Growth Chart Study in Children Under 5 Years Old in Rural Area of Khoramabad Province

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ABSTRACT

Growth chart is the best measure for weight monitoring of children. Most factors that affect child heath show their effect on child weight. This cross sectional and descriptive analytical study was achieved to estimate malnutrition prevalence and effective factors in children under 5 years old in rural area of Khoramabad province. 555 girls and 570 boys were chosen from health houses by cluster sampling. Data were gathered through questionnaires. verbal interviews and child weighing. Nutritional status was estimated via weight/age index and the data were analysed by chi-square test. The results show 7.7% malnutrition among the children in this area. Factors that influence the nutritional status were: Frequency of diarrhea and acute respiratory infection, birth weight, duration of breast feeding and milk formula.

INTRODUCTION

The first years after birth are the base for quality improvement of life time. Therefore, follow-up and surveillance of children are vital for the health of society. Children under 5 years old are most vulnerable and high risk group who need special health srevices. 12.5-15% of world population are in this age group. 25-30% of mortality in developing countries occurs in this category (1-3,7,16). Although growth velocity in these children have the highest rate, but infection diseases, diarrhea and malnutrition are common in this age (5, 6, 11, 18). Some factors effect seriously child growth status, specially in developing countries, like: family size, educational status, parent's job, parents socioeconomic status, their knowledge about proper nutrition, prenatal care, mother age, mother weight, newborn sex and etc. (18).

The studies in Iran showed poor nutritional status among Iranian children (15). Growth monitoring is the first step to make strategies for malnutrition prevention. Growth chart are the more sensitive instrument that shows weight changing in time and determine quickly growth retardation (2,10).

All factors influencing health, reveal their effect on weight. Better evaluation of health status can be made by studing the growth pattern (2,10). Therefore, a descriptive–analytical study will help us to find the best way to improve child health.

MATERIALS AND METHODS

This cross sectional descriptive analytical study is done in rural areas of Khoramabad province, in winter 1998. Children under 5 years old were studied in 70 health houses. These health houses cover 8661 children in this area. The cases were chosen randomly via cluster sampling. 56 clusters, each containing 20 children, were chosen. The data were collected via standard questionnairies, mother interview and child weighing. Information resourses were: mothers, prenatal care forms, child surveillance forms, child spacing forms, and growth charts.

The data were analysed by SPSS software, and χ^2 test.

RESULTS

The weight curve in 8.6% of girls and 6.8% of boys were under 3 percentile and were constant in 31.8% of girls and 29.9% of boys. This pattern is more obvious after first year of life, (42.2% of 2-3 years old girls and 43.7% of 1-2 years old boys had constant weight curve). Constant weight has significant relation with weight percentile (Table 1; $\chi^2 = 40.44$, P< 0.0001). Weight loss was seen in 24.4% of girls and 26.1% of boys which was more clear after first year of life, specially in girls between 3-4 years old (32.3% of girls in this age group versus 37.5% of boys in second year of life). These results had also significant relation with weight percentile (Table 2; $\chi^2 = 62.36$, P < 0.001).

The cases of diarrheal diseases were seen after 2-6 months old and this rate increases rapidly after first year of life, 43.2% children in the third year of life were affected (50.1% of boys in second year of life were affected too). It was found significant relation between diarrheal affection and weight percentile (Table 3; $\chi2 = 81.11$, P < 0.001).

30.9% of girls and 30.7% of boys were affected by respiratory infections: 43.2% of girls were in third year of life and 60.2% of these boys were in second year of life upper respiratory infections were significantly related with weight percentile (Table 4; $\chi^2 = 74.52$, P < 0.001).

Infant nutritional status was significantly related with child weight. More breastfeeding duration, decreases the number of malnurished children (18.2% of children who were not breastfed were under weight versus 3.6% in breastfed children) (Table 5 & 6).

1.1% of girls and 1.1% of boys had low birth weight (under 2000 grams) which was significantly related with weight percentile (Table 7; $\chi^2 = 37.41$, P < 0.001).

DISCUSSION

Child's weight is an important index to evaluate nutritional and health status. With weight measuring we are able to determine the malnutrition prevalence.It was found 7.7% malnurished

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children, which was less than the prevalence of malnutrition in Iran, 1995, reported by Iranian health ministry (15%).

WHO reports 35% as the average of the prevalence of malnutrition in developing countries (7).

The nutritional status in first years of life are very important in life quality of a human, on the other hand poor feeding is an inhibitory factor in intelligence developement (4,13,16,17).

Many studies in the world show alteration of nutritional states infection disease, like diarrhea and respiratory infections, which regarde growth and development (9,12,19).

Diarrheal and respiratory infection are the major causes of child mortality. 3.2 million children under 5 years old in developing countries dye each year because of diarrhea. For example in 1984 and 1985, diarrhea caused 22% of child mortality in Iran (15). Infection diseases have more this effect after breast feeding. Fortunately, now after the health strategies like "control of diarrhea disease and control of acute respiratory infection", the mortality rate in this category are decreased.

Birth weight is an important factor for health status. Mortality and morbidity are high in the low birth weight infant, who children gain less weight in later years too (10).

Growth has highest velocity in infancy. Therefore good and appropriate nutrition that provides the child's need, is necessary (10).

Mother milk until 4-6 months old is the essential food for babies, for their physiologic and psychologic needs. Mother milk can improve growth status too (10).In this study, significant relation between breastfeeding, good growth and well nutritional status was found (10).

Some studies report the relation between malnutrition and sex but this study did not reach the same result.

According to the results of this study it is proposed to pay more attention to infant nutrition, to prevent infectious diseases and to educate mothers about breast feeding, about the best time and method for weaning, to promot their child health (8,10,14).

Table 1.**Total and proportional distribution of constant weight, times from birth according to weight percentile**

Percentile	W.constant									
	Zero		First		Second		Thirth		Total	
	n	%	n	%	n	%	n	%	n	%
≤3%	34	4.4	31	14.1	20	17.9	2	10	87	7.7
>3%	739	95.6	189	85.9	92	82.1	18	90	1038	92.3
Total	733	100	220	100	112	100	20	100	1125	100

$\chi^2 = 40.24$; P< 0.001

Table 2. **Total and proportional distribution of weight loss time from birth according to weight percentile