

Original article

Prevalence of Malnutrition in Children 7-12 Years Old in Kerman, 2013

Milad Gholami¹, Azizallah Dehghan^{*2}, Najmeh Kargar³, Pejman Mohammadi⁴, Mahmood Moosazadeh⁵, Hadi Hadizadeh⁶

¹. School of Health, Arak University of Medical Sciences, Arak, Iran.

². Research Center for Modeling in Health, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran

³. School of Health& Nutrition, Shiraz University of Medical Sciences, Shiraz, Iran

⁴. Department of Occupational Health, Kerman university of Medical Sciences, Kerman, Iran

⁵. Deputy of Health, Mazandaran University of Medical Sciences, Sari, Iran

⁶. School of Hygiene, Tehran University of Medical Science, Tehran, Iran

Received: 11/28/2013

Accepted: 2/25/2014

Abstract

Introduction: Malnutrition remains among the most serious children health problems and the main cause of children mortality in the World Health Organization (WHO) Eastern Mediterranean Region. Nearly one-third of children in the region are either underweight or stunted, and more than 30% of the population suffers from micronutrient deficiencies. The aim of this study is to determine the prevalence of malnutrition among school children in Kerman.

Materials and Methods: This is a cross-sectional study. A number of 1,056 students of Kerman, in the age range of 7 to 12 years were selected by multistage sampling. Children weight for age (W / A), height for age (H / A) and weight for height (W / H) indicators were calculated and were compared with NCHS standard index. Students' height and weight were measured with standard tools. Epi-info and Stata 11 software were used for analysis. Descriptive and chi 2 tests were used to provide a comparison according to (in) gender (sex).

Results: Prevalence of Malnutrition based on weight-for-age, height-for-age and weight-for-height respectively is 6.06, 5.58 and 75.9 percent and the average prevalence of malnutrition with above indicators respectively is 24.43, 26.04 and 24.90 percent. Comparison of weight-for-age and weight-for-height indices in children showed higher prevalence of malnutrition in girls compared to boys (P-value<0.05).

Conclusion: According to our results, prevalence of malnutrition among school children was high in Kerman and the causing factors must be identified and the necessary planning should be performed to eliminate them.

Keywords: Malnutrition, Children, Kerman

^{*}Corresponding Author: Tel. 09171214107, Email: adehghan@collegian.kmu.ac.ir

Introduction

Malnutrition is the most serious children health problem and the main cause of children mortality in the World Health Organization (WHO) Eastern Mediterranean Region. Nearly one-third of children in the region are either underweight or stunted, and more than 30% of the population suffers from micronutrient deficiencies. High-and middle-income countries are experiencing both kinds of malnutrition i.e. micronutrient deficiencies and overweight people, which enhance diseases burden in Eastern Mediterranean Region ^[1]. A proper diet and nutrition program is required to protect health and fitness in children. Neglecting this important issue would cause major problems in physical and mental health status and also is a threat for growth and development of children ^[2]. Naturally, there is an instinctive ability for growth in children that can be affected by various factors if it is not noticed and sometimes prevents growth and development of children ^[3]. Chronic malnutrition in early adolescence is responsible for growth retardation in many parts of the world. Iron deficiency and its anemia is also one of the main problems of teenage girls around the world. Improving nutrition of this group before pregnancy can help reducing infant and maternal mortality ^[4]. In this age, due to physical and mental changes and also increase of nutrition requirements for rapid growth and due to changes in nutrition diet, the balance between energy and food intake is collided. Thus, this is the most important nutritional vulnerability period ^[5]

Malnutrition, as one of the most important causes of growth retardation with infection, is responsible for 54-46 percentages of children mortality in developing countries ^[6]. Also, in these countries, high prevalence of malnutrition and its relation to children mortality rate and somatic growth deficiency is the most fundamental problem in the health sector ^[7]. United Nations International Children's Emergency Fund (UNICEF) has announced in its report on malnutrition in Iran that 11% of Iranian children suffer from moderate and severe underweight, 5% suffer from moderate and severe thinness and 15% suffer from moderate and severe stunting ^[8]. Over 16% of diseases in world are due to malnutrition; this figure goes up to 33% in deprived areas ^[9]. Recent studies show that malnutrition can significantly affect children's learning in educational environment as well as their future success in life ^[10].

The quality of nutrition status is known as one of the best indicators in health gamut and static anthropometric measurement is also a method with high reliability and low economic costs, by which health situation of individuals or communities can be assessed ^[11]. Weight and height are two important anthropometric indicators used in all age groups. World Health Organization (WHO) in 1986 proposes children height for age (stunting), weight for age (underweighting) and weight for height (thinness) indicators to diagnose malnutrition based on NCHS standards.

