



## Anthropometric index and life style behaviors of 7-12 years children of Buin-Zahra county in 2018

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### ARTICLE INFO

#### Original Article

#### Article history:

Received 18 June 2018

Revised 04 August 2018

Accepted 18 August 2018

Available online 01 September 2018

#### Keywords:

Children  
Life style  
SIB system  
Overweight  
Stunting  
Thinness

### ABSTRACT

Children in elementary school ages due to entering the new era of their life are more high risk of facing with wrong food habits that have been associated with noncommunicable diseases. This study was conducted to assess obesity/overweight status and lifestyle behavior (diet, physical activity and screen time) in 7-12 years children in Buin-Zahra health network. The data of 120 children from "SIB system" was collected in January 2018 as a cross-sectional study. It consisted of weight, height, amount of fruits, vegetables, dairy products, and junk foods intake, physical activity and screen time. Z-score for height for age (HAZ), body mass index for age (BAZ) and weight for age (WAZ) were calculated using World Health Organization reference data. Anthropometric assessments revealed obesity (BAZ>2) in 6.6%, thinness (BAZ<-2) in 13.3% and stunting (HAZ<-2) in 4.1% of children. Stunting and thinness were significantly more common in males. Fruit, vegetable and dairy products intake and screen time were more in females. A strong positive correlation between screen time and age was significant at the 0.01 level. There are substantial rates of stunting, thinness, and obesity in 7-12 years children. The results suggest the need for evaluating health caregivers' educational methods to improve nutritional status in children.

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### 1. Introduction

The World Health Organization (WHO) proposed a plan to reduce non-communicable diseases (NCDs) premature deaths 25% by 2025 which is called 25×25 target (1). Tobacco use, physical inactivity, unhealthy diet, and harmful alcohol use are key behavioral risk factors responsible for significant mortality and morbidity due NCDs to. One of the factors which is specified for 25×25 target is no increase in diabetes and obesity (2). Absolutely, childhood and adolescence are the most important periods of time to control the risk of NCDs because of the formation of behaviors (3, 4). Child health surveys have indicated an increase in childhood obesity especially in low-income societies that has been attributed to enhancing the availability of unhealthy foods and lack of knowledge about healthy diet (5). In these ages, some changes will influence on food intake patterns along with more interactions with others especially classmates, increasing

allowance and educational activities, more exposed to mass media and food advertisements as a result of lower control of guardians. Snack consuming can help children as supplementary nutrients, which are not met in daily meals. But because of their affiliation to high fat, sugar and calories foods, various illnesses can be caused (6). Also, obesity/overweight is just one of the patterns of malnutrition such as underweight, stunting, wasting, marasmus and kwashiorkor in children (7). The WHO global database on child growth and malnutrition uses a Z-score cut-off point of <-2 SD to classify low weight-for-age, low height-for-age and low BMI-for-age as moderate, and <-3 SD to define severe under nutrition (8). Wasting/thinness (BMI-for-age Z-score <-2 SD) often reflects the recent or severe process of weight loss and its prevalence below 5% is acceptable and above or equal 15% as critical in any society. Stunting (height-for-age Z-score <-2 SD) indicates a process of failure to reach linear growth potential as a result of illness or inappropriate feeding practices.

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Prevalence of stunting below 20% is low and above or equal 40% as very high. Underweight (weight-for-age Z-score <-2 SD) below 10% and above or equal 30% is low and very high prevalence respectively. Overweight and obesity are defined as BMI-for-age greater than 1 standard deviation above the WHO growth reference median and obesity is greater than 2 standard deviations above the WHO Growth Reference median (9). According to high prevalence of nutritional problems in children and adolescents, it is necessary to modify their lifestyle and enable them to correct method of family life. Policymakers can establish leagues to impact positively on behaviors related to NCD risk factors (2, 10). Schools environment by appropriate policies and curriculums can reinforce healthy lifestyle such as physical activity (11, 12) and healthy dietary habits (13). Educating health providers related to children by extensive basic interventions to promote their knowledge, attitudes, and skills and employing multimedia especially audiovisual media in this regard can lead to NCDs prevention and management (14).

Regarding the necessity of identification of children with nutritional problems and reducing its complications, the present study was performed to designate the prevalence of underweight, obesity, stunting and wasting in 7-12 years children of Buin-Zahra County.

## 2. Materials and methods

This was a cross-sectional study done among 120 participants in the age of 7-12 years old. The data has been collected from 'SIB' system; in a period of one month in

January 2018. This study has been done in two health centers of Buin Zahra, Qazvin. Totally, the data of 4631 children in range of 6-18 years old were recorded in the 'SIB' system in the related health centers. We selected the data of 120 subjects in 7-12 years old randomly. The data consisted of weight, height, intake of fruits, vegetables, dairy products, and junk foods, physical activity and screen time. Anthropometric Z-scores including weight for age (WAZ), Height for age (HAZ) and BMI for age (BAZ) were calculated using World Health Organization reference data. Quantitative data were reported as Mean±SD and frequencies, by IBM SPSS Statistical Software (V.24, Chicago, 2016). Mann-Whitney U test was used for comparing the independent non-parametric data and Wilcoxon test for dependent non-parametric data. T-test was used for dependent parametric data and Pearson correlation analysis for data correlation.

