

## THE PREVALENCE OF DEVELOPMENTAL DISORDERS AMONG PRIMARY SCHOOL STUDENTS IN HAMADAN AND ITS RELATIONSHIP WITH SOCIOECONOMIC FACTORS IN 2014

NAHID MOHAMMADI<sup>1</sup>, FATEMEH CHERAGHI<sup>2</sup>, LATIFEH FELEGARI<sup>3</sup>, MARYAM BABAEI<sup>4</sup>, MARYAM ZANGENEH<sup>5</sup>, ALI REZA SOLTANIAN<sup>6</sup>, AREZOO SHAYAN<sup>7\*</sup>

<sup>1</sup>Chronic Diseases (Home Care) Research Center and Mother and Child Care Research Center, Hamadan University of Medical Sciences, Hamadan, Iran. <sup>2</sup>Associate Professor, Research Center for Chronic Disease (home care), School of Nursing and Midwifery, Hamadan University of Medical Sciences, Hamadan, Iran. <sup>3</sup>MA.Hamadan University of Medical Sciences, Hamadan, Iran. <sup>4</sup>Instructor of Nursing, School of Nursing and Midwifery, Azad University of Toyserkan Hamadan, Toyserkan, Iran. <sup>5</sup>Student of Medical Physics, Isfahan University of Medical Sciences. <sup>6</sup>Associate Professor, Research Center for Modeling of No communicable Disease, Department of Biostatistics, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran. <sup>7</sup>Instructor of Midwifery, School of Nursing and Midwifery, Mother and child Care Research Center, Hamadan University of Medical Sciences, Hamadan, Iran. Corresponding author; Email: arezoo.shayan2012@yahoo.com.

Received - 07.09.2017; Reviewed and accepted - 28.09.2017

### ABSTRACT

**Background and Aim:** The school age as one of the most important periods of life plays a key role in maintaining and promoting health. One of the important indicators of the health status of children in this period is monitoring physical growth and factors affecting it. This study aimed to determine the prevalence of growth disorders among the primary students and its relation to socioeconomic factors. **Methods:** In this descriptive-correlational study, 530 students aged 6-13 in elementary schools in Hamadan were selected through stratified random sampling method. Students' anthropometric indices were used to measure their heights, weights, and BMIs. The socioeconomic data were collected through a checklist to interpret the results concerning the NCHS growth reference and confidence intervals and to verify the relationship between variables; a univariate regression analysis was used. **Results:** Comparison of the growth indices with the NCHS showed that 5% of both genders were short and 16% were obese. The prevalence of overweight among the boys was 6% and among the girls was 7%. The prevalence of underweight among the boys was 5% while this value for girls was 6%, and 18% of the boys and 19% of the girls were thin. The results showed that children belonging to high-income families had higher body mass and were heavier ( $P < 0.05$ ). **Conclusion:** The results of the study showed that growth disorders among students are on the rise. Therefore, promoting a healthy lifestyle through nutritional and physical activities is highly recommended for parents, especially mothers.

**Keywords:** Child Growth, Socioeconomic Factors, NCHS Chart.

### INTRODUCTION

Childhood is one of the most important stages at which human physiological characteristics develop and the health of individuals in each society is associated with the growth of its members at an early age. This period is characterized by a relatively rapid physical development. Given that major physical, cognitive, emotional and social growth occurs at the school age, this age is a dynamic period of growth and development [1]. Research shows that health problems in this period are the main culprit of absenteeism, school drop-outs, and lack of homework [2]. The idea of determining indicators and growth curves dates back to 1877 when Budch and his colleagues in the city of Boston defined the specific developmental curves of the children in that city. In 1993, the World Health Organization (WHO) recommended that data reported by the National Center for Health Statistics (NCHS) is a good reference for measuring the growth status of children around the world [1]. The reference data were the results of a survey on the healthy American children between 2-18 years old. Currently, 99 countries around the world use this chart to determine the growth impairment of children [3]. Indicators of height, age, weight to age and weight to height in growth charts, in combination are important public health indicators that can provide useful information about children's developmental delay or disruption [4]. Overweight and obesity statuses put children at risk of diseases such as type 2 diabetes, hypertension, sleep apnea, cardiovascular disease, low quality of life, low self-esteem and psychosocial disturbances in adulthood [5]. In a study conducted on children aged 4-6 years in Sweden, China and the United Kingdom (2013), it was found that the prevalence of underweight and short stature in Sweden were 0.3% and 0.6%, in England, the values were 9.6% and 2.2%, respectively and in China, the values were 9.5% and 16.5% [6]. In a study carried out by Deck and his colleagues (2013) on primary school children in Morocco, 43.1% of the children were underweight, 18.2% were short and 8.7% were obese [7]. Mushtaq et al. (2011) reported overweight and obesity among the children of the Pakistani primary school (17%

