How to Cite:
AL-khalik, A. A., Al-hafidh, A. H., & Kadhum, S. A. (2022). Lifestyle associated with the obesity in children under 5 years of age in Hilla city, Iraq. *International Journal of Health Sciences*, *6*(S8), 1040–1050. https://doi.org/10.53730/ijhs.v6nS8.10166

Lifestyle associated with the obesity in children under 5 years of age in Hilla city, Iraq

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***Abstract*---**Background: Poorer communities have disproportionately higher rates of overweight and obesity, but there are few research that looks at child health-related lifestyles that may guide the development of useful treatments. The Aim of study is to identify lifestyle factors associated with obesity in children under 5 years. Subjects and Methods: A case-control study was conducted on 100 children with obesity and 100 healthy participants in primary health care centers at Hilla city. The study used a convenience sampling technique (non-random sampling technique) to choose the children with obesity and control groups via take body anthropometry and direct interviews. The data collection continued for a period of 3 months starting on 2nd January 2022 and ending on 1st April,2022. Results: the results found that the children who practice physical activity inside the home for 1-2 per week are likely at higher risk for obesity at 17.680 times than those who practice physical activity inside the home daily. While the participants who do not eat while watching TV are likely at less risk for obesity than those who eat while watching TV (B=-0.679-; P. value=0.032; OR= 0.507; 95% C.I 0.272-0.945). Sleeping (10-13 hours) including naps at afternoon are association with less risk for obesity (B= -0.699-; P. value=0.023; OR= 0.497; 95% C.I 0.272-0.909). While the children who do not watch TV/ Playing with IPad for more than 2 hours daily are likely at less risk for obesity than those who Watching TV/ Playing with IPad for more than 2 hours daily (B=-0.675-; P. value=0.048; OR= 0.509; 95% C.I 0.261-0.995). Conclusion: The study revealed that daily physical activity is significantly

association with a reduced of obesity. Whereas Eating while watching TV, Sleeping (10-13 hours) including naps in the afternoon, Watching TV/ Playing with IPad, and good appetite are significantly association with an increase of obesity.

***Keywords*---**obesity, lifestyle, physical activity, behavioral.

Introduction

The prevalence of childhood obesity has lately substantially grown in both developed and developing nations (1), despite indications that some affluent nations have reached a plateau in this regard (2). According to Cali' et al., (2008) (3), children who are obese are more likely to acquire cardiometabolic risk factors. Given that obesity results from a chronic energy imbalance, the main focus of efforts to prevent pediatric obesity is the promotion of healthy lifestyle habits including lowering energy consumption and increasing physical activity (4). Childhood obesity has been linked to a number of lifestyle variables, including physical inactivity (5), excessive sedentary behavior (6), and inadequate sleep length (7).

Physiological, psychological, social, behavioral, environmental, and hereditary variables all have a role in obesity, which is a complex illness (8). The multifaceted causes of obesity include interactions between heredity and bad lifestyle choices. Studies on twins, families, and adoption have revealed that the heredity of obesity varies from 30% to 70% (9).

Patients and Methods

1. Design of the study: A case- Control study was conducted on 100 children with obesity and 100 healthy participants
2. Setting of the Study: The study was conducted in primary health care centers at Hilla city, Babylon Governorate, which is located south of the capital, Baghdad
3. Sampling technique: Total number of health care sectors in hilla city was 2 included (first Hilla sector , second Hilla sector), 50% of health care centers had been taken from each sector, 10 health care centers were selected randomly from these sectors ,primary health care centers from health care sectors collection were selected by simple random sampling. The study used convenient sampling (non- random sampling technique) to choose case and control by direct interviewer to parents of child and anthropometric measure.
4. Method of data collection: The data was collected by direct interview with the parent of child after translated questionnaire to local language (Arabic) by using close-ended questions and body anthropometry was taken to every child by using (a weighing scale to measure body weight and length tape measure for measuring height and Tape measure for mid-arm circumference (Shaker's tape)).
5. Statistical Analysis: The data for each questionnaire was encoded and entered into an excel sheet before in being transferred to the Statistical

Packages for Social Sciences (SPSS)-26 Version. Extract data in the form of statistical tables consisting of frequencies, percentages, means, standard deviations, and ranges (minimum and maximum values). Statistical significance was taken into account when the P-value was equal to or less than 0.05. Univariate and Univariate logistic regression analysis was used to identify the risk factors associated with obesity. Significant difference between percentages using Pearson Chi-square test (□2-test).

