastolic (79.78 mmHg) blood pressure than other groups.

Body vitals	Group 1		Group 2		Group 3	
	Mean	SD	Mean	SD	Mean	SD
<b>Systolic BP</b>	102.67	8.78	116.67	10.02	115	10.08
<b>Diastolic BP</b>	74.83	4.40	79.78	4.23	77.46	6.69
<b>Pulse rate</b>	68.33	4.55	94	8.43	90	7.96

The standard deviation of systolic BP (10.8) and diastolic BP (6.69) of group 3 (15-18) was higher. It means that group 3 adolescents have more dispersed systolic and diastolic blood pressure. The lower standard deviation of systolic BP (8.78) of group 1 and diastolic BP of group 2 (4.23) means they have more consistent values (table 3.9). The elevated blood pressure was common in obese children (Yi, LI, Chong, Frank, & Shi, 2015)

The mean pulse rate of children groups was in normal range however group 2 had mean pulse rate 94 higher than other groups. The high standard deviation of pulse rate of group 2 mean this group has more spread pulse rate values and low standard deviation of group 1 mean it has more consistent values (table 3.8).

The mean pulse rate of children groups was in normal range however group 2 had mean pulse rate 94 higher than other groups. The high standard deviation of pulse rate of group 2 mean this group has more spread pulse rate values and low standard deviation of group 1 mean it has more consistent values (table 3.8).

Body vitals	Group 1		Group 2		Group 3	
	Mean	SD	Mean	SD	Mean	SD
<b>Systolic BP</b>	99.6	8.68	111.38	11.22	119.31	8.67
<b>Diastolic BP</b>	68.6	8.50	72	9.26	77.44	7.44
<b>Pulse rate</b>	71.6	6.73	89.69	9.00	88.81	7.40

The mean systolic and diastolic blood pressure of children frequently consuming fast food of group 3 was high. The high standard deviation of group 2 children means it had more spread values of systolic and diastolic blood pressure (table 3.9). The mean and standard deviation of Group 2 was high of children consuming fast food more frequently. A previous study (Zain, 2018), indicated that sodium consumption in children from fast food restaurants is considered more than average amount to be consumed leading to pre high blood pressure in children, later on it might develop to hypertension and other heart diseases when reaching in their adolescence stage.



## **CONCLUSIONS**

From observation of study, we concluded that majority of the children belongs to normal weight. Prevalence of overweight children was 11.66% and obese children were 12.5%. The children and adolescents with the high BMI, due to the fast food consumption, less physical activity (1-4 or 4-8 hours in a week) and related eating habits (mostly eating while watching television). Majority of the children and adolescent with the high BMI were involve less in physical activity. Eating while watching television, might be the potential source that link overweight and obesity among the children. Because in our findings majority of the children eat while watching television. The children of all groups had normal blood pressure and pulse rate (lie in normal range). It was concluded that reduced physical activity, increased consumption of fast food is linked with the high BMI.

## **RECOMMENDATIONS**

Based on the observation of the study it is recommended that; Adolescents should participate in physical activity for at least 3 days a week. Fast food consumption should be avoided to prevent overweight and obesity. Different strategies have been adopted to change the children food types consumed during television viewing and reduced time spent watching television. Strategies should be adopted for obesity prevention and healthy lifestyle should be promoted during childhood and adolescence. The intake of fast food can be reduced by implementing laws to regulate marketing of fast food in markets. The promotion of healthy eating habits and education related fast food needs to be strengthened.

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