



Growth indicators and nutritional supplement evaluation in 6-12 months year old children's: A perspective from Ilam

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ABSTRACT

Introduction: The study of nutritional status and children growth monitoring can play an important role in the diagnosis of developmental disorders in the early stages of life. Accordingly, the purpose of this study was to examine the growth chart and nutrition supplements in children of 6-12 months old in Ilam.

Materials and Methods: This study was performed using data from 200 health records of children aged 6-12 months who referred to Ilam health centers in 2017. The sampling method was multistage cluster sampling. Weight measurement performed in kilograms and height and head circumference measured in cm and all specimen measurements performed in identical conditions. Data analysis carried out using SPSS.21 with a confidence level of 0.5.

Results: Out of 200 cases, 89(44.5%) were male and 111(55.5%) were female. The mean age was 9.44 ± 1.23 months. Among investigated children, 39% (78children) in terms of weight to age index, 18.5% (37children) in terms of height to age index of developmental delay, and 24% (48children) in terms of head circumference to the age had undesirable growth. In addition, 55.5% of children had started baby food in an improper time. In addition, 44.5% were breastfed. The findings demonstrated that there is a significant difference in the weight to age index in terms of gender ($p=0.024$). Moreover, height and head circumference to age indices had a statistically significant relationship with weight to age index ($p<0.05$).

Conclusion: Underweight cases in boys were more than girls and chronic malnutrition in girls was higher than boys. Therefore, long-term studies are needed for more accurate evaluations.

Keywords: children, growth charts, nutrition supplements

INTRODUCTION

Children are the capital of a country such that the future health of society will be guaranteed by securing their health. Since children, along with the elderly and women, are the most vulnerable groups in the society, it is important to evaluate and consider their health issues. Attention to children growth and development is a crucial importance in their health evaluation. The World Health Organization (WHO) recommends a growth chart which is prepared based on the National Center for Health Statistics (NCHS) data to evaluate the children. Experts find this chart and similar diagrams to be the simplest, most appropriate, and most valuable tool for diagnosing childhood malnutrition and developmental disorders(1). There are some hesitations in accounting the international standard growth chart of National American Center in accordance with Iran's condition due to racial, social, and economic differences that affect the growth process. Hence, the use of local and regional growth chart is necessary to evaluate children growth (2).

Generally, two main reasons can be accounted for the developmental disorder (1). Organic causes such as the presence of an acute or chronic disease (infection) that interferes with the absorption or metabolism of nutrients(2). Inorganic causes such as food intake deficiency, loss of appetite, inadequate mother knowledge of the proper child feeding ways, and the parent employment status (3, 4).

Failure to pay attention to child developmental delay or cessation, which is commonly seen in children under the age of 5 years, causes serious problems such as increased mortality, increased other related diseases, decreased learning,

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and mental, emotional or physical disabilities (5). One of the methods for achieving this goal is to investigate and monitor the developmental disorders in children, periodically monitor their height and weight, and perform disorder screening. For example, the growth chart is a simple and inexpensive device for monitoring the child's health and nutrition, which can be easily used by health personnel (6).

The main characteristic of the growth curve is that the anthropometric index value for the child is marked with respect to its age in a specific location at the growth chart, so that it possible to visually compare the child growth to the standard curves of the National Center for Health Statistics (NCHS) (7).

In children growth monitoring, the growth curve trends and paths are of particular importance, so that between the 3rd and 97th percentiles (as the normal range), four different situations occur (1). The growth chart is upward and parallel to the standard curve which is considered as normal (2). The growth chart is upward but its slope is less than the standard curve, which is a sign of developmental delay (4). Horizontal growth chart that indicates developmental cessation (3). Downward growth chart which indicates a developmental drop. Modes 2-4 are considered as abnormal and require immediate attention and intervention (6).

Developmental disorder is a global issue. According to the World Health Organization (WHO), more than 30% of children under the age of 5 suffer from developmental growth, of which 80% suffer from reduced height growth rate, 20% are underweight. According to the studies, the prevalence of developmental disorders in developing countries is higher than in other parts of the world. In most of these countries, the children physical growth and infants is lower than international standards. The findings of a national survey in Iran in 2008 indicated that 9.5% of children under the age of 5 years had moderate to severe underweight. In this study, the prevalence of stunting and weight loss was reported as 13.9% and 5.3%, respectively (8).

