

Association of Risk Factors of Family Environment with Childhood Obesity

SUMMAIRA HASSAIN¹, FARYAL WAHEED², MUHAMMAD AFZAL SAQIB³

ABSTRACT

Aim: To determine the association of family environment risk factors with childhood obesity.

Method: It was a case control study (analytical) and was conducted in Public and Private schools of Bahawalpur City and was analyzed in Department of Community Medicine, Quaid-e-Azam Medical College, Bahawalpur. Students of age 8-10 years studying in grade 4 and 5 of private and public schools of Bahawalpur was included in the study. A predesigned and pretested questionnaire was used after thorough introduction and explanation of study. Questionnaire was designed to assess the different aspects of childhood obesity. It comprised of questions about demographic information which includes name, age, height, weight, gender, class and evaluation of dietary intake and parents BMI. Questions about the assessment of physical activity, hours spend in watching television, participation in sports activities and number of daily meals were also included.

Results: My study showed that childhood obesity was associated with parental BMI, eating between regular meals, TV viewing >4hours/day and physical activity <20min/day.

Conclusion: My study concluded that childhood obesity is associated with risk factors of family environment (parental BMI, eating between regular meals, TV viewing >4hours/day and physical activity <20min/day).

Key words: Obesity, family environment, BMI, TV viewing, physical activity.

INTRODUCTION

The number of children and adolescents struggling with significant weight problems and obesity is growing at an alarming rate. In the past 30 years, the occurrence of overweightness in children has tripled and it is now estimated that one in five children in the US is overweight¹.

Obesity is prevalent in several developing countries, affecting children, adolescents and adults². Particularly in those countries experiencing rapid industrialization and urbanization, obesity is growing luster and co-exists with infectious diseases, becoming one of the greatest public health problems³.

Approximately 15% of children age 12-19 are currently overweight obese and 1/3 increase has been observed since late 1970s. These trends may be attributed in part to decline in physical activity, sedentary life style and family environment⁴. Children are found spending more on sedentary activities like television and computer. This when coupled with food create a whole generation of couch potato children⁵.

Parents have a strong influence over whether or not their children will become overweight or obese &

it's not just genes that they pass on. Most significantly, when children will grow up in families with bad eating habits and sedentary life style dominated by television watching and videogames, they are 33.3% more likely to become overweight or obese as young adults⁶. There are a variety of environmental factors that determine whether or not children and their parents choose healthy diet. According to a study conducted by (CDC) center for diseases control and prevention, 55 million school age children have access to sugar drink and less healthy food throughout the day⁷. According to physical activity guideline for Americans recommendation 2007, only 18% of students in grade 8 to 12 do least 16 minute of aerobic physical activity each day⁸. A study in United States showed that breast feeding against child hood overweightness and obesity. 75% of mothers start breast feeding only 13% of babies are exclusively breast fed at the end of the 6 months⁹. A study by CDC showed that children age 8-18 years spend an average of 7.5 hours a day using entertainment a media including TV, Computer and Video games. Out of 7.5 hours 4.5 hours is dedicated to viewing TV¹⁰. TV viewing is a contributing factor to child hood obesity may take away from the time children spend in physical activity¹¹.

As global awareness and social mobilization has increased against childhood obesity in recent years, it has been realized that there are variety of family

¹Assistant Professor, Department of Community Medicine, Quaid-e-Azam Medical College Bahawalpur

²Demonstrator, Department of Community Medicine, Quaid-e-Azam Medical College Bahawalpur

³Medical Superintendent, Sheikh Zayed Medical Collage/Hospital, Rahim Yar Khan

Correspondence to Dr. Summaira Hassain

environmental factors which determine whether the children choose healthy life style or not. So such studies which intend to describe the role of family.

MATERIAL AND METHOD

This case control study was conducted in Public and Private schools of Bahawalpur City and was analyzed in Department of Community Medicine, Quaid-e-Azam Medical College, Bahawalpur from 26.09.2013 to 25.06.2014. Total 331 cases and 331 controls were selected through (multistage) stratified random sampling technique.

Students of age 8-10 years studying in grade 4 and 5 with BMI for age > 95 percentile were labeled as obese (cases) and students of same age and gender 8-10 year in grade 4 and 5 with BMI < 95 percentile were labeled as eutrophic (controls) were included in this study. Unwilling students and parents were excluded from study.