## 3. Results

A total of 120 subjects were studied. Gender of the participants was as followings, 75 girls (62.5%) and 45 boys (37.5%). Demographic data of the subjects are shown in Table 1. As shown in Table 2, from the total of 120 children 7-12 years who were considered, obesity (BAZ>2) was in 6.6% of them and thinness (BAZ<-2) was in 13.3% of them also obesity in girls was more prevalent than boys and thinness in boys was more prevalent than girls.

According to Table3, underweight (WAZ <-2) in these children was 15% and it was more prevalent in boys rather than girls and stunting (HAZ <-2) was 4.1% of these children and it was more prevalent in boys.

**Table 1.** Basic Demographic data of the participants (Male and Female).

Situation	Gender	No.	Mean	Std. Deviation	Std. Error Mean
Height	M	45	123.82	11.684	1.742
	F	75	130.21	13.695	1.581
weight	M	45	24.1644	8.06998	1.20300
	F	75	29.4640	11.02847	1.27346
WAZ	M	40	-0.9498	1.46847	0.23219
	F	54	-0.2874	1.49035	0.20281
HAZ	M	45	-0.6582	1.21068	0.18048
	F	75	-0.3109	1.06281	0.12272
BAZ	M	45	-.6304	1.50935	.22500
	F	75	-.0531	1.48886	.17192

**Table 2.** Gender-based comparison of BMI for age (BAZ) in 7-12 years old children based on WHO Z-scores.

Situation	Boy		girl	
	n	%	n	%
Obesity (BAZ >2)	1	2.2	7	9.3
Thinness (BAZ <-2)	12	26.6	4	5.3

According to Table 4, the usage of fruits among girls was better than the boys. Six girls used fruit less than 2 serving a day (8% of the total girls) but 9 boys (20% of them) had consumption less than 2 serving of a day. Concerning using fruits of 2-4 serving daily the amounts were 69 (92%) and 36(80%) respectively in girls and boys. As shown in Table 4,

**Table3.** Gender-based comparison of weight for age (WAZ) and height for age (HAZ) in 5-18-year-old children based on WHO Z-scores.

Situation	Boy		Girl	
	n	%	n	%
Under weight (WAZ<-2)	12	26.6	6	8
Stunting (HAZ<-2)	4	8.8	1	1.3

vegetable usage among girls was also better than boys. Two (2.6%) girls used it rarely but one boy (2.2%) had rare usage. Amount of daily vegetable consumption less than 3 serving in the girls and boys were 22 (29.3%) and 17 (37.7%), respectively. Finally, using vegetables between 3-5 serving were 51 (68%) and 27 (60%) in the girls and the boys. As

Table 4 shows, dairy products intake among girls was also better than the boys. Two girls (2.6%) and two boys (4.4%) had rare usage. Amount of using dairy products less than 3 serving daily in the girls and boys were 20 (26.6%) and 15 (33.3%) respectively. And finally, dairy products using between 3-5 servings were 53 (70.6%) and 28 (62.2%) in the

girls and the boys. According to Table 4, junk foods intake among boys was better than girls. 38 (50.6%) girls used it rarely but 28 boys (62.2%) had rare usage. For girls and boys, weekly junk foods consumption were 26 (34.6%) and 14 (31.1%) respectively and daily junk food consumption were 10 (13.3%) in girls and 3 (6.6%) in boys.

**Table 4.** Comparison of using fruits, vegetables, dairy products and junk food in the participants according to their gender.

Food Groups	Food intake	Boy		Girl	
		n	%	n	%
Fruit	Less than 2 serving	9	20	6	8
	2-4 serving	36	80	69	92
Vegetable	Rarely	1	2.2	2	2.6
	Less than 3 serving	17	37.7	22	29.3
	3-5 serving	27	60	51	68
Dairy products	Rarely	2	4.4	2	2.6
	Less than 3 serving	15	33.3	20	26.6
	3-5 serving	28	62.2	53	70.6
Junk food	Rarely	28	62.2	38	50.6
	Weekly	14	31.1	26	34.6
	Daily	3	6.6	10	13.3

As shown in Table 5, screen time among girls was more than boys. 46 of girls (61.3%) and 23 of boys (51.1%) had less than 2 hours screen time. Amount of screen time nearly 2 hours in day for girls and boys were 18 (24%) and 22 (48.8%) respectively.

And finally screen time more than 2 hours in the day were 11(14.6%) and 10 (22.2%) for the girls and the boys. According to Table 5, physical activity time among boys was

more than girls. 3 of girls (4%) and 2 of boys (4.4%) had no physical activity time. Amount of daily physical activity time less than 420 minutes for girls and boys were 8 (10.6%) and 4 (8.8%) respectively. Finally, daily physical activity time more than 420 minutes were 64 (85.3%) and 39 (86.6%) for the girls and the boys. As Table 6 displays, there was a strong positive correlation between screen time and age significantly at the 0.01 level.