Result

Socio-demographic Characteristics

Table 1 showed that the highest percentage of children with obesity in the age group 5 years 36 (36.0%). Fifty percent of children with obesity each for boy and girl. As for mother education, 55 (55.0%) of the participants with obesity were their mothers who have college/ institute certificates. Concerning father education, the results found that the highest percentage 52 (52.0%) of the participants with obesity their fathers have college/ institute certificates. Whereas 68 (68.0%) of them were living in the owned houses. There is no significant association between the case and control groups regarding socio-demographic characteristics (P. value >0.05), except for gender (girls) is higher significantly in the case than in the control group.

Table (1) The distribution of socio-demographic characteristics of children with obese and control group

		Obese		Control		P value
		No	%	No	%	
Child age (years)	2 years	8	8.0	9	9.0	0.881
	3 years	23	23.0	19	19.0	
	4 years	33	33.0	32	32.0	
	5 years	36	36.0	40	40.0	
Gender	Boy	50	50.0	68	68.0	0.010*
	Girl	50	50.0	32	32.0	
Mother education	Illiterate	5	5.0	2	2.0	0.608
	Read & write	4	4.0	4	4.0	
	Primary school	9	9.0	6	6.0	
	Secondary school	13	13.0	18	18.0	
	College/ Institute	55	55.0	51	51.0	
	Higher education	14	14.0	19	19.0	
Mother occupation	Working	54	54.0	63	63.0	0.196
	Not	46	46.0	37	37.0	
Father education	Illiterate	1	1.0	-	-	0.162
	Read & write	11	11.0	4	4.0	
	Primary school	6	6.0	3	3.0	
	Secondary school	15	15.0	17	17.0	
	College/ Institute	52	52.0	51	51.0	
	Higher education	15	15.0	25	25.0	
Father occupation	Working	94	94.0	100	100.0	-
	Not	6	6.0	-	-	

Type of house	Owned	68	68.0	72	72.0	0.767
	Rented	25	25.0	23	23.0	
	Shared	7	7.0	5	5.0	

*Significant difference between percentages using Pearson Chi-square test (χ^2-test) at 0.05 level.

Lifestyle of children

The Lifestyle of children with obesity is shown in Table 2. The table found that the highest percentage (50.0%, 52.0%, and 70.0%) of children with obesity whose parents report that responded with yes or daily regarding physical activity (more than 2 hours) inside the home, sleeping (<10 hours) including naps at afternoon, and a good appetite of child respectively. While the highest percentage (50.0%, 49.0%, and 71.0%) of children with obesity whose parents report that responded with "no" about eating while watching TV, Watching TV/ Playing with IPad for more than 2 hours daily, and Child eating quickly respectively. More than half of children 51 (51.0%) were sometimes practice physical activity (more than 2 hours) outside the home (bicycle, football)**.**

Regarding the control group, the same table found that the highest percentage (68.0%, and 50.0%) of the healthy children whose parents report that responded with "yes" or "daily" regarding physical activity (more than 2 hours) inside the home, and a good appetite of child respectively. While the highest percentage (57.0%, 56.0%, 52.0%, and 87.0%) of the healthy children whose parents report that answer with "no" about physical activity (more than 2 hours) outside the home (bicycle, football), eating while watching TV, Watching TV/ Playing with IPad for more than 2 hours daily, and Child eating quickly respectively.

