

Determinants of Overweight and Obesity among Qatari Children (2-5 years) in Doha, Qatar-2010

Mervat Rady^{1,2*}, Mariam Al-Muslemani¹, Rasha Salama^{1,3}

¹Joint Program of Arab Board in Community and Family Physicians, Doha, Qatar. ²Department of Community, Environmental and Occupational Medicine, Faculty of Medicine, Ain-Shams University, Egypt. ³Department of Community Medicine, Faculty of Medicine, Suez Canal University, Egypt

*Corresponding Author: Dr. Mervat Rady, Consultant Trainer -Arab Board Program, Primary Health Care-Doha, Department of Family and Community Medicine, Qatar. Email: mhrady@hotmail.com

ABSTRACT

Background: Childhood obesity is a major global burden with modifiable and preventable underlying risk factors. **Objective:** to determine risk factors for overweight and obesity among children; 2-5 years old in Doha city, Qatar. **Subjects and Methods:** A cross sectional approach was conducted from July 2009 to April 2010. Six primary health care centers were randomly selected using the cluster sample technique. Data was collected by Pre-designed and pre-tested interview questionnaire with children's mothers to elicit the information about children socioeconomic characteristics, dietary history and physical activity. Weight and height were measured and BMI was calculated. Overweight and obesity were assessed by WHO- BMI for age growth charts. **Results:** the overall prevalence of overweight and obesity was 26.9%. The final model of multiple logistic regression analysis showed that important determinants of overweight and obesity were positive family history of obesity, low levels of physical activity and consuming high caloric food items more than 4 times per week. **Conclusion:** The study documented high prevalence of overweight and obesity among preschool children in Doha city. Family history of obesity, low levels of playing outdoors and dietary pattern were determinants of overweight/obesity. Suitable recommendations were issued to prevent childhood overweight and obesity among preschoolers.

Key words: *Preschoolers, Qatar, Overweight, Obesity Determinants.*

Rady M, Al-Muslemani M, Salama R. Determinants of Overweight and Obesity among Qatari Children (2-5 years) in Doha, Qatar-2010. *Canad J Clin Nutr* 2013; 1(1): 16-26. DOI: <http://dx.doi.org/10.14206/canad.j.clin.nutr.2013.01.03>

INTRODUCTION

Childhood obesity is a condition where excess body fat negatively affects a child's health or wellbeing (1). Developing countries have seen an increase in child obesity since they started to adapt the westernized lifestyles and behaviors with excess positive energy balance, accelerated by an increasingly sedentary lifestyle in recent decades (2, 3). The increasing consumption of fats, sweeteners, energy dense foods, and fast food meals compared to traditional diets with higher intake of cereals characterize the current era. The result is a series of nutritional inequities in many nations, communities, and households. Technology and transportation throughout the food supply chain have facilitated the production and distribution of foods associated with the nutrition transition, while cultural influences have introduced new foods into developing countries and shaped the desire for those foods (4, 5).

State of Qatar is being classified among the countries passed through advanced nutritional transition stage, with high level of overweight and obesity, and micronutrient deficiencies in some population sub-groups (6). Determining the risk factors of preschool overweight and obesity can serve as a basis for planning policies and cost effective intervention programs as well as a baseline for further research. So the aim of this study was to identify determinants of overweight and obesity among preschool children aged 2 to 5 years in Doha city.

SUBJECTS AND METHODS

Study Design

This cross-sectional study was conducted from July 2009 to April 2010 in sample units of six randomly selected primary health care centers (PHCCs) from the total 10 centers list of Al-Doha city; the capital of Qatar.

Sample Size

The sample size was estimated by using the formula: $n = \frac{DEFFECT [z^2 \alpha/2 (pq) /d^2]}{}$; the prevalence of obesity was taken as 16% (7), the degree of precision of the estimate was set at 5% and the design effect of cluster sampling was set as 1.8. Using the previous formula the sample size was estimated to be 371. After adding an inflation rate 30%, an additional 112 children were added. Thus 483 children were selected for this study.

Study Population

The study subjects were apparently healthy children including boys and girls aged 2-5 years who attended these centers with their mothers and agreed to participate by maternal written consent. The following children were excluded; children with chronic diseases or using medications capable to interfere with weights or heights, and children with physical deformities or if the mothers were unwilling to participate. The study protocol was approved by the ethical committee of Hamad Medical Corporation and Primary Health Care Corporation. A prior consent for the study was taken from the mothers.