and 7.5%, respectively) [8]. Also, Christie et al. (2009) in a study entitled 'Overweight and short-stature prevalence and its relation to socio-economic factors of Columbian children,' reported the overweight, obesity and short-stature rates as 11.1, 1.8 and 9.8 % [9]. According to UNICEF statistics in 2011, 11% of children in the primary school of Iran were underweight, 5% were thin, and 15% were short [10]. Based on the latest survey (2011), on school-age children in Iran, 2/19 % of children were short- 8.5% were thin, and 12.4% were underweight [11]. In a study conducted in Kermanshah (2012) attempted to present the growth pattern of elementary school students. The study found that 26.9% of children were overweight, 21.5% of them were obese, 17.5% were thin, and 13.8% were short [12]. Also, the results of a study in Khoypovince indicated that 15.4% of the school-age children were overweight, 19.5% were short, and 2.1% were short and overweight [13]. Also, some studies have shown that mean height, weight, and body mass index in all percentiles in Iranian children were significantly lower than those proposed by the NCHS [14]. Several factors, alone or in combination, affect the growth pattern. These factors include biological and psychological factors, nutritional and socio-economic status [6]. Throughout life, social-economic constraints affect health, so that those with low-income socio-economic backgrounds are at least twice as likely to suffer from serious illness and early death as others. Factors such as low-income families, parents' low level of education, uncertain jobs, and living in inappropriate homes contribute to these differences [15]. Socio-economic status is a concept that developed by measuring indicators such as level of education, occupation and social status of an individual or individuals [16]. Commission on social determinants of health (CSDH) has introduced a framework for identifying the relationship between social and health factors; it defines how socioeconomic, political and individual factors affect the health and well-being of an individual [17]. Among the factors mentioned, evidence suggests that income, wealth, education, and occupation have the greatest impact on health. This group of factors is referred to as

socioeconomic status [11]. Therefore, the factors affecting the development of children should be evaluated. Nurses play an important role in the health of students in schools and can diagnose children's health problems with the help of students, family, school staff, health care providers and introduce them to care centers, and they also play an important role in teaching a healthy lifestyle to students [18]. However, the results of the studies on the effect socio-economic factors on the physical development of children have been inconclusive and conflicting. In spite of the importance of monitoring growth at the age of childhood, less has been documented in the Iranian context. Even no study has been conducted in Hamadan. Therefore, researchers of this study decided to measure the height, weight, body mass index of the children in Hamadan and compare them to the NCHS reference (weight for age, height for age and BMI for age). Also, they attempted to investigate the relationships between the physical growth of children and socio-economic status. Therefore, this study aimed to determine the effect of socioeconomic factors on the developmental disorders in primary school children in Hamadan.