Generally, malnutrition can be prevented if developmental disorder is detected in the early stages and effective actions are taken concerning its treatment. In many parts of the world, the growth pursuit program and its promotion is used to identify child malnutrition by health workers, and in some places to provide children in need with baby food. In this regard, the purpose of this study was to determine the growth status and nutrition supplements in 6-12-month-old children in Ilam.

MATERIALS AND METHODS

The present study is a descriptive-analytic study which was carried out in 2017 using health record information in Ilam health centers. The studied samples consisted of 200 children with the age of 6-12 months who referred to health centers in Ilam. In this study, multistage cluster sampling was employed. Firstly, Ilam districts were determined and then the health centers of each area were identified. In the next stage, from each strict, three health centers were drawn randomly and the researcher, while referring to the birth registry of each health center, extracted the records of households who were eligible for entering the study randomly by utilizing the random numbers table and recorded their information. The collected data included growth monitoring criteria such as weight to age indices, height to age, and head circumference to age according to the National American Center for Health Statistics standards, as well as data on iron drop intake, vitamin A + D intake, breastfeeding, observing the proper start time for baby food, forbidden food articles.

The growth chart, which is comprised of three separate curves including: weight to the age, height to the age, and weight to the height, was employed to compare the children's weight and height. Each chart consists of several curves (different percentiles) with the highest percentile of 97 (the upper curve), the lowest percentile of 3 (curve below), and the middle percentile or middle curve of 50. The middle curve represents the median reference for weight to age, height to age, or weight to height. Accordingly, the status of each of these indices was classified as desirable and desirable. The data, after being extracted from health records, were analyzed by using SPSS software version 22 and employing the proper statistical tests including chi-square test and independent t-test with confidence level of 0.05.

RESULTS

According to the study outcomes, out of investigated children, 89 (44.5%) of the children were male and 111 (55.5%) of the children were female. The mean age was 9.44 ± 1.23 months. In terms of maternal education, 29 (14.5%) of mothers had junior high school (intermediate school) degree or lower education level, 67 (33.5) of mothers had high school diplomas, and 104 (52%) of mothers had post-secondary university education. Concerning fathers' education: 27 (13.5%) of fathers had junior high school degree or lower education level, 85 (42.5%) of fathers had high school diploma, and 88

(44%) of fathers had post-secondary university education. Regarding the mother's job, 156 (78%) of mothers were housewives and 44 (22%) of mothers were employed. In terms of father's job, 86 (43%) of fathers were employees, 111 (55.5%) of fathers were self-employed and 3 (1.5%) of fathers were unemployed. Out of investigated children, 48% were the first child of the family, 38.5% were the second child, and 13.5% were the third child or higher.

Among studied children, 39% (78) of children in terms of weight to age index based on underweight criterion, 18.5% (37) of children in terms of height to age index according to the developmental delay criterion, and 24% (48) of children based on head circumference to age, were malnourished (**Table 1**). According to the Chi-square test, there was a statistically significant correlation between the weight to age index and gender ($P = 0.024$).

Table 1: Comparison of anthropometric indices by gender

Anthropometric indices	Weight for Age	Boys		Girls		P-Value
		Numbers	Percent	Numbers	Percent	
Weight to age	Desirable	47	23.5	75	37.5	0.024
	Undesirable	42	21	36	18	
Height to age	Desirable	73	36.5	90	45	0.507
	Undesirable	16	8	21	10.5	
Head circumference to age	Desirable	67	33.5	85	42.5	0.480
	Undesirable	22	11	26	13	

Moreover, according to this test results and **Table 2**, the height to age index and the head circumference to age had a statistically meaningful correlation with the weight to age index ($p < 0.05$).

Table 2: Comparison of height to age and head circumference to age indices with weight to age indices

Anthropometric indices	Weight for Age	Boys		Girls		P-Value
		Percent	Numbers	Percent	Numbers	
Height to age	Desirable	110	55	53	26.5	0.001
	Undesirable	12	6	25	12.5	
Head circumference to age	Desirable	101	50.5	51	25.5	0.004
	Undesirable	21	10.5	27	13.5	

Based on the findings of **Table 3** and considering the age of 6 months to start baby food, 55.5% of children had started baby food at an improper time. Based on independent t-test, there was no difference in both genders regarding the start time for baby food ($p > 0.05$). The iron drop and vitamin A + D intake level among children was 49% and 44.5%, respectively. 44.5% of the investigated children were breastfed and 44.5% had improper and forbidden articles of foods.