Study Tools

At each center, a structured interview questionnaire was used. It consists of 36 closed ended questions in Arabic about: Children's characteristics: age, sex, child siblings' number and birth order; parents characteristics: educational level, maternal job, family income and family history of obesity; children's behaviors and habits as regard eating habits, daily activity and exercise and the recorded anthropometric measurements of the child and his/her mother. Data collection process was done separately in a private room for each child to ensure privacy. The pretest of the questionnaire had been done prior to the real data collection among 30 mothers. Weights and heights were taken by trained nurses in the centers using the standard techniques with a sensitivity of 0.1 cm and 0.1 kg respectively. Zero error was set daily. BMI was calculated and the children were identified as overweight if the BMI was $\geq 85^{\text{th}}$ - $< 97^{\text{th}}$ percentile and obese if BMI was $\geq 97^{\text{th}}$ percentile according to age-sex specific percentiles of BMI using the WHO BMI-for-age growth charts (8).

Exclusive breast feeding: was defined as that the child being fed no food or drinks even the water other than the breast milk. Eating behaviors and habits: they were based on food frequency. It is concerning type of food usually consumed by Qatari children in a week. The categories of each food item were classified by the author as follow: > 4 days per week: Every day or 5-6 times per week, ≤ 4 times per week: equal to and below 4 times per week and Never/very seldom: never or 2 days or 1 day per month. Daily life activity: This refers to the average length of time children spend on each activity in a day. The reference for watching television, and playing indoor games (such as computer games, game boy, and play

station) were considered to be < 2 hours per day. For playing outdoors, we considered the reference to be ≥ 1 hour by day. Exercise: This refers to whether the child participates in any type of sports, or exercise suitable for his/her age; the ideal frequency per week was considered 3 times per week and duration per time not less than 30 minutes.

Statistical Analysis

All data entries were double checked for any errors. Association of each categorical variable with overweight and obesity was assessed using X² test and the strength of their association was computed by the unadjusted odds (95% confidence interval). Variables showing statistically significant ($P < 0.05$) association with the outcome variable (overweight and obesity) were considered as risk factors for the outcome. These variables were simultaneously entered into a step wise logistic regression model to determine the independent risk factors of overweight and obesity. Data analysis was performed using the SPSS statistical package. In this study P value < 5 % was considered as statistical significant.

RESULTS

A total 464 children from the selected 6 PHCCs who satisfied the inclusion criteria and agree to participate, were enrolled in the study, out of them 50.2% were boys and 49.8 were girls with mean sample age 41.69 ± 10.2 months. 98 of the studied children were under weights according to body category and excluded from the analysis. The overall prevalence of overweight and obesity was 12.9% and 14%. The prevalence of overweight and obesity was 10.6% and 15.5% in boys and 15.2 and 12.5% in girls. The overall difference between boys and girls was statistically insignificant.

Table 1 represents the bivariate relationship of some socioeconomic and nutritional habits variables were statistically significant ($P < 0.05$) and were associated with increased risk of overweight and obesity as the odds ratios exceeded the unity, while for high protein and green vegetables intake; both were significant protective variables and the since the odds ratio was 0.05 and 0.41 respectively.

Table 2 shows the statistically significant bivariate relationship of some physical activity variables which were associated with increased risk of overweight and obesity as the odds ratios exceeded (1) and the 95% CI does not contain the unity, $P < 0.05$. The data on table 2, also shows that there is a very low percent 11.2% (41/366) of children who practice sports or exercise in our sample and there is no relation between the history of doing exercise and occurrence of OW&OB among the children since $P > 0.05$. However, the duration and frequency per week were significantly associated with occurrence of OW&OB among children in this age group since higher percent of OW&OB were among those practice sports for less than 30 minutes per time and less than 3 times per week compared to the other categories and $P < 0.001$ in the two situations.