Table (2) The distribution of children with obese and control group according to Lifestyle of children

		Obese		Control	
		No	%	No	%
Physical activity (more than 2 hours) inside home	Yes (Daily)	50	50.0	68	68.0
	No	37	37.0	31	31.0
	Sometimes (1-2/week)	13	13.0	1	1.0
Physical activity (more than 2 hours) outside home (bicycle, football)	Yes (Daily)	10	10.0	14	14.0
	No	39	39.0	57	57.0
	Sometimes (1-2/week)	51	51.0	29	29.0
Eating while watching TV	Yes (Daily)	44	44.0	25	25.0
	No	50	50.0	56	56.0
	Sometimes (1-2/week)	6	6.0	19	19.0
Sleeping including naps at afternoon	<10 hours	52	52.0	34	34.0
	(10-13 hours)	38	38.0	50	50.0
	>13 hours	10	10.0	16	16.0
Watching TV/ Playing with IPad more than 2 hours daily	Yes (Daily)	37	37.0	20	20.0
	No	49	49.0	52	52.0
	Sometimes (1-2/week)	14	14.0	28	28.0
Child have good appetite	Yes	70	70.0	50	50.0
	No	23	23.0	10	10.0

	Sometimes	7	7.0	40	40.0
Child eating quickly	Yes	29	29.0	9	9.0
	No	71	71.0	87	87.0
	Sometimes	-	-	4	4.0
Number of servings	2	-	-	12	12.0
	3	57	57.0	53	53.0
	4	28	28.0	26	26.0
	=>5	15	15.0	9	9.0

In table 3 the results found that the children who practice physical activity inside the home for 1-2 per week are likely at higher risk for obesity at 17.680 times than those who practice physical activity inside the home daily. While the participants who do not eat while watching TV are likely at less risk for obesity than those who eat while watching TV (B=-0.679-; P. value=0.032; OR= 0.507; 95% C.I 0.272-0.945). Sleeping (10-13 hours) including naps at afternoon are association with less risk for obesity (B= -0.699-; P. value=0.023; OR= 0.497; 95% C.I 0.272-0.909). While the children who do not watch TV/ Playing with IPad for more than 2 hours daily are likely at less risk for obesity than those who Watching TV/ Playing with IPad for more than 2 hours daily (B=-0.675-; P. value=0.048; OR= 0.509; 95% C.I 0.261-0.995). As for the appetite of children, the results reveal that the participants who sometimes have a good appetite are likely at less risk for obesity than those who daily have a good appetite (B=-2.079-; P. value<0.001; OR= 0.125; 95% C.I 0.052-0.302). Also, the current study reveals that the children who do not eat quickly are likely at less risk for obesity than those who eat quickly (B=-1.373-; P. value=0.001; OR= 0.253; 95% C.I 0.113-0.570).

Table (3) Univariate Logistic Regression analysis to identify Lifestyle of children associated with Obese

		B	P. value	OR	95% C.I. for OR	
					Lower	Upper
Physical activity (more than 2 hours) inside home	Yes (Daily)	Reference				
	No	0.484	0.114	1.623	0.890	2.960
	Sometimes (1-2/week)	2.872	0.006	17.680	2.239	139.616
Physical activity (more than 2 hours) outside home (bicycle, football)	Yes (Daily)	Reference				
	No	-0.043-	0.926	.958	.386	2.375
	Sometimes (1-2/week)	0.901	0.058	2.462	0.971	6.245
Eating while watching TV	Yes (Daily)	Reference				
	No	-0.679-	0.032	0.507	0.272	0.945
	Sometimes (1-2/week)	-1.718-	0.001	0.179	0.063	0.508
Sleeping (10-13 hours) including naps at afternoon	<10 hours	Reference				
	(10-13 hours)	-0.699-	0.023	0.497	0.272	0.909
	>13 hours	-0.895-	0.051	0.409	0.166	1.006
Watching TV/ Playing with IPad more than 2 hours daily	Yes (Daily)	Reference				
	No	-0.675-	0.048	0.509	0.261	0.995
	Sometimes	-1.308-	0.002	0.270	0.117	0.627

	(1-2/week)					
Child have good appetite	Yes	Reference				
	No	0.496	0.239	1.643	0.719	3.754
	Sometimes	-2.079-	<0.001	0.125	0.052	0.302
Child eating quickly	Yes	Reference				
	No	-1.373-	0.001	0.253	0.113	0.570
	Sometimes	-22.373-	0.999	0.000	0.000	.
Number of servings	2	Reference				
	3	21.276	0.999	1737393566.00	0.000	.
	4	21.277	0.999	1739738226.00	0.000	.
	=>5	21.714	0.999	2692452017.00	0.000	.