Since children in primary school are one of the most vulnerable groups and their health provides the context to increase their learning, and according to the importance of identifying malnutrition aspects in all age groups specially children, this study was accomplished with aim of malnutrition prevalence survey among 7-12 years olds in Kerman in 2013.

Materials and Methods

This is a cross-sectional study accomplished in Kerman in winter 2013. According to malnutrition prevalence (81.9%) in previous studies, confidence level of 95%, acceptable error of 0.03 and also design effect of 2 and 6 educational grade, the sample mass was obtained 1008, and finally, 1056 students participated in the study. The samples were selected from students in Kerman by multistage sampling.

At first 3 girl and 3 boy schools are selected by random sampling of 2 education districts in Kerman. Then in each school, 15 students were selected from each grade by random sampling. Before beginning the study the required permission was assumed from Kerman Education Office and the consent form was given to students the day before inquiry and measuring that was delivered to researchers in day of measurement.

The participation rate was 100%. The student's weight was measured by appropriate and precise scale with light cloths and no shoes. The student's height was also measured by taping meter mounted on the wall, while students had no shoes, feet stuck together and

hip, shoulders and back of the head were in contact with the wall. The background variables were simultaneously recorded. All the measurements were accomplished by the project executers and trained experts.

The weight for age (weight/age), the height for age (height/age) and the weight for height (weight/height) indicators were used to evaluate malnutrition status and compared with NCHS (National center for Health statistics) standards. The weight for age indicator assesses the prevalence of underweight represented past and present malnutrition and the height for age indicator also assesses the prevalence of stunting represented past malnutrition and the weight for height is for assessing the prevalence of thinness^[13].

Data analysis was performed by Epi-info 2000 and Stata 11 software and Descriptive and Chi-Squire tests.

Results

This study includes 1056 students; 530 boys (19.50%) and 526 girls (81.49%). Malnutrition status is shown in Table1 according to the weight for age, the height for age and the weight for height indicators. In this table, malnutrition indicators are enumerated to three categories: severe, moderate and normal.

Table 2 demonstrates that there is a statistically significant difference in malnutrition in weight for age (underweight) and weight for height (thinness) indicators among the children ($P < 0.001$). However, the prevalence of malnutrition for height for age

indicators were high both in boys and girls but there is no statistically significant difference

between two groups according to height for age indicator (thinness).

Table 1: The frequency of types of malnutrition in children 7 to 12 years in the city of Kerman, 2013

Indicator	Severity	Weight for age		Height for age		Weight for Height	
		Frequenc	Percenta	Frequenc	Percenta	Frequenc	Percenta
		y	ge	y	ge	y	ge
Sever		64	6.06	59	5.59	103	9.75
Medium		258	24.43	275	26.04	263	24.91
Normal		734	69.51	722	68.37	690	65.34
Total		1056	100	1056	100	1056	100

Table 2: Comparison of the prevalence of malnutrition in children 7 to 12-years in the city of Kerman, by sex 2013

	Gender	Normal	Medium	Sever	P-value
Weight for age	Male	411(77.55)	96(18.11)	23(4.34)	<0/001
	Female	323(61.41)	162(30.80)	41(7.79)	
Height for age	Male	369(69.62)	133(25.09)	28(5.28)	0.675
	Female	353(67.11)	142(27.00)	31(5.89)	
Weight for height	Male	375(70.75)	118(22.26)	37(6.98)	<0/001
	Female	313(59.51)	146(27.76)	67(12.74)	

Discussion

In this study, the prevalence of malnutrition in primary school children (7-12 years old) was estimated by using anthropometric indicators and compared with NCHS standards. Based on the results, the prevalence of malnutrition was nearly high according to the weight for age, the height for age and the weight for height indicators for boys and girls in primary schools of Kerman, however, compared to the study by Alavi Naien et al on primary school girls of Kerman in 2008, a significant reduction was shown in all three indicators ^[4].

The prevalence of severe and moderate malnutrition, according to the weight for age indicator, were respectfully 6.06% and 43.42%

, which were lower than the study of Dehghan et al. in Larestan, Ghorbani et al. in Zanjan and Aghamolaie et al. in Bandar abbas ^[8,14,15] and were nearly equal to the study of Delourian zade et al. in Shahroud and Darvishi et al. in Kordestan ^[9 , 11]. However, compared to the study of Alavi Naieni et al., a significant reduction is observed ^[4].

The prevalence of severe malnutrition in girls, according to height for age indicator, was 5.59% and significantly higher than boys. Also, the prevalence of malnutrition in girls reduces to less than half of the same factor in the study by Alavi Naieni et al ^[4].