## MATERIALS AND METHODS

This cross-sectional study is descriptive-correlational. Using stratified random sampling, 530 male and female students from the first and sixth grade studying in the first and the second districts were recruited to participate in this study. The schools were selected randomly from the list of the education department, and the data were collected by random sampling after obtaining informed consent. The data for demographic characteristics and socioeconomic status was collected through the checklists. To this end, parents' subjects were interviewed. Personal and family checklists included questions about student's age, gender, education level, height, weight, BMI, the number of family members, head of the family, and birth order. The socio-economic status checklist comprised the questions about parents' education, parents' occupation, place of residence (city, village, and suburb), housing status (housing ownership, type of housing, and the number of rooms). The total monthly income of the family and the family assets. In this checklist, the occupation status of parents was classified based on the Kazimpur model. In this research, the occupations were divided into seven groups and in proportion to the type of occupations were categorized. Occupations that were similar regarding activity and level were assigned the similar scores. Similarly, the economic classification was based on the ownership of the ten- items, including home and personal cars, dishwasher, LCD washing machine, TV, refrigerator, handmade carpet, computer/laptop, sofa, dining table and microwave oven. According to the classification of economic family status, the ownership of fewer than three items shows weak economic level status, the ownership of 4 to 6 items indicates the average economic level while possession of more than 7 items signifies the high economic status. To measure the weight, a German Beurer' digital scale with a precision of 0.1 kg was used, and after 10 weightings, the scale was compared with a standard weight of 1 kg. The weight measurements were carried out with minimum wear and without shoes. The reliability of the instrument was determined by comparing Beurer's scale with the standard scale. The height was measured by German-made Soehnles' height gauge with a precision of 0.1 cm. During the measurement of height, the person was asked to lean against a wall without a shoe and to stick the heel, buttocks, head, and shoulders to the wall. All measurements were performed by one person and with one tool. In total, for all measurements, the first author used a meter and a scale to measure the heights in the early morning and. After recording the height and weight, the BMI was calculated by dividing the weight (kg) by the height squared in meters (m). The child's anthropometric index was calculated and compared with age, weight for age and body mass index (NCHS) with the standard index of 5-50-95. To interpret the results, NCHS indices and confidence intervals were used to examine the relationship between variables and growth disorders; a univariate regression was used. The data were analyzed using SPSS version 16 software, and the chosen significant level was less than 5% ( $P > 0.05$ ) [19-21].