Independent study variable was inadequate family environment (Parental BMI (either), Eating habits between 3 regular meals daily, Watching TV / Computer use daily, Physical activity / outdoor games daily) and dependent study variable was childhood obesity.

Height and weight of all children of age 8-10 year studying in grade 4 & 5 in public and private schools were taken. BMI was calculated. Children with BMI for age > 95 percentile were labeled as obese. Then the children were selected randomly according to sample size.

As the sample was 331 case and 331 controls. They were selected proportionately for better representation. Keeping in view the number of public (Male /Female) and private (Male /Female) schools. There were 87 public schools & 20 private schools in Bahawalpur City where primary classes were conducted. The ratio between public /private schools was 4:1 so out of 331, 258 cases (obese) were taken from public and 73 from private schools.

Out of 87 public schools, 55 were females and 32 were male schools. Since female / male schools ratio was approximately 2:1, out of 258 cases (obese), 173 cases were taken from female schools and 85 from male public schools.

Among 20 private schools 12 were Female and 8 were Male schools. Female/male schools ratio was 3:2 so out of 73 cases 24 were taken from Male schools and 49 from female schools. As the ratio of cases / controls was 1:1, for each case one control was taken from the same class.

Addresses and telephone numbers were taken from the selected children. Their parents were telephonically called and after taking consent from them, their child was included in the study. Those

who refused, the next child was taken. After taking time from the parent's home visit was made. A predesigned and pretested questionnaire was used to collect information regarding the family history. The cases and controls were interviewed regarding history of exposure according to the specific variables i.e: Parental BMI (either), eating habits between 3 regular meals daily, Watching TV / Computer use daily, Physical activity / outdoor games daily. Height and weight of the parents was taken to calculate BMI. Pre-designed and pre-tested Questionnaires was used to collect data

Weighing machine was used to measure weight in kgs. Children were weighed without shoes and the pockets emptied. After weighing every child, the machine was made zero to avoid error in weighing. Anthropometric tape was used to take height (in cm) of children in vertical position, erect with parallel feet and ankles and with shoulders and bottom touching the wall.

Data analysis: Data collected was entered & analyzed through SPSS version-17. Frequency of risk factors of family environment in both cases and controls was calculated. Stratification was done for parents' education and economic status for both the groups so as to minimize the effect of these two variables. Contingency tables were made. Odds ratios were determined to find out association of childhood obesity and risk factors of family environment (parents BMI (either), Eating habits between 3 regular meals daily, Watching TV / Computer use daily, Physical activity / outdoor games daily). The difference between two groups' cases and controls was subjected to statistical significance. Chi-square test was used as test of significance as the variable under study was qualitative in nature. Level of significance used was $\leq 5\%$.

RESULTS

My study showed that childhood obesity is positively associated with maternal obesity (OR=2.15) (Table 1). It was also proved in my study that there is an association between childhood obesity and paternal obesity (OR= 2.24) (Table 2). My study proved that childhood obesity is strongly associated with eating between regular meals (OR= 4.65) (Table 3). It was also proved in my study that childhood obesity is associated with daily TV viewing for more than 4 hours (OR = 3.33) (Table 4). My study also showed that there is an association between childhood obesity and physical activity of <20 minutes daily (OR = 2.3) (Table 5).

Table 1: Association of childhood obesity with maternal obesity

Childhood obesity	Maternal Obesity		Total
	Yes	No	
Yes	214	117	331
No	152	179	331

OR =2.15

Table 2: Association of childhood obesity with paternal obesity

Childhood obesity	Paternal Obesity		Total
	Yes	No	
Yes	198	133	331
No	132	199	331

OR = 2.24

Table 3: Association of childhood obesity with eating between regular meals

Childhood obesity	Eating between regular meals		Total
	Yes	No	
Yes	250	81	331
No	132	199	331

OR =4.65

Table 4: Association of childhood obesity with TV viewing daily

Childhood obesity	TV viewing daily		Total
	>4 Hrs	<4 Hrs	
Yes	274	57	331
No	198	133	331

OR = 3.33

Table 5: Association of childhood obesity with physical activity daily

Childhood obesity	Physical activity daily		Total
	<20 Minutes	>20 Minutes	
Yes	232	99	331
No	148	183	331

OR = 2.3

DISCUSSION

Our study showed that childhood obesity is positively associated with maternal obesity (OR =2.15) which was similar to another study conducted in SAU PAULO Brazil¹² where childhood obesity is associated with maternal obesity (OR 2.5), probably because of strong influence or role of mother in maintaining the family environment. Moreover children of obese mother are more likely to be overweight themselves.