Table 3 illustrates that, when the variables showing significant association at $P < 0.05$ were simultaneously considered in the logistic regression model with overweight and obesity as a binary outcome versus the normal weights, it was observed that children with positive family history of obesity, negative history of daily breakfast and with exclusive breast feeding ≤ 4 months were having 7.4 times (OR= 7.4; 95% CI =2.9-12.8), 7.9 times (OR=7.9; 95% CI=4.1-19.7) and 8.5 times (OR=8.5; 95% CI=5.7-18.3) more risk of overweight and obesity respectively. Similarly, children eating meals full of carbohydrates, bakery and sugary foods for more than 4 days per week having 8.5 times (CI=1.6-12.5), 3.7times (CI=1.5-9.3) and 6.2 (4.1-15.5) times more risk of overweight and obesity respectively. The risk of overweight and obesity is nearly twice when the child consumed fast food meals more than 4 times/week

(OR=1.9, CI=1.2-4.1). Playing outdoors in the weekends for less than 1 hrs/day was associated with the risk of overweight and obesity of 18.9 times (OR=18.9; CI=11.3-26.7).

DISCUSSION

In the present study, the prevalence of overweight and obesity was 12.9% and 14%; being 10.7% and 15.5% in boys and 15.2% and 12.5% in girls, respectively. In a study done by Supreme council of Health in coordination with the WHO-EMRO (2008), the prevalence of overweight among less than 5 years Qatari children was 28.7% (6). Also, Al-Najeeb *et al.*, showed that the rate of obesity and overweight was 23% and 16% respectively among primary school Qatari children (9). The results of these studies mean that the problem of overweight and obesity among the Qatari children is a real health problem and reflecting the negligence or underestimation of the problem. Although the mechanism of obesity development is not fully understood, it is confirmed that obesity occurs when energy intake exceeds energy expenditure. There are multiple etiologies for this imbalance, hence, and rising prevalence of obesity cannot be addressed by a single etiology. Genetic factors influence the susceptibility of a given child to an obesity-conductive environment. However, environmental factors, life style preferences, and cultural environment seem to play major roles in the rising prevalence of obesity worldwide (10). Parental obesity is the best predictor of childhood obesity as reported by Abdul Wahab *et al.*, in Kuwaiti (11). Also, Shepherd (2009), reported that the first cause of excess body fat in children is a genetic factor especially among near relatives (12). From the family history of obesity point of view, the present study shows strong relation between family history and children body status suggesting the genetic effect. This relation may be due the fact that parents and children usually share dietary habits and have similar physical activity levels, thus contributing towards the greater risk of obesity in certain families. Also, busy families today rely on convenient foods which often come from fast food establishments, other restaurants, and the frozen and prepackaged food sections of the grocery store.

Hurried families no longer have time to sit down to eat meals together, even though eating together has been associated with greater intake of foods from the basic food groups in both children and adults, furthermore it was reported that infant weight gain is associated with an interaction between the duration of breastfeeding and the timing of complementary food introduction (13). Moreover, they specify the interaction which was identified for longer durations of breastfeeding than 20 weeks. In the meantime, they recognize earlier complementary food induction (< 16 weeks) was associated with greater infant weight gain. In a wide-ranging meta-analysis, Harder *et al.*, included 17 studies, reported the duration of breast feeding; and included children fed exclusively with infant formula for comparison (14). Based on these data, they reported that the duration of breast feeding was inversely associated with risk of overweight, independent of the definition of overweight used and the age of the participants in the studies.

Fast food intake is one of the risk factors for obesity and overweight in the present study. It is more energy dense and higher in fat content. The same result was observed by David *et al* and Weyermann *et al.*, as the prevalence of overweight and obesity grew from in children with frequent snacking and consumption of junk food (15, 16). Excess consumption of carbohydrates, bakery, fatty and the sugary items were significant risk factors for overweight and obesity. The same result was obtained in a number of cross-sectional and longitudinal studies (10, 17, 18). Consumption of these items increases weight as they add more calories and satiety is not addressed. However, Food frequency methods like the one we used in our

study, measure usual diet, but estimate caloric intake poorly (10). Other methods such as 24-hour recall or food diaries evaluate caloric intakes more accurately, however, estimate short-term not long-term intake (19). Mahshid *et al.*, reported that, total energy intake is difficult to measure accurately at a population level (10).

A number of studies in western countries failed to correlate the excess in obesity rates with the total energy intake and even they reported lower level of energy intake among obese children compared with their lean counterparts (20). Evaluation of food intake among pre-school children is an even more difficult task because there is little data about food habits and preferences of this age group in the literature. Older age groups especially school- children, teens and adolescents have been investigated much more thoroughly (21). Also, food evaluation using parents recall is always liable to bias due to over or under estimation as reported also by Schonfeld and Warden, who reported that this method is not a valid measurement (22). Our results document the relation between missing breakfast and occurrence of overweight and obesity among children. The odds to become an overweight or obese child are 8 times more among children skipping breakfast than the children do not do that. Unfortunately, 28% of study sample skips to take the breakfast daily. It was reported that one out of every three children skips breakfast. Skipping breakfast expose a hungry child to eat more portions from the high caloric lunch meal or to snack frequency (9).

