Original Article

How Healthy are Children at the Beginning of Primary School in Iran?

Abstract

Background: Childhood is the most important life stages where personality is built and formed. Since children are as a treasured capital for each society, assessment of their health status is so vital. This study assessed the health indices of children starting the primary school and considered parental factors influencing kid's health. **Methods:** An analytical descriptive cross-sectional study applied to measure the health status of children at the beginning primary school. The data extracted from 7768 primary school children with an average value of age 7 years and their parents, who were referred to Children Health Testing centers in the school year of 2016, in all provinces of Iran. **Results:** From 7768 kids, 52.3% were boys and 47.7% were girls. The mean of weight and height of children was 20.65 kg, and 115.84 cm, respectively. The mean body mass index (BMI, kg/m2) for age ratio of children in the country was 16.26. In addition, 4.9% of boys and 3.7% of girls were short stature, 0.5% of boys and 1.8% of girls were tall and 94.5% of kids had normal growth. About 5.3% of boys and 6.8% of girls were underweight, 9.2% of boys and 7.7% of girls were overweight, and 4.7% of boys and 3.4% of girls were obese. **Conclusions:** The overweight and severe short stature problems in children were more dominant than underweight and severe tall. Although underweight is more common in girls than boys, it is reversed in the case of overweight and obesity. In addition, the ratio of health problems among children in different provinces was dissimilar, thus considering the health status of children in each province to find a solution was crucial.

Keywords: *Body Mass Index, child, education, employment, health status, urbanization*

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Introduction

There are several definitions for the health, of which the definition proposed by the World Health Organization, the health has been defined as the complete physical, mental, and social welfare not merely the absence of disease or disability. There are numerous factors that affect the health notably genetics, environment, lifestyle, socio- economic status, health services, etc.[1] Childhood is the most important life stages where personality is built and formed. Behavioral disorders and conflicts are often caused by lack of attention to the critical period of childhood and lack of the correct guidance in the process of growth and evolution in childhood. This lack of attention to the failure in compromising and adapting with the environment leads to various deviance in different dimensions for children.[2,3] To grow normally and to develop the personality of the children strongly and stably, an appropriate environment is necessary. In this trend of growth, the environment, family, school and

the community, each play specific roles, that the role of the school environment and the family is crucial since it determines the relationship between parents and educators and the way of dealing with children.[3] School Readiness test has been considered in the most countries.[4] Investigating the health issues of the students, and designing programs to address these issues and to improve the health and safety of the students are considerably important, since, after the age of 5–6 years the children spend an important part of their life at school corresponding to their physical and mental development. Providing the health of students is, in fact, a supplementary for maternal and child health services.[5] Studies have shown that the factors such as parent's education, parent's occupation, place of residence, income and economic status of the family can affect children's health. Increasing the knowledge of the parents will improve the awareness, attitude, and performance of the parents toward the improvement of nutritional status of children. According to the studies, low maternal education level and low income of families, have positive significant relations

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with shortness,[6,7] malnutrition[8] or underweight[9,10] of children. This study assessed the health indices of children starting the primary school and considered parental factors influencing kid's health.

Methods

An analytical descriptive cross-sectional study applied to measure the health status of children with an average value of age 7 years at the beginning primary school who were referred to Children Health Testing centers in the school year of 2015–2016, in all Iranian provinces. In this work, the sample size was determined using census and the information related to the height, weight, anthropometric index BMI, gender, residence location, socioeconomic status, education level, as well as occupation and age of parents of children, which were recorded in the electronic system of Iran Especial Education Organization. Based on the Percentile Index and Z-Score and according to the World Health Organization definition,[11] wasting, stunting, underweight, overweight, and obese school children were determined. Although according to previous studies, it should be accepted that near 24% of children are under quite unsuitable conditions (obesity, underweight, short stature, etc.),[12,13] considering the safety factor of 95%, the power of 90%, and the accuracy of 0.02, the sample size was determined as 6920 children, that considering the loss of 12% due to unknown reasons and loss of information a sample size of 7750 children was selected for the study. In this study, a larger sample size with of 7768 children was investigated. The samples were selected and investigated randomly with a proportional allocation from 31 provinces among the children who referred to Health Testing centers in the school year of 2015–2016. As with increasing the referring children in a province, the larger sample size exists in that province. Among 7768 examined children 66.2% were urban children and 33.8% were rural children, 52.3% were boys, and 47.7% were girls. To analyze the results, SPSS software applied. To describe the data the mean, standard deviation, frequency and percentage and to analysis the data one-way ANOVA, t-test and Chi-square test were used.

Results

According to the results, among 7768 examined children that 66.2% were urban children and 33.8% were rural children, 52.3% were boys and 47.7% were girls. The highest frequency of children population was 11.5% related to Tehran, and the lowest one was 2% related to Yazd and Semnan. Among the fathers and mothers 3.5% and 4.4% were illiterate, respectively, 17.7% and 20.5% had degrees in elementary education, 51.9% and 51.1% had degrees in high School education, and 26.8% and 24% had the diploma or higher degrees. Among fathers 82.6% were employed, 1.2% was retired, and 7.5% were unemployed. Among mothers 11.8% were employed, 0.3% was retired,

and 87.5% were unemployed. Finally, 26.5% of parents were relatives and 1.4% were died/divorced.

The mean children's age was 7 years, the mean father's age and mother's age were 39 and 34, respectively, and so on the number of family members was 4, the birth order was 1, and the weight and height of the children were 20.65 kg and 115.84 cm, respectively. The mean BMI was 15.31 kg/m^2, the mean BMI to age ratio was 16.26, the mean height to age ratio was 16.26 [Table 1].

Considering the obtained mean in the BMI for age ratio, the children in 5 provinces of Markazi, Ilam, Yazd, Hamadan, and West Azerbaijan with the means within 17.53 to 18.01and within the percentiles of 85 to 95 are exposed to overweight. In addition, the least mean of BMI for age ratio is related to Qom province with 15.34 that together with other 25 provinces are within the percentiles of 5 to 85 with normal weight. The one-way ANOVA test showed that there is a significant relationship between the mean of BMI and BMI for age ratio in different provinces of Iran ($P < 0.001$) [Table 2].

For eyesight variable 97.5% of the children were without the problem, 2.5% were suspected to have a problem, that the highest value of the problem was related to Hamadan province with the score of 5.4%. In hearing test 98.5% of children were with no problem, 1.5% were suspected to have a problem, that the highest number of suspected people was related to Kermanshah province with the score of 4.6%. Chi-square test showed that there is a significant difference between the eyesight test and hearing test in different provinces ($P < 0.05$) [Table 2].

According to the height for age variable, 4.9% of boys and 3.7% of girls were short stature, 0.5% of boys and 1.8% of girls had tall, and 94.5% of the children were grown normally. In BMI for age variable, 5.3% of boys and 6.8% of girls were underweight, 9.2% of boys and 7.7% of girls were overweight and 4.7% of boys and 3.4% of girls were obese. Finally, 80.7% of the boys and 82.1% of the girls had normal weights [Table 3].

The results of t-test showed that there is a significant difference between the variables of the weight, BMI, BMI for age and height for age in urban and rural areas ($P < 0.001$). The mean variable of BMI in urban children is further than rural children, but for the height for age and BMI for age it is reversed. With increasing of the education level of parents, the mean BMI children has increased, but with working parents, mean BMI children has decreased and mean BMI for age and height for age has increased. Moreover, the results of ANOVA and t-test indicated that in the education level and occupation of parents, the highest average value of BMI is related to the children whose parents have the education level higher than diploma and have jobs. A significant relationship was found between parents' education and the father's

occupation with the variables of BMI, BMI for age and height for age, as well as between the mother's job and BMI variable ($P < 0.001$). The highest mean of three variables BMI, height for age, and BMI for age was related to children without divorced or separated parents [Table 4].

Also, the results of Chi-square test regarding the relationship between the variables of eyesight, speech status, and hearing test with the parents' variables (education and occupation of parents, the divorce/death state, place of residence), no significant relation was found between the education level of the parent and eyesight and hearing and speech status in this case. Nevertheless, with increasing the education level of parents, decreased the rate of the problem is in a state of diminished eyesight and hearing status. The rate of the problem in children with working father or mother is less than that in children with non-working parents, nevertheless, no significant relation was found. There was no significant difference between the results of evaluating the eyesight, hearing, and speech status in urban and rural children ($P > 0.05$), while a significant relation was found between the speech and death/divorce status ($P < 0.001$)

Table 1: Descriptive statistics of examined variables for children at beginning primary school

Variable	Mean	Max	Min	SD
Children's age (y)	7	7	6	0.41
Father's age (y)	39	60	24	6.19
Mother's age (y)	34	57	20	5.61
Number of family members	4	14	1	1.05
Birth order	1	11	1	0.99
Weight (kg)	20.65	55	11	3.99
Height (cm)	115.84	140	71	5.70
BMI (kg/m^2)	15.31	38.56	7.65	2.24
Height to age ratio	16.26	21.91	10.48	1.48
BMI to age ratio	16.26	21.91	10.48	1.48

Table 2: The mean BMI, mean BMI for age ratio and frequency of problem in eyesight and hearing test for children at beginning primary school, in Iran provinces

Province	BMI (kg/m^2)	BMI for age ratio	Vision status (Suspected to have a problem (%)	Hearing status (Suspected to have a problem (%)
Azerbaijan, East	15.67	16.55	2.0	3
Azerbaijan, West	16.07	17.53	1.2	0
Ardabil	15.72	15.65	2.9	0
Isfahan	15.19	15.86	1.8	2.1
Alborz	15.74	15.69	3.9	1.5
Ilam	14.48	17.76	1.8	0.6
Bushehr	16.08	16.86	3.0	0.6
Tehran	15.72	15.78	2.8	1.6
ChaharMahaal and Bakhtiari	14.99	15.94	1.8	0.6
Khorasan, South	14.51	15.84	0.0	0.6
Khorasan, Razavi	15.32	17.14	2.8	1.9
Khorasan, North	14.82	15.65	3.0	2.4
Khuzestan	16.15	16.52	2.2	1.5
Zanjan	15.33	15.88	0.0	1.2
Semnan	14.78	15.47	1.3	1.3
Sistan and Baluchestan	14.08	15.64	3.0	0
Fars	15.11	16.07	3.8	1.8
Qazvin	15.31	15.74	1.8	1.2
Qom	15.81	15.34	4.0	1.2
Kurdistan	14.40	15.87	3.7	0.6
Kerman	14.74	16.37	1.7	2
Kermanshah	15.27	15.74	2.9	4.6
Kohgiluyeh and Boyer-Ahmad	15.22	15.52	3.4	0.6
Golestan	15.00	15.80	0.5	1.1
Gilan	15.90	15.88	1.2	1.7
Lorestan	15.05	15.99	2.3	2.9
Mazandaran	15.89	15.88	2.4	1.9
Markazi	14.86	18.01	3.0	1.2
Hormozgān	14.48	15.78	1.8	0
Hamadan	14.74	17.68	5.4	1.2
Yazd	14.80	17.71	4.5	3.2
Whole country	15.31	16.26	2.5	1.5

that the highest rate of the problem was 5.7% related to children with divorced or separated parents.

Conclusions

This study showed that the severe short stature problem is more common than severe tall, that this rate in boys is higher than girls. Moreover, the problem of overweight among Iranian children has overcome the problem of underweight so that about 14% of boys and 11% of girls have overweight and obesity problems. On the other hand, although underweight is more common in girls than boys, it is reversed in the case of overweight and obesity. Considering the obtained means in the BMI for age ratio, the children in 3 provinces of Markazi, Ilam, and Yazd are exposed to overweight. In addition, the least mean of BMI for age ratio is related to 3 provinces of Gom, Semnan and Kohgiluyeh and Boyer-Ahmad. For eyesight variable and hearing test, the highest value of the problem was related to Hamadan province and Kermanshah province, respectively.

Considering the high rate of overweight and obesity in children compared to being underweight, and based on the rate of other health problems among children in different Iranian provinces, evaluating the children's status beginning the primary school is crucial to make policies for improving the health indices in children, with regard to the sensitive position of this group as human capital, and the effects of children's physical health on their mental and physical growth in the future. Bashardust *et al*. (1996) on Isfahani children beginning primary school, in which 1.71% of children were referred for auditory and 2.46% for visual special examinations.[14] Zamani *et al*. Concluded

Table 3: Classification of health indicators according to gender

Health indicators	Z-score	Details	Boys	Girls
Height for age	-2 > z	Short stature	4.9%	3.7%
	-2 > z > +3	Grown normally	94.5%	94.5%
	z > +3	Tall	0.5%	1.8%
BMI for age	z < -2	Underweight	5.3%	6.8%
	-2 < 2 < +1	Normal weights	80.7%	82.1%
	+1 > z >+2	Overweight	9.2%	7.7%
	z >+2	Obese	4.7%	3.4%

Table 4: Parental factors affecting the quantitative and qualitative health variables of the children

Variable	BMI (Mean)	BMI for age ratio (Mean)	Vision status (Suspected to have a problem)	Speech status (Suspected to have a problem)	Hearing status (Suspected to have a problem)
Mother's education					
Illiterate	14.95	16.18	3.2%	1.8%	2.4%
Elementary	14.93	16.38	2.5%	2.1%	1.6%
High school	15.30	16.26	2.4%	2.2%	1.5%
Diploma or higher degrees	15.73	16.18	2.5%	2.2%	1.2%
P	<0.001	<0.001	0.518	0.996	0.372
Father's education					
Illiterate	14.72	16.21	2.9%	2.6%	3.3%
Elementary	14.95	16.41	2.6%	2.8%	1.6%
High School	15.29	16.26	2.4%	2%	1.5%
Diploma or higher degrees	15.68	16.16	2.4%	2%	1.2%
P	<0.001	<0.001	0.473	0.724	0.211
Mother's job					
Employee	15.79	16.19	2%	1.9%	1.3%
Unemployed	15.25	16.27	2.6%	2.2%	1.5%
P	<0.001	>0.05	0.464	0.672	0.651
Father's job					
Employee	15.39	16.14	2.5%	2.1%	1.5%
Unemployed	14.86	16.49	2.6%	2.2%	1.8%
P	<0.001	<0.001	0.868	0.759	0.397
Place of residence					
Urban	15.52	16.18	2.4%	2.0%	1.5%
Rural	14.91	16.42	2.6%	2.6%	1.5%
P	<0.001	<0.001	0.813	0.161	0.661
Divorce. death state					
No	15.31	16.26	2.5%	2.1%	1.5%
Yes	15.21	16.09	3.8%	5.7%	1%
P	>0.05	>0.05	0.660	0.00	0.241

that, among the children in Jahrom, 1.8% of boys and 1.2% of girls were underweight, 3.8% of boys and 1.5% of girls had short stature, 2.4% of boys and 1.2% of girls were thin, 13.3% of boys and 6.5% of girls were overweight and 10.9% of boys and 9.7% of girls were obese.[13]

Gaeni *et al.* showed that the prevalence of underweight, overweight, and obesity in boys was, 4.77%, 9.81% and 4.77%, and in girls as 4.77%, 10.31%, and 4.49% respectively.[15] Lazeri *et al.* on Italian children indicated the prevalence of wasting and overweight, 2.4% and 4.33% respectively.[16] Abdolaziz Kamal, *et al.* showed that a combination of height for age as an indicator of short stature and weight for height as an indicator of wasting, that the significant proportion of Qatari children were in normal or slightly above normal nutritional status.[17]

Muthuri, *et al.* showed that, a total of 563 participants in Kenyan school children, 3.7% were underweight, 14.4% were overweight, and 6.4% were obese.[18] The study of Kachi, *et al.* on Japanese children indicated the Overweight prevalence was 12.3%.[19] The study of Ghosh, *et al.* the prevalence of under nutrition in the observed children were 57.95% (according to height-for-age Z scores) and 52.82% (according to weight-for-age Z scores).[8]

As the results indicated, the more the parents' education level has negative effect on vision and hearing problems. Children with divorced/separated parents have more speech problems. Javaheri *et al.* study showed that the height and the weight of children with more educated parents were higher than other children.[20] The study of Islam, in 2014, showed that the highest prevalence of underweight in children exists in families with illiterate mothers.[9] The study of Kavoshi and Senbanjo separately indicated that low maternal education and low income of the families have significant relationships with shortness of the children.[6,7] The study of Ghosh, in 2015, showed that there is a significant relation between socioeconomic status and the prevalence of malnutrition and scores of children in primary school.[8] In addition, the study of Wolde *et al.* revealed that the kids of mothers with low education level are exposed to the weight loss.[10] Based on the results, it can be stated that using this comprehensive information regarding the health status of children beginning in primary school, and the sensitive position of this group in terms of their mental and physical growth in the future, proper circumstances can be provided to improve the health indices in children, by distributing economic and social capacities and enhancing education and income levels of families, appropriately.

Acknowledgments

Conflicts of interest

There are no conflicts of interest.

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