Table 3: Comparison of nutritional status and gender variables

Nutritional Variable	Status	Boys		Girls		P-Value
		Numbers	Percent	Numbers	Percent	
Iron-Drops Intake	Yes	88	44	1	5	0.693
	No	110	55	1	5	
Vitamin A+D	Yes	85	42.5	4	2	0.038
	No	111	55.5	0	0	
Breastfeed	Yes	62	31	27	13.5	0.469
	No	79	39.5	32	16	
the proper start time for baby food	Yes	87	43.5	2	1	0.6.3
	No	108	54	3	1.5	
Forbidden food article intakes	Yes	71	35.5	18	9	0.541
	No	89	44.5	22	11	

DISCUSSION

According to this study results and based on the NCHS chart, 39% (which was higher in boys than in girls), 18.5% and 24% (which was higher in girls than in boys) of children suffered from malnutrition in terms of weight to age, height to age, and head circumference to age indices respectively. The results of Vahabi et al. (2015) demonstrated that the prevalence of drop in the weight growth curve for children under two years of age was approximately 14% and the maximum prevalence for the curve decline was 4.6%, which was exactly equal for girls and boys. The prevalence of stops

in the height growth curve was approximately 10% and the highest observed prevalence of stops in the height growth curve was 3.1 % (3.2% for boys and 3% for girls) (9).

The United Nation Children's Fund (UNICEF) has introduced inadequate nutrition and diseases in the classification of malnutrition, as effective factors that have a drastic impact on the children nutritional status. It also stated that the first response to nutritional problems and Infections in young children is weight loss (3).

In this study, there was a significant correlation between weight for age indices and gender and there was no meaningful relationship between head circumference for age index and weight for age index. In Vahabi et al., the effect of gender on the incidence of height and weight growth disorders was not significant (9). According to the study conducted by Ismaili et al., mean head circumference in newborn male was higher than that of newborn female (10).

Exclusive breastfeeding in children referred to health centers in Ilam was calculated to 44.5% while it was 59.3% in Qatar (11), 74.9% in the United States (12). Qaed Mohammadi et al. (13), found 47% of children had breastfed in Bushehr, Iran that was more than our study results. However, Hatami et al., found only 23% of four-month old infants were exclusively breastfed (14). In the present study, there was no statistically significant relationship between exclusive breast feeding and gender. Similarly, in Khabbaz Khoob et al., the prevalence of exclusive breastfeeding in both genders of children with the age of up to 6 months was not statistically significant (15). Regarding the importance of mothers' attitude towards breastfeeding, continuous education in mothers can be a serious priority for health planning managers. In addition to the cooperation of the Ministry of Health, this priority requires the cooperation of other sectors and the positive attitude development in mothers through the public media.

The results of this study showed that only 57% of infants received regular doses of multivitamins, which is a low percentage. Also, there was no statistically significant relationship between the multivitamin intake and gender. In the study conducted by Anis, a similar figure (56% in Mazandaran, Iran) was obtained. In this study, iron drops intake in 44.5% of the cases was regular and also there was no significant relationship between iron intake and gender. The results of this study were consistent with studies conducted by Naemi (16) and Charkazi (17). However, it did not match the study of Saeidi (18) and Gholmi (19). Although, iron drops and multivitamins are available to most mothers in Iran free of charge; however, only about half of the children took regular drops of iron and multivitamins. Therefore, in addition to providing iron drop and multivitamins, educating and changing the mother's attitude is of crucial importance.

According to the WHO, the start age for baby food is four to six-month-old. In this study, 44.5% of children started the baby food intake in a proper age. Mohammad Hosseini et al., demonstrated that there was a statistically positive correlation between mother's knowledge and children nutrition status (20). Therefore, it can be said that lack of mothers' adequate education and knowledge about the proper nutritional supplement and economic-cultural poverty causes a significant increase in the incidence of malnutrition from these ages.

CONCLUSION

Some of children has delay in growth indices which related to lack of parent knowledge and malnutrition. Moreover, National Center for Health Statistics (NCHS) is global and is not a precise scale for measuring the Iranian children growth, therefore, long-term studies are needed for more accurate evaluations.

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CONFLICT OF INTEREST

None.

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