The role of physical inactivity in the process of obesity is very clear in the present study as the obesity rate is significantly higher among the inactive group of children. It has been hypothesized that a steady decline in physical activity among all age groups has heavily contributed to rising rates of obesity all around the world. Numerous studies have shown that sedentary behaviors like watching TV and playing computer games are associated with increased prevalence of obesity (23). Furthermore, parents from these studies report that they prefer having their children watch TV at home rather than play outside unattended because parents are then able to complete their chores while keeping an eye on their children (24).

In addition, increased proportions of children who are being driven and low participation rates in sports particularly among female children (25), are also associated with increased obesity prevalence which is very obvious among our sample since a very small percent of the children participate in exercise or sport activity. Since both parental and children's choices fashion these behaviors, it is not surprising that overweight children tend to have overweight parents and are themselves more likely to grow into overweight adults than normal weight children (26). Although, the population-based studies which relate physical activity to obesity are limited, but they concluded that increased physical activity might decrease the accelerated weight gain epidemic (27-30). In the present study, it was found that children who did not play outdoor games had an increased risk of overweight and obesity. By encouraging children to play outdoor games not only increases their physical activity but also they remain fit.

CONCLUSION

The major conclusion drawn from this study is that family history of obesity, absence of daily breakfast, consuming fast food, excess carbohydrates, bakery and sugary food items with low levels of physical activity are associated with higher prevalence of overweight and obesity among Qatari preschool children attending the primary care centers. Accordingly, there is a need to apply nutritional education programs to mothers regarding feeding of their children during this age group (2-5 years), and encouraging out-door activities suitable for their age as a preventive strategies for childhood overweight and obesity.

Conflicts of Interest

The authors indicated no potential or actual conflict of interest pertaining to this study.

Authors' Contribution

All authors made full contribution to data acquisition, interpretation of results, drafting and revising the final manuscript. All authors read and approved the final manuscript.

Study Limitations

There were certain limitations of the present study; the study relied on the mother's memory-recall which influenced by limited degree of loss of information as regard their children physical activity and dietary patterns. Dietary history was based only on qualitative data and didn't take into consideration type and amount of foods in details.

Acknowledgements

We would like to thank all nurses, technicians and physicians for their kind support in data collection and laboratory analysis. We also thank the children and their parents for contribution in the study.

REFERENCES

1. World Health Organization. Obesity and Overweight. World Health Organization. Obesity and overweight. Fact sheet: 311. September, 2006. WHO press office, Geneva, Switzerland.
2. Marghenta C, Trudy M, Francesco B. Methodological consideration for childhood surveillance system: The case of obesity. *Journal of Public Health* 2007; 15(3):147-153.
3. John C. Dietary fat and body weight control. *Lipids Journal* 2003; 38(2):123-127.
4. Hawkes C. Uneven dietary development: linking the policies and processes of globalization with the nutrition transition, obesity and diet-related chronic diseases. *Globalization and Health* 2006; 2:4. Doi: 10.1186/1744-8603-2-4.
5. Kumanyika S, Jeffery R, Morabia A, C Ritenbaugh V. Obesity prevention: the case for action. *International Journal of Obesity* 2002; 26(3): 425-436.
6. World Health Organization. Regional strategy on nutrition 2010-2019. Technical paper. Regional Committee for the Eastern Mediterranean. EM/RC57/4. 2010. Available from: www.emro.who.int/docs/EM_RC57_4_en.pdf.
7. Ghada Y, Maryam A, Musaiger A, Reshma D. Prevalence of overweight and obesity among children aged 2-5 years in Bahrain: A comparison between two reference standards. *International Journal of Pediatric Obesity* 2009; 4 (4): 414 –416.
8. World Health Organization. Child Growth Standards based on length/height, weight and age. *Acta Paediatrica* 2006; 450: 76-85.