In a study conducted in Kordestan, the prevalence of malnutrition was 6.5, which is almost equal to our study and also the prevalence in girls was higher than boys ^[11]. The prevalence of malnutrition in studies performed in Shahroud, Zanjan, Bandar abbas and Larestan was higher than the current study ^[8, 9, 14, and 15]. The prevalence of malnutrition according to the height for age indicator in female students was higher in studies performed in Larestan and Kordestan ^[8, 11]. It should be noted that studies in other parts of country were conducted in previous years and the prevalence of malnutrition might have reduced in other parts, too.

The prevalence of severe malnutrition according to weight for height indicator was 9.75% that was almost equal to the study in Larestan ^[8] and less than similar studies in Kordestan and Bandar abas ^[11, 15] and also higher than similar studies in Zanjan and Shahroud ^[9,14].

The geographical factors, nutritional pattern of ethnic and different cities, different socioeconomic level and genetic factors can justify the prevalence of malnutrition differences in various geographical regions.

References

1. World Health Organization. Nutrition in the Eastern Mediterranean Region. Available from: <http://www.emro.who.int/entity/nutrition/>.
2. Vahidi AA, Ahmadi A, Salehi M, et al. Evaluation of the nutritional status of the primary-school children based on weight and height in Kerman, Iran. *Journal of Kerman University of Medical Sciences*, 1997; 5(1): 37-43.
3. Kligman RM, Marcadante KJ, Jenson HB, et al. *Nelson Essentials of Pediatrics*. 5th ed. Philadelphia; Elsevier Saunders; 2006.

Reduction in prevalence of malnutrition, according to three indicators (weight for age, height for age and weight for height), is probably due to proper nutritional training to mothers and children and intervention programs such as food security plan and distribution of subsidy milk and free nutrition in schools. Also, improvement of economic and social situation of households and decrease in household size can be effective. It should be considered that the main part of malnutrition is not due to slight food intake but is a result of poor nutrition pattern. The proper nutrition training can be useful and target groups are mothers and children.

Conclusion

It can be concluded that the prevalence of malnutrition is nearly high and equal to other parts of country, but less than 2013. Thus, more efforts should be accomplished to reduce the prevalence of malnutrition in the forthcoming years.

Acknowledgment

Acknowledgment is made perfectly to the education officials and the principals and teachers of selected schools.

4. Alavi Naieni AM, Djazayeri A, Keyghobadi K, et al. Comparative survey of nutritional status in 10-year old female students in kerman. *Journal of School of Public Health and institute of public health researches* 2002;55(3): 57-66.
5. Kulin HE, Bwibo N, Mutie D, et al. The effect of chronic childhood malnutrition on pubertal growth and development. *The American journal of clinical nutrition*.1982; 36(3):527-36.
6. Sanghvi U, Thankappan KR, Sarma PS, et al. Assessing potential risk factors for child malnutrition in rural Kerala, India. *Journal of tropical pediatrics*. 2001; 47(6):350-5.
7. Ramazani AA, Raghebi SS, Amirkhizi F. The survey of the nutritional status and related factors in 24-0 month-old children in south Khorasan province in Iran. 2006. *Iranian Journal of Epidemiology* 2010; 5(4):8-13.
8. Dehghan A, Ershad langroudi M, Kamali sarvestani M, et al. Study of Prevalence of malnutrition in elementary students in Larestan in 2010. *Journal of north Khorasan University of medical sciences*. 2011; 2(4):25-8.
9. Delvarianzadeh M, Sadeghian F. Malnutrition prevalence among rural school students. *Payesh, Journal of the Iranian Institute for Health Sciences Research*. 2006; 5(4):263-9.
10. Basiri Mogaddam M, Gahramany M, Chamanzary H , et al. Survey of prevalence of malnutrition in children who study at grade one in Gonabad primary school in 2005- 2006. *Ofogh-E-Danesh*.2008; 13(1):40-5.
11. Darvishi S, Saleh Hazhir M, Reshadmanesh N, et al. Evaluation of malnutrition prevalence and its related factors in primary school students in Kurdistan Province. *Scientific Journal of Kurdistan University of Medical Sciences*. 2009; 14(2):78-87.
12. WHO Working Group. Use and interpretation of anthropometric indicators of nutritional status *Bulletin of World Health Organization*.1986;4(1): 924-41.
13. Fesharakinia A, Sharifzadeh GhR, Zarban A. Investigation of Nutritional Status in Elementary School Students of South Khorasan Province:East of Iran, *Journal of Qom University of Medical Sciences*. 2008; 2 (3): 47-52.
14. Ghorbani J. A study of malnutrition at the primary school students in Zanjan. *Journal of Zanjan university of medical sciences and Health services* 1998; 23(1): 24-31.
15. Agha Molaei T, Sobhani AR. Anthropometric evaluation of Nutritional status in primary school Students at Bandar Abbas 2001-02. *Journal of school of public health and institute of public health Researches*. 2003; 7(2): 49-56.