Table 4 Multivariate Logistic regression analysis showed that daily physical activity is significantly association with a reduced of obesity. Whereas Eating while watching TV, Sleeping (10-13 hours) including naps in the afternoon, Watching TV/ Playing with IPad, and good appetite are significantly association with an increase of obesity.

Table (3) Multivariate Logistic Regression analysis to identify Lifestyle of children associated with Obese

Multivariate Logistic regression		B	P. value	OR	95% C.I. for OR	
					Lower	Upper
Physical activity (more than 2 hours) inside home	Yes (Daily)	Reference				
	No	0.441	0.250	1.554	0.733	3.293
	Sometimes (1-2/week)	2.584	0.027	13.255	1.334	131.700
Eating while watching TV	Yes (Daily)	Reference				
	No	-0.485-	0.259	0.616	0.265	1.429
	Sometimes (1-2/week)	-1.662-	0.011	0.190	0.053	0.684
Sleeping (10-13 hours) including naps at afternoon	<10 hours	Reference				
	(10-13 hours)	-0.708-	0.065	0.493	0.232	1.046
	>13 hours	-0.849-	0.157	0.428	0.132	1.385
Watching TV/ Playing with IPad more than 2 hours daily	Yes (Daily)	Reference				
	No	-0.859-	0.084	0.424	0.160	1.123
	Sometimes (1-2/week)	-1.603-	0.005	0.201	0.065	0.624
Child have good appetite	Yes	Reference				
	No	-0.307-	0.593	0.736	0.239	2.267
	Sometimes	-2.569-	<0.001	0.077	0.027	0.217
Child eating quickly	Yes	Reference				
	No	-0.751-	0.159	0.472	0.166	1.341
	Sometimes	-21.655-	0.999	0.000	0.000	.

Discussion

The results found that there is no significant association between the case and control groups regarding socio-demographic characteristics (P. value >0.05), except for gender (girls) is higher significantly in the case than in the control group. These findings are consistent with results of past studies in Ghana (10). Bell et al., (2018) (11), which revealed that there was no significant association between Maternal level of education and obesity. In Australia the study by Sanigorski et al., (2007) (12) reported that Obesity and overweight were shown to be more common in girls than in boys (29.6 % ±1.4 % vs. 23.9 % ±1.3 %, respectively).

The results found that the children who practice physical activity inside the home for 1-2 per week are likely at higher risk for obesity at 17.680 times than those who practice physical activity inside the home daily. These results are consistent with the previous studies (13) (14) . Chaput et al., (2017) (15), which found that more physical activity of children to support a healthy level of adiposity. Also, (16), reported The highest percentage (65.4%) of children who met the physical activity (≥ 3 h daily physical activity) have protect from obesity. Another study by (17), reported that Physical inactivity has been highlighted as a significant cause of death worldwide and a contributor to the rise in overweight and obesity.

In this study, Sleeping (10-13 hours) including naps at afternoon are association with less risk for obesity (B= -0.699-; P. value=0.023; OR= 0.497; 95% C.I 0.272-0.909). These findings agreed with (18), who found that there was significant association between short sleep and overweight/obesity. Sleep deprivation is linked to lower levels of circulating leptin (19) (20) and higher levels of ghrelin (21), which are linked to increased hunger, appetite, motivation to eat, and food intake (22) (23). Furthermore, when sleep is restricted, more recent experimental studies with adults have shown increases in caloric intake from both snack foods (24) and main meals (25), implying that less sleep may increase the risk of obesity via neuroendocrine changes that increase food intake. Finally, although little is known about this, sleep deprivation is thought to cause changes in physical and sedentary activity, which might contribute to weight gain.