**Table 5.** Gender-based comparison of physical activity and physical activity time in the participants.

Situation	Boy		girl		
	n	%	n	%	
Screen time	More than 2 hours	10	22.2	11	14.6
	2 hours	22	48.8	18	24
	Less than 2 hours	23	51.1	46	61.3
Physical activity	Without activity	2	4.4	3	4
	More than 420 minutes	4	8.8	8	10.6
	Less than 420 minutes	39	86.6	64	85.3

**Table 6.** Correlation between demographic data and food intakes, screen time, physical activity, anthropometric indices among participants.

		Fruit	Vegetable	Dairy	Junk Food	Screen Time	Activity	Snacks	WAZ	HAZ	BAZ
Age	Correlation Coefficient	0.022	-0.066	0.024	0.075	0.290**	0.008	0.153	0.279**	0.308**	0.229*
	Sig. (2-Tailed)	0.809	0.472	0.797	0.414	0.001	0.931	0.095	0.007	0.001	0.012
	N	120	120	120	120	120	120	120	94	120	120
Height	Correlation Coefficient	0.084	-0.044	-0.048	0.074	0.210*	-0.057	0.137	0.710**	0.773**	0.403**
	Sig. (2-Tailed)	0.359	0.635	0.602	0.422	0.021	0.538	0.137	0.000	0.0001	0.0001
	N	120	120	120	120	120	120	120	94	120	120
Weight	Correlation Coefficient	0.071	-0.107	-0.059	0.051	0.158	-0.115	0.178	0.928**	0.710**	0.745**
	Sig. (2-Tailed)	0.443	0.245	0.523	0.580	0.085	0.212	0.052	0.0001	0.0001	0.0001
	N	120	120	120	120	120	120	120	94	120	12

\*Correlation is significant at the 0.05 level, \*\*Correlation is significant at the 0.01 level.

#### 4. Discussion

Considering the increasing rate of nutritional problems such as obesity, underweight, stunting and wasting and their deleterious consequences with public health problems; active implementation of policies and interventions are needed. In order to reduce malnutrition among children, it is required to have more information about dietary patterns, education system, and knowledge and attitude of health providers in health centers (15). There are different rates of malnutrition all over the world which are dependent on age, gender, race and ethnicity, lifestyle and socio-economic status (16).

This study provides information about amount of fruits, vegetables, dairy products, and junk foods intake, screen time, physical activity, number of snacks and meals consumption and prevalence of underweight, wasting, stunting and obesity among 7-12 years old children. Adequate intake of dairy products, vegetables and fruits was observed in 67.5%, 65% and 87.5% respectively which girls had more intake than boys. Data of National Health and Nutrition Examination Surveys (NHANES) in 1989-1991, 2005-2006 and 2007-2008 in the United States showed a significantly decrease in milk consumption and the same reducing trend in European countries (17).

In Iran, Omidvar et al. (18) revealed that only 29.8% of children in Tehran met the food guide pyramid recommendation for dairy intake. Also, most of the children had rarely consuming junk foods (66%) but its intake was more in boys. Children tendency toward consuming vegetables and fruits decrease especially in large families and tendency toward consuming junk foods increase with age. Amini et al. (19) showed in their study that all fruit servings, half of the vegetable servings and almost one-third of dairy servings were met in primary schools' children in Tehran. The standard of daily screen time in children is lower than 2 hours which 17.5% of children had exceeded it.

While in a survey of Jari and colleagues in 2014, 43.2% of Iranian children had overstepped the standard (20). The appropriate physical activity (420 minutes or more weekly) was among 85.5% children and in general, equal to the results of the Saudi Arabia, sedentary (lower PA and more ST) of girls were more obvious than boys.

Prevalence of underweight, stunting, wasting and obesity were respectively 15%, 4.1%, 13.3% and 6.6% which feature our study population was significantly more underweight and thinner than global reference population. According to the studies performed in the USA and European countries, obesity rates are almost double but the total rates of malnutrition indices are less than 2.3% in European countries (21, 22). Rahmani et al. in 2014 showed that the obesity rate about 6.1% in below 18 years old (15). Soheilipour et al. in 2015 (23) revealed 9.3% obesity in 6-11 years. In Africa, in the same ages, obesity was similar with our results but underweight was almost half (6.2%) (24). Teblick and colleagues showed 11.3% wasting rate and 16.3% stunting rate (4 times more than our results) in Tanzania (25).

#### 5. Conclusion

There is an urgent need to conduct proper management to control children nutritional problems and establish accurate curriculums in educating children, health workers and parents regarding the prevention and reduction of deleterious consequences of childhood malnutrition. This study is an initial survey to evaluate the quality of 'SIB' system by following the nutritional information of these children in the future.

#### Conflict of interest

The authors declare no conflicts of interest.

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