The role of home environment in development of childhood obesity has been recognized for a long period of time. Our study also concluded that maternal over weight was strongly associated with childhood obesity (OR 2.15) which was also similar to another study conducted in department of pediatrics university of medicine and dentistry New Jersey, where maternal obesity was the most significant predictor of childhood obesity (OR=3.62).

Results of our study that childhood obesity is strongly associated with maternal obesity were also similar to another study conducted in Kiel Germany¹³ where there was strong association between childhood overweightness and maternal over weight (OR = 9.06).

It was concluded in our study that childhood obesity is strongly associated with paternal obesity (OR 2.24) which was similar to another study in SAUO PAULO Brazil¹⁴ where paternal overweight was positively associated with childhood obesity (OR = 2.5). Association of childhood overweightness with paternal overweightness was also showed in another study conducted in UK⁷ where paternal obesity was significantly associated with childhood obesity (OR = 3.06) because parents have a strong influence over children and it's not just gene that they pass on. When children grown up in families with poor eating habits and either parent obese they are more likely to develop obesity.

Our study concluded that childhood obesity is positively associated with eating between regular meals (OR =4.65) which was similar to another study conducted in SAUO PAULO Brazil¹² where there was strong association between childhood obesity and eating between the three regular meals (OR= 3.8). This observed similarity is probably because of similar eating patterns and behaviors found in children irrespective of geographical area and race. Parents with poor nutritional habits and sedentary lifestyles become role model for their children and this obesogenic home environment favors child to eat more and irregularly. Moreover there is role of advertise food products and off course the availability of junk food or high caloric diet at home or nearby.

Our study showed that there was strong positive association between TV viewing for >4 hours/day and child hood obesity (OR 3.33) which was similar to another study in SAUO PAULO Brazil¹² where TV viewing for >4 hours/day was most important predictor of childhood obesity (OR= 2.07). This similarity proved that high level of TV viewing in children leads to sedentary life styles. Most of the TV viewing occurs at home and among children the family environment is critical source of influence on children eating habits and behaviors.

TV has become a significant social phenomena in Pakistan. TV viewing is generally believed to generate social forces of undeniable influence. Many advertisements broadcasted and most common products marketed to children are fast food, cold drinks, candies, sweets, soda and snack foods.

Association of childhood obesity with TV viewing >4 hours per day found in my study was also similar to another study conducted in Melbourne Australia¹⁴ where TV viewing >4 hours/day was strong predictor

of obesity in children (Boys OR 2.6 and girls OR 2.8). TV viewing >4 hours/day in causing childhood overweightness was also proved in another study conducted in city of Zwolle, Netherlands¹⁵ where Odd's ratio of being overweight was 1.7 for viewing TV >2 hours among 4 to 8 years children. This association between TV viewing might be explained by factors in the home environment that influence TV viewing. Parents have a central role as they determine the number of TV viewing hours, rules and the children's bed time. The scientific statement addresses the parents and adult care givers "as agents of change" for obese children as they regulate their eating behaviors, TV viewing/computer use patterns and life styles.

Our study proved that there is strong association between childhood obesity and reduced physical activities of <20 minute/day (OR=2.3) which was similar to another study conducted in SAUO POLO Brazil¹² where reduced physical activity for <20 minutes/day was a strong factor in causing obesity. Strong association of childhood overweightness with reduced daily physical activity was also found in another study in Melbourne Australia¹⁴ where low level of physical activity was associated with obesity in children (OR 1.7 for boys and 2.3 for Girls). This low level of physical activity is attributed to TV viewing irrespective of area and race. Children of 4 to 8 years age are much interested in electronic games and TV viewing. These behavioral patterns were also observed in southern European countries i.e., Spain and Greece where positive association between sedentary behaviors and overweight indices were found.