## FINDINGS

Analysis of the demographic data showed that from 451 subjects in the study, 57% were boys and 43% were girls, 54.3% were the first-child of the family, 75% of the subjects lived with 3 or 4 members, and 96% of them lived with two parents (Table 1). Analysis of Socioeconomic data showed 72% of fathers and 85% of mothers had a lower diploma education. 64.66% of the subject lived in an apartment while 70% of the students lived in their own homes and 30% the subjects lived in a rental home, and 61% lived in a house with two rooms, and 72.53% lived in a home with 50 to 100 square meters and most of the subjects (34.36%) drove the vehicles in group 1 (Pride-Peykan-Renault) and 28.60% drove the vehicles in group 2 (Peugeot –Samand-Sorento) (Table 2). The mean height, weight, and BMI of the girls were 135 cm, 32.97 kg and 17.56 kg/m<sup>2</sup>, respectively. Minimum height of the girls was 105, and maximum heights of the girls were 165 cm. The minimum weight for the girls was 15.5 while their maximum weight was 68.3 kg. The minimum BMI of the girls was 11.87, and their maximum BMI was 30.6 kg/m<sup>2</sup>. Also, the mean height, weight, and BMI for the 7 year-old girls were 118.42 cm, 23.54 kg and 16.69 kg/m<sup>2</sup>. These values for the 8 year-old girls were 123.99 cm, 24.8 kg and 16.1 kg/m<sup>2</sup> and for the 9 year old girls they were 130 cm, 28.1 kg and 16.5 kg/m<sup>2</sup>. The average height, weight, and BMI for ten-year-old girls were 134.96 cm, 30.65 kg and 16.63 kg/m<sup>2</sup> while the averages for 11-year-old children were 142.7 cm, 37.41 kg and 18.4 kg/m<sup>2</sup>. The values for 12-year-olds were 141.11 cm, 43.09 kg and 51.19 kg/m<sup>2</sup> respectively. The mean height, weight, and BMI of the boys were 135 cm, 6/32 kg and 48/17 kg/m<sup>2</sup> respectively. Minimum height of the boys was 103, and maximum height for the boys was 162 cm. The minimum weight of the girls was 15.5 while their maximum weight was 82.7 kg. The minimum BMI of the boys was 10, and their maximum BMI was 32.3 kg/m<sup>2</sup>. Also, the mean height, weight and BMI of the 7 year-old girls were 120.5 cm, 23.76 kg and 16.29 kg/m<sup>2</sup>. These values for the 8 year-old boys were 126.86 cm, 26.04 kg and 16.11 kg/m<sup>2</sup> and for the 9 year boys they were 130 cm, 28.1 kg and 16.5 kg/m<sup>2</sup>. The average height, weight and BMI of ten-year-old girls were 137.7 cm, 32.51 kg and 17.2 kg/m<sup>2</sup> while the values for 11-year-old boys were 142.9 cm, 38.04 kg and 18.79. The values for 12-year-olds were 146.96 cm. The height and weight and BMI for students in Hamadan were compared with the NCHS. In 5% of both genders (11 girls and 14 boys), the heights were below the 5th percentile. In 43 girls (22.1%) and 8 boys (3%), the heights were above the 95th percentile. In 13 girls (6%) and 14 boys (5%), the weights were below the 5th percentile, and in 14 girls (7%) and 17 boys (6%), the weights were above the 95th percentile. In 36 girls (18%) and 49 boys (19%), the BMI values were below the 5th percentile, in 32 girls and 41 boys (16%), the BMI values were above the 95th percentile. Therefore, based on the fifth percentile of this chart, the prevalence of short stature in both genders was 5%. The prevalence of underweight among the boys was 5% while this value among the girls was 6%, and the prevalence of overweight among the boys and the girls were 6% and 7%, respectively. According to BMI, the prevalence rates of thinness among the boys and girls were 19% and 18% respectively, and the prevalence of obesity between both genders was 16% (Table 3). Analysis of socioeconomic data showed that 44.87% of students' families had income below 1 million Toman, 62.97% of the subject possessed the properties which valued moderate, and 34.36% of them drove Pride, Peykan or Renault. 58% of the subjects were not willing to respond to the questions about the value of their houses. 10.64% of the subjects owned the houses valued between 1 to 30,000 Tomans. In total, the socioeconomic status of 17% of the subjects was good, 61% were moderate, and 19% were poor. Data on the father's occupations showed that 66 (14.63%) of the occupations fell in the seventh rank, 184 (79.7%) were placed in the sixth rank, 122 (27.5%) fell in the fifth rank. The occupations of 55 (12.19%), 15 (3.32%), 5 (0.22%) and 1 (8.88%) participants were ranked as the fourth, third, second and first respectively. Regarding the mother's occupation, 3 (66%) of them fell in the seventh rank, 12 (2.66%), was ranked sixth. 18 (3.99%), 3 (66%) were placed in the fifth and fourth ranks respectively. and 402 (92.3%) were housewives (Table 3). Analysing the socioeconomic variables influencing the height, weight, and BMI

of students using univariate regression showed that there were significant correlations between the value of family properties with height, the family income with the weight and the family income with BMI ( $P < 0.05$ ) (Table 4). The parents' occupation level,

parents' education level and the value of family properties did not influence the weight and BMI. The parents' occupation, the level of parents' education and the moderate value of family properties were not influenced by the height of the children.

**Table 1: Demographic Characteristics of Students**

Variable	Frequency	
Gender	Girls	257(57)
	Boys	1194(43)
Education	First grade	45(9.98)
	Second grade	55(12.19)
	Third grade	77(17.07)
	Fourth grade	81(17.96)
	Fifth grade	107(23.74)
	Sixth grade	86(19.06)
Family size	3-4 members	339(75)
	More than 4 members	112(25)
Birth order	First child	245(54.3)
	Second child	143(21.7)
	Third child or	63(14)
Living with parents	Father	3(0.66)
	Mother	15(3.34)
	Both	433(96)

**Table 2: Socioeconomic Characteristics of the Subjects**

Variable	Frequency	
Father's education	Below high school diploma	337(74.73)
	Bachelor or above	114(25.27)
Mother's education	Below high school diploma	391(86.7)
	Bachelor or above	60(13.3)
Home type	Flat	293(64.96)
	House	158(35.04)
Home ownership	Rental property	316(70)
	Personal housing	135(30)
Number of rooms at home	One	126(28)
	Two	276(61)
	Three or more	49(11)
House size	Under 50 square meters	17(3.76)
	100-50 square meters	327(72.53)
	200-100 square meters	96(21.28)
	Above 200 square meters	11(2.43)
Type of vehicles	Group 1 (Pride-Peykan-Renault)	155(34.36)
	Group 2 (Peugeot-Samand-Sorento)	129(28.60)
	Group 3 (Suzuki-Mazda3-bus)	20(4.40)
	Not having a vehicle	126(28)
		21(4.46)

**Table 3: Comparison between the Height, Weight and BMI of Primary School Students in Hamadan with the Nchs Reference**

Gender	Number	Growth indicators	Below the 5 <sup>th</sup> percentile		Normal		Above the 95 <sup>th</sup> percentile	
			Number	Percent	Number	Percent	Number	Percent
Girls	195	Height	11	5	141	72	43	22.1
		Weight	13	6	168	86	14	7
		BMI	36	18	127	65	32	16
Boys	256	Height	14	5	234	91	8	3
		Weight	14	5	225	87	17	6
		BMI	49	19	166	64	41	16

**Table 4: Socioeconomic Variables Influencing Height, Weight and Body Mass Index of Students**

Variable	B	Std.error	Beta	T	Sig
The Value of Family Properties (Height)	2.568	1.153	0.115	2.228	0.028
Family Income (weight)	2.882	0.927	0.21	3.108	0.002
Family Income (BMI)	1.266	0.37	0.29	3.407	0.001

**DISCUSSION**

Comparison of the anthropometric profile of children on a periodic basis can be one of the most appropriate tools for monitoring the nutritional status and health of children. It can provide the authorities who are in charge of health care system of Iran with valuable information [22]. Therefore, this study was conducted to determine the prevalence of developmental disorders in elementary school students and to examine its relation to socioeconomic factors in Hamadan. Based on the data gathered from 451 students, the prevalence of short stature was 5%. The

prevalence of underweight among the subjects was 5.5 %, while the prevalence of overweight was 6.5 % According to BMI, the prevalence rates of thinness and obesity were 18.5% and 16% respectively. In the study carried out by Azami et al. (2011) on elementary school students in Kermanshah, the prevalence of short stature among boys was 5.6% and obesity was 13.4% [12], unlike the results reported by Azami and his associates, the present study found that primary school students in Hamadan were more obese and is less underweight. The average weight of girls was 97/32 kg. Minimum weight of the girls was 15.5 kg while the maximum weight was 68.3. The average weight of the 7-year-

old subjects was 23.6 and this value for the 8, 9, 10, 11, 12 and 13-year-old subjects were 126.86, 130.63, 137.7, 142.09, 146.96 and 150.09 respectively. In 2008, Nemati et al. investigated the anthropometric factors among 9-19-year-old girls in Ardabil. The mean weight for the 7 year old girl was 21.8. This value for 8, 10, 11, 12 and 13 year old girls were 23.8, 27.6, 30.3, 33.8, 36.6, 41.2 kg respectively. The average height of the 7 8, 9, 10 11, 12, 13-year-old girls were 118.9, 123.5, 129.5, 134.2, 139.5, 143.6 and 147.7 cm respectively. Overall, the heights of 30/9% of students in Ardebil were below the fifth percentile of the NCHS [23]. In contrast to these findings, the mean ages of the girls in different age groups in Hamadan were higher than those in Ardabil. Although Nemati and his associates (2008) reported that the height, weight, and BMI of the girls of all ages were lower than the NCHS standards, our study found that only BMI of students was different from the standard chart. In a study conducted in Ethiopia (2012), A male reported that 23% of schoolchildren were tall, 21% were short, and 11% were thin. Our results did not lend support to these finding in the literature. In Amale's study, the prevalence rates of short stature and overweight among school students were higher than our findings [24]. However, the results of this study correlated fairly well with Moshtagh et al. s' (2011) findings. The prevalence rates of overweight and obesity in the study conducted by Moshtagh and his colleagues among children aged 5 to 12 years old, were 17 and 7.5% [8]. Our results were 1 percentage higher. Our results were in contradiction with Ramires (2014) who found the prevalence rates of short stature and obesity were 9.1% and 24% [25]. The prevalence rates of short stature and obesity were 4.1% and 8% more than those rates in the current study. The results of the study by Keda (2012)[26] and Helga (2011)[27] on the effect of socio-economic variables on children's development showed that the children possessed the properties which valued low had a shorter life span (OR=9). These results were inconsistent with the findings of our study. In another study in the Netherlands on the children under the age of two, it was found that the children owned the low valued properties had a faster growth rate than others [28]. These results echoed the findings of the present study. Similarly, the results of Mohammadi et al.'s study in 2015 indicated that there was a relationship between the economic level and height or income had a direct impact on the height growth. Our results disapprove these findings. A group of researchers, (Beata, 2013)[29], (Cecilia, 2012)[30], Moshtagh & Meshki (2012)[31], found that both weight and BMI were directly related to family income. The results were consistent without comes. However, in the study conducted by Davis (2015)[32] and Shoeps (2011)[33], the prevalence of obesity was reported in lower-income families. Similarly Kim (2014)[34] and Kuchi (2015)[35] found that the children from the families with lower income were more obese. Perhaps it can be argued that differences in the prevalence of anthropometric abnormalities can be due to the effect of the nutritional or genetic factors of the environment, and the difference in the use of standard criteria can also lead to such a difference [36].

## CONCLUSION

Comparing the results with the NCHS chart showed that in 5% of all subjects, the height was below the 5th percentile, and in % 6 of the girls and 5% of the boys the weight was below the 5th percentile. In 18% of the girls and 19% of the boys (49), BMI was below the 5th percentile. Therefore, the prevalence rates of short stature among girls and boys were 5%. The prevalence rates of underweight among boys and girls were 5% and 6%, respectively, and the prevalence rates of overweight were 6% and 7%, respectively. According to BMI, the prevalence rates of thinness among boys and girls was 19% and 18% respectively, and the prevalence of obesity in both genders was 16%. Among the variables examined, there was a significant relationship between the assets and height. Moreover, income was significantly associated with weight and BMI.

## ACKNOWLEDGMENTS

Researchers of the study are grateful to the research committee of Hamadan University of Medical Sciences and Faculty of Medicine. This article is the result of a research project (No.

9306182864/35/16) approved by the research committee in University of Medical Sciences in Hamadan.

## REFERENCES

- Ozera K, Ozdol Y. Three yearly variations of some anthropometric measurement and body composition of children in the different socio-economic status. *Procedia - Social and Behavioral Sciences*. 2014;116(7):3422-26
- Sereebutra P, Solomons N, Aliyu MH, Jolly PE. Sociodemographic and environmental predictors of childhood stunting in rural Guatemala. *Nutrition research*. 2006; 26(2):65-70.
- Maracy M-R, Sarrafzade S, Kelishadi R, Hosseini S-M. Child Weight Growth Trajectory and its Determinants in a Sample of Iranian Children from Birth until 2 Years of Age. *Int J Prev Med*. 2014;5(3):348-55.
- Silveira CRM, Beghetto MG, Carvalho PRA, Mello ED. Comparison of NCHS, CDC and WHO growth standards in the nutritional assessment of hospitalized children up to five years old. *Nutr Hosp*. 2011; 26(3):465-71.
- Elgar FJ, Xie A, Pfortner TK, White J, Pickett KE. Relative deprivation and risk factors for obesity in Canadian adolescents. *Social science & medicine*. 2016; 152(4):111-18.
- Lakshman R, Zhang J, Zhang J, Koch FS, Marcus C, Ludvigsson J, et al. Higher maternal education is associated with the favourable growth of young children in different countries. *J Epidemiol Community Health*. 2013; 67(7): 595-602.
- Dekkaki IC, Ettair S, Meskini T, Khalloufi N, Mouane N, Barkat A. Growth evaluation of a group of children enrolled in public schools in Rabat, Morocco: the role of socioeconomic factors. *International journal of general medicine*. 2013;6(4):765-71.
- Mushtaq MU, Gull S, Abdullah HM, Shahid U, Shad MA, Akram J. Prevalence and socioeconomic correlates of overweight and obesity among Pakistani primary school children. *BMC Public Health*. 2011; 11(724):1-10.
- Christine M., Baylin A, Joanne E , Mercedes M, Eduardo V. Overweight Is More Prevalent Than Stunting and Is Associated with Socioeconomic Status, Maternal Obesity, and a Snacking Dietary Pattern in School Children from Bogota , Colombia. *j nut*. 2009; 139(2):370-76.
- Dehghan A, Ershad Langroudi M, , Kamali Sarvestani M, Shahoseini S. Prevalence of malnutrition in students of elementary schools in Larestan city in 2010. *JNKUMS*. 2011; 2(4):25-8.
- Namakin K, Sharifzade G, Majnone H, Firouzi F, Latifi M. Prevalence of Malnutrition in Students of Deprived Areas in South Khorasan. *Journal of Knowledge & Health*. 2011;6(2):38-42.
- Aazami M, Akbari M, Heshmati B, Alikhani M. The Growth Pattern among Elementary School Students in Kermanshah, Iran. *Journal of Isfahan Medical School*. 2012;30(181):1-8.
- Rezaadeh K, Dorosty Motlagh A, Omidvar N, Rashidkhani B. Prevalence of stunting-cum-overweight and its association with socio-demographic characteristics of parents in school-age children in Khoy City, Iran. *Iranian Journal of Nutrition Sciences & Food Technology*. 2009; 4(3):35-46
- Hoddinott J, Behrman JR, Maluccio JA, Melgar P, Quisumbing AR, Ramirez-Zea M. Adult consequences of growth failure in early childhood. *Am J Clin Nutr*. 2013;98(5):1170-78.
- Panahi J, Havasian MR, Roozegar MA. Knowledge of physical education teachers' toward tooth avulsion in Tehran, Iran. *J Oral Health Oral Epidemiol* 2014; 3(2): 66-71.
- Assunção MCF, Muniz LC, Dumith SC, Clark VL, Araújo CL, Gonçalves H, et al. Predictors of body mass index change from 11 to 15 years of age: the 1993 Pelotas (Brazil) birth cohort study. *Journal of Adolescent Health*. 2012;51(6):65-9.
- Moshki M, Bahram M, Ahkoundi R, Hosseini Z. Evaluation of Body Mass Index and some socio-economic variables related to the primary schoolchildren in Gonabad. *Journal of Research & Health* 2011; 1(1):73-76.

18. Ikeda N, Irieb Y, Shibuya K. Determinants of reduced child stunting in Cambodia: analysis of pooled data from three Demographic and Health Surveys. *Bull World Health Organ.* 2013;91(5):341-49.
19. Panahi J, Tajbakhsh P, Judaki A, Havasian MR. In vitro inhibitory effect of the Hydro-Alcoholic extract from the *Avicennia Marina* (Hara) on candida *Albicans*. *Mintage Journal of Pharmaceutical and Medical Sciences* 2014; 3(4): 9-11.
20. Havasin MR, Roogani A, Yasemi MR, Rouintan R, Hosseini R, Panahi J. Epidemiology of Animal Bites in Region of Ilam, Iran. *Mintage Journal of Pharmaceutical and Medical Sciences.* 2015; 1(1): 21-2.
21. Mohamadi J, Motaghi M, panahi J, Havasian MR, Delpisheh A, Azizian M, Pakzad I. Anti-fungal resistance in candida isolated from oral and diaper rash candidiasis in neonates. *Bioinformation* 2014; 10(11): 667-70.
22. Tartibian B., Akbari H. Survey and Comparison of the Anthropometric Characteristics of 11-17Years old Female Students of Urmia with NCHS Standard. *Research on Sport Sciences.* 2008;18(1):83-171.
23. Nemati A, Naghizadeh Baghi A, Dehghan M H. Anthropometrics Factors of Girls of Ardabil aged 7-19 years and comparison of them with NCHS Standard . *J Ardabil Univ Med Sci.* 2008; 8(2):202-08.
24. Amare B, Moges B, Fantahun B. Micronutrient levels and nutritional status of school children living in Northwest Ethiopia. *Nutrition journal.* 2012; 11(1):108-14.
25. Ramiresa E, Menezesa R, Oliveira J. Nutritional status of children and adolescents from a town in the semiarid Northeastern Brazil. *Rev Paul Pediatr.* 2014; 32(3):200-7.
26. Ikeda N, Irieb Y, Shibuya K. Determinants of reduced child stunting in Cambodia: analysis of pooled data from three Demographic and Health Surveys. *Bull World Health Organ.* 2013;91(5):341-49.
27. Urke HB, Bull T, Mittelmark MB. Socioeconomic status and chronic child malnutrition: wealth and maternal education matter more in the Peruvian Andes than nationally. *Nutrition Research.* 2011; 31(10):741-47.
28. Silva LM, Rossem Lv, Jansen PW, Hokken-Koelega ACS, Moll HtA, Hofman A. Children of Low Socioeconomic Status Show Accelerated Linear Growth in Early Childhood; Results from the Generation R Study. *PLoS ONE.* 2012; 7(5):1-10.
29. Gurzkowska B, Kulaga Z, Litwin M, Grajda A, Swiader A, Kulaga K, et al. The relationship between selected socioeconomic factors and basic anthropometric parameters of school-aged children and adolescents in Poland. *Eur J Pediatr.* 2014; 173(1):45-52.
30. Assunção MCF, Muniz LC, Dumith SC, Clark VL, Araújo CL, Gonçalves H, et al. Predictors of body mass index change from 11 to 15 years of age: the 1993 Pelotas (Brazil) birth cohort study. *Journal of Adolescent Health.* 2012;51(6):65-9.
31. Moshki M, Bahram M, Ahkoundi R, Hosseini Z. Evaluation of Body Mass Index and some socio-economic variables related to the primary schoolchildren in Gonabad. *Journal of Research & Health.* 2011; 1(1):73-6.
32. Bailey-Davis L, Horst M, Hillemeier MM, Lauter A. Obesity disparities among elementary-aged children: data from school-based BMI surveillance. *Pediatrics.* 2012; 130(6):1102-09.
33. Shoeps DO, de Abreu LC, Valenti VE, Nascimento VG, de Oliveira AG, Gallo PR, et al. Nutritional status of pre-school children from low income families. *Nutrition journal.* 2011;10(1):43-7.
34. Kim K, Shin SC, Shim JE. Nutritional status of toddlers and preschoolers according to household income level: overweight tendency and micronutrient deficiencies. *Nutrition Research and Practice.* 2015;9(5):547-53.
35. Kachi Y, Otsuka T, Kawada T. Socioeconomic Status and Overweight: A Population-Based Cross-Sectional Study of Japanese Children and Adolescents. *Journal of epidemiology / Japan Epidemiological Association.* 2015; 25(7):463-69.
36. Maia MM, Fausto MA, Vieira EL, Benetton ML, Carneiro M. The prevalence of malnutrition and its risk factors in children attending outpatient clinics in the city of Manaus, Amazonas, Brazil. *Archivos Latinoamericanos de Nutrición.* 2008;58(3):234-41

© 2017 by the authors; licensee MJPMs, India. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>)