9. Al Naqeeb B. The role of parents and schools in preventing childhood obesity. *Journal of Academic Writing* 2010; 37-44.
10. Mahshid D, Noori A, Anwar T .Childhood obesity, prevalence and prevention. *Nutrition Journal* 2005; 4(24):1-8.
11. Al-Isa AN, Campbell J, Desapriya E. Factors Associated with Overweight and Obesity among Kuwaiti Elementary Male School Children Aged 6–10 Years. *International Journal of Pediatrics* 2010; 459261:6. Doi: 10.1155/2010/459261.
12. Shepherd A. Diets and behaviors to prevent child obesity. *Practice Nursing* 2009; 20(4):172-179.
13. Heather P, Theresa A, Nicklas D.A review of family and social determinants of children’s eating patterns and diet quality. *Journal of American College of Nutrition* 2005; 24(2):83-92.
14. Harder T, Bergman R, Kallischnigg G, Plagemann. Duration of breastfeeding and risk of overweight: a meta-analysis. *Am J Epidemiol* 2005; 162: 397- 403.
15. Ludwig DS, Peterson KE, Gortmaker SL. Relation between consumption of sugar-sweetened drinks and childhood obesity: a prospective, observational analysis. *Lancet* 2001; 357(9255):505-508.
16. Weyermann M, Rothenbacher D, Brenner H. Duration of breastfeeding and risk of overweight in childhood: a prospective birth cohort study from Germany. *International Journal of Obesity* 2006; 30:1281–1287.
17. Matthew M, Bonnie G, Sandra H, Rachel J. Recommendations for Prevention of Childhood Obesity. *American Academy of Pediatrics* 2007; 120(4): S229- S233.
18. Rolland C. Deheeger M, Bellisle F. Nutrient balance and android body fat distribution: Why not a role for protein? *Am J Clin Nutr* 1996; 663-664.
19. Styne D. Obesity in childhood: what's activity got to do with it? *Am J Clin Nutr* 2005; 81: 337-338.
20. Kelishadi R, Pour M, Sarraf N, Sadry G, Ansary R. Obesity and associated modifiable environmental factors in Iranian adolescents. *Isfahan Healthy Heart Program. Heart Health promotion from childhood. Pediatr Int* 2003; 45:435-42.
21. Geni B, Eugênia F, Giselia A .Early weaning and other potential risk factors for overweight among preschool children. *Clinics* 2010; 65(2):181-187.
22. Schonfeld-Warden N, Warden CH. Obesidade pediátrica -Uma visão global da etiologiae do tratamento. *Clin Pediatr Am Norte* 1997; 2:343-366.

23. Tremblay M, Willms D: Is the Canadian childhood obesity epidemic related to physical inactivity? *Int J Obes Relat Metab Disord* 2003; 27:1100-1105.
24. Gordon L, Griffiths P, Bentley M, Ward D, Kelsey K, Shields K, Ammerman A. Barriers to physical activity: qualitative data on caregiver-daughter perceptions and practices. *Am J Prev Med* 2004. 27: 218-223.
25. Swinburn B, Egger G. Preventive strategies against weight gain and obesity. *Obes Rev* 2002; 3: 289-301.
26. Carriere G. Parent and child factors associated with youth obesity. *Health Rep* 2003; 14:29-39.
27. Denes M., Barbara L. Physical activity in relation to overweight and obesity in children and adolescents. *Eur J Pediatr* 2000; 159(1):45-55.
28. Ross J, Pate R. The national children and youth fitness study .*Educational recreant dance* 1987; 1: 51-56.
29. Maffeis C, Talamini J, Tato L. Influence of diet, physical activity and parents' obesity on children adiposity: a four year longitudinal study. *Int J Obese Relat Mitab Disord* 1998; 22:758-764.
30. Roberts S, Savage J, Coward W. Energy expenditure and intake in infants born to lean and overweight mothers. *N Engl J Med* 1988; 318:461-466.