Also, the present study reveals that the children who do not watch TV/ Playing with IPad for more than 2 hours daily are likely at less risk for obesity than those who Watching TV/ Playing with IPad for more than 2 hours daily (B=-0.675-; P. value=0.048; OR= 0.509; 95% C.I 0.261-0.995). These results agreed with the study findings done by (26), who reported that Watching television (>4 h) on weekends (OR=3·8; 95 % CI: 1·2-12·0, P. value = 0·02) were significant association with overweight/obesity. This is backed up by research in children and adolescents, which shows that excessive screen media exposure is linked to increased eating while watching screens and shorter sleep duration, both of which can contribute to increased obesity (27). However, a study done in Pakistan disagrees, arguing that houses with television sets are related with poor nutritional and sedentary lifestyles, suggesting the necessity to manage childhood obesity at an early stage of development (28). But, (29) explained that The prevalence of obesity as a result of extended hours of television viewing might be related to the fact that youngsters would be less involved in physical activity and

will increase their consumption of sweets and other drinks as they sit and watch television. Increased physical inactivity leads to an increase in body mass and, as a result, obesity.

As for the appetite of children, the results reveal that the participants who sometimes have a good appetite are likely at less risk for obesity than those who daily have a good appetite (B=-2.079-; P. value<0.001; OR= 0.125; 95% C.I 0.052-0.302). these findings agreed with the previous study conducted by (30) reported that children with higher weight and waist showed reduced satiety responsiveness and increased responsiveness to food cues in both samples (8–11-y-olds: both *P* 0.001; 3–5-yolds: both *P* 0.05).

Food intake and energy expenditure are controlled by complex, redundant, and distributed neural systems that reflect the fundamental biological importance of adequate nutrient supply and energy balance. Much progress has been made in identifying the various hormonal and neural mechanisms by which the brain informs itself about availability of ingested and stored nutrients and, in turn, generates behavioral, autonomic, and endocrine output. While hypothalamus and caudal brainstem play crucial roles in this homeostatic function, areas in the cortex and limbic system are important for processing information regarding prior experience with food, reward, and emotion, as well as social and environmental context. Most vertebrates can store a considerable amount of energy as fat for later use, and this ability has now become one of the major health risks for many human populations. The predisposition to develop obesity can theoretically result from any pathological malfunction or lack of adaptation to changing environments of this highly complex system. Complex, redundant, and widespread brain networks regulate food intake and expenditure, reflecting the basic biological need for appropriate nutrition supply and energy balance. The many hormonal and neurological systems by which the brain educates itself about the availability of ingested and stored nutrients and, in turn, creates behavioral, autonomic, and endocrine output has made significant progress. While the hypothalamus and caudal brainstem are vital for this homeostatic function, the cortex and limbic system are important for processing information about earlier food, reward, and emotion experiences, as well as social and environmental context. Most vertebrates have the ability to store a significant quantity of energy as fat for later use, and this ability has now become one of the primary health concerns for many human societies. Obesity can theoretically be caused by any pathological defect or lack of response to changing conditions in this extremely complex system (31).

Also, the current study reveals that the children who do not eat quickly are likely at less risk for obesity than those who eat quickly (B=-1.373-; P. value=0.001; OR= 0.253; 95% C.I 0.113-0.570). These results agreed with the study by (32), who revealed the odds ratio was 2.15 (95% CI, 1.84–2.51) of eating quickly on the presence of obesity. The effect of this factor also corresponds to several studies that mentioned when the pace of eating is increased, rapid eaters overeat and acquire the eating habits of obese patients; at the same time, their judgment of satisfaction (fullness) after consumption diminishes (33). Furthermore, obese patients have a fast eating speed (33), and lowering eating speed has been shown to reduce meal size and body weight while enhancing important physiological responses to oral glucose in obese children and adolescents (34) (35).

Conclusions and Recommendations

The study revealed that daily physical activity is significantly association with a reduced of obesity. Whereas Eating while watching TV, Sleeping (10-13 hours) including naps in the afternoon, Watching TV/ Playing with IPad, and good appetite are significantly association with an increase of obesity. Establishment of strategies by health care providers to educate about physical activity and a healthy lifestyle that enhances the reduction of the risk of obesity in children.

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