Association of low physical activity and childhood obesity (OR 2.3) in my study was also similar to another study in city of Zwolle Netherland¹⁵ where decreased physical was most important agent of childhood overweightness (OR 2.38). As increased TV viewing is a source of sedentary life style and behavior, it is the home environment and family practices which cause childhood obesity.

CONCLUSION

Obesity is a chronic disorder and has multiple causes. My study concluded that there is strong positive association of childhood obesity with risk factors of family environment (parental obesity, eating between 3 regular meals, TV viewing >4 hours/day and physical activity <20 minutes/day).

My study concluded that maternal obesity is most significant predictor of childhood obesity. It was also concluded there is strong association between paternal obesity and childhood overweightness.

My study also concluded that eating between 3 regular meals is the most important cause of childhood obesity. It was also proved in my study that TV viewing >4hours/day is strongly associated with childhood obesity. My study also concluded that there is positive association between childhood obesity and reduced physical activity <20 minute/day.

REFERENCES

1. Salmon J, Timperio A, Telford A, Carver A, Crawford D. Association of family environment with children's television viewing and with low level of physical activity. *Obes Res.* 2005 Nov;13(11):1939-51.
2. World Health Organization (WHO). Obesity preventing and managing the Global Epidemic. Report of a WHO consultation on obesity. Geneva: WHO/NUT/NCD,2008.
3. Jodkowska M, Oblacirska A, Tabak I, Mikiel-kostyra K. Overweight and obesity among adolescents in Poland: gender and regional differences. *Public health nutrition.*2011;65(3):497-502
4. Koletzko B, Toschke AM. Meal patterns and frequencies: do they affect body weight in children and adolescents? *Crit Rev Food SciNutr.* 2010 Feb 50(2): 100 -5.
5. Hitze B, Bosy-Westphal A, Plachta-Danielzik S, Bielfeldt F, Hermanussen M, Müller MJ. Long-term effects of rapid weight gain in children, adolescents and young adults with appropriate birth weight for gestational age: the Kiel Obesity Prevention Study. *ActaPaediatr.* 2010 Feb;99(2):256-62.
6. Paxton SJ, Eisenberg MO, Meumark-Sztainer D. Prospective predictors of body dissatisfaction in adolescent girls and boys:a five year longitudinal study. *Development Psychology.*2006;42(5):888-99.
7. Snyder TD, Dillow SA, Hoffman CM. Role of family environment in child hood obesity. *NCES.*2009;81:20.
8. Kaphingst KM, Story M. Child care as an untapped setting for obesity prevention: state child care licensing regulations related to nutrition, physical activity and media use for school aged children in the united sates. *J Amer Pub Res Prac.*2009;6(1):1-3.
9. Arenz S, Ruckerl R, Koletzko B, Von KR. Breastfeeding and childhood obesity- a Systematic review. *Int J Obes Relat Metab Disord.*2004;28:1247-56.
10. Rideout V, Hamil E, The media family: Electronic Media in the lives of Infants, Toddlers, preschoolers and their parents. *Pediatr Clin North Am.*2010;30:40-57.
11. Zimmerman FJ, Bell JF. Association of Television content type and obesity in Children. *Am J Public Health.*2010;100(2):334-40.
12. Ribeirold C, Taddei JAAC, Colugnalti F. Obesity among children attending elementary public schools in Sao Paulo, Brazil: a case-control study. *Public Health Nutrition.*2003;6(7):659-63.
13. Danielzik S, Czerwinski MM, Langnase K etal. Parental overweight, socioeconomic status and high birth weight are the major deterinantas of overweight and obesity in 5-7 y-old children. baselinedata of the Kiel obesity prevention study (KOPS). *Int Jour OBes* 2004;28:1494-1502.
14. Judith EB, Jan MN, Dorthy HB. Television viewing by school age children. Associations with physical activity, snack food consumption and unhealthy weight. *Soc Indic Res* 2011;101:221-25.
15. Tandon PS, Zhou C, Sallis JF, Cain KL, Frank LD, Saelens BE. Home environment relationships with children's physical activity, sedentary time, and screen time by socioeconomic status. *Int J BehavNutrPhys Act.* 2012;9:88.