Table 1: Bivariate relationship between the socioeconomic and dietary habit variables, overweight and obesity among Qatari children 2-5 years old attending PHCCs-2010

Variables	Body Category		OR (95%CI)	P-Value
	Overweight & Obese (n=125) No. (%)	Normal (n=241) No. (%)		
Positive family history of obesity	80 (64.0)	28 (11.6)	13.2 (7.5-23.5)	<0.001
Exclusive Breast feeding ≤ 4 months	114 (91.2)	189 (78.4)	2.9 (1.4-5.7)	<0.001
> 3 meals per day	40 (32.0)	40 (16.6)	2.4 (1.4-4.1)	<0.001
Negative history of daily breakfast	80 (64.0)	34 (14.1)	10.8 (6.3-18.7)	<0.001
Snacks consumption ≥ onetime/day	92 (73.6)	142 (58.9)	1.94 (0.8-4.5)	<0.05
Soft drinks consumption ≥ onetime/day	97 (77.6)	137 (56.8)	2.74 (1.5-5.1)	<0.001
Artificial juice consumption ≥ onetime/day	105 (84)	121(50.2)	17.4 (4.1-23.6)	<0.001
Protein intake > 4 days/week	16 (12.8)	57 (23.7)	0.05 (0.01-0.4)	<0.001
Dairy products intake > 4 days/week	69 (55.2)	96 (39.8)	1.86 (1.2-2.9)	<0.01
Carbohydrate products intake > 4 days/week	34 (27.2)	8 (3.3)	36.(8.9-150.7)	<0.001
Sugary products intake > 4 days/week	76 (60.8)	15 (6.2)	14.8 (6.3-34.9)	<0.001
Bakery products intake > 4 days/week	64 (51.2)	18 (7.5)	5.5 (2.2-13.8)	<0.001
Fatty meals intake > 4 days/week	6 (4.8)	2 (0.8)	11.1 (2.1-59.2)	<0.001
Fast food meals intake > 4 days/week	24 (19.2)	23 (9.5)	3.6 (1.7-7.9)	<0.001
Green vegetable intake ≥ onetime/day	78 (62.4)	173 (71.8)	0.41(0.17-0.98)	<0.05
Fruits & fresh juice intake ≥ onetime/day	18 (14.4)	12 (4.9)	2.9 (1.3-6-7)	<0.01

Table 2: Bivariate relationship between the physical activity habits variables, overweight and obesity among Qatari children 2-5 years old attending PHCCs-2010

Variables	Body category		OR (95%CI)	P-Value
	Overweight & Obese(n=125) No. (%)	Normal (n=241) No. (%)		
Spend time for sleeping > 8 hrs/day	57 (45.6)	46 (19.1)	3.55 (2.2-5.9)	<0.001
Spend time watching TV > 2 hrs/day	103 (82.4)	166 (68.9)	2.12 (1.2-5.9)	<0.01
Spend time playing other electronic games > 2 hrs/day	33 (26.4)	21 (8.7)	4.32 (2.4-7.9)	<0.001
Spend time playing outdoors in weekdays < 1 hr/day	90 (72)	124 (51.4)	2.43 (1.5-3.9)	<0.001
Spend time playing outdoors in weekends < 1 hr/day	114 (91.2)	37 (15.4)	57.1(27.1-67.2)	<0.001
Positive history of practicing exercise	18 (14.4)	23 (9.5)	0.63(0.31-.29)	>0.05
Time sport <30 min/time	18 (72.2)	23 (13.04)	17.3 (3.5-85.2)	<0.001
Frequency/week <3 times/week	18 (88.8)	23 (26.1)	22.7(3.9-29.1)	<0.001

Table 3: Risk factors using stepwise logistic regression analysis

Variables	Category	AOR (95%CI)	P-Value
Family history of obesity	No	1.00	
	Yes	7.4 (2.9-12.7)	<0.01
Exclusive breast feeding	> 4 months	1.00	
	≤ 4 months	8.5 (5.7-18.3)	<0.01
Daily breakfast intake	Yes	1.00	
	No	7.9 (4.1-19.7)	<0.001
Meals full of carbohydrates	≤ 4 days/week	1.00	
	> 4 days/week	8.5 (1.6-12.5)	<0.05
Bakery foodstuffs intake	≤ 4 days/week	1.00	
	> 4 days/week	3.7 (1.5-9.3)	<0.001
Sugary foodstuffs intake	≤ 4 days/week	1.00	
	> 4 days/week	6.2 (4.02-15.5)	<0.001
Fast food meals intake	≤ 4 days/week	1.00	
	> 4 days/week	1.9 (1.2-4.1)	<0.001
Playing outdoors in weekends	≥ 1 hr/day	1.00	
	< 1 hr/day	18.9 (11.3-26.7)	<0.001
Constant	-57.023		

The overall predictive % of the model=94% ($R^2 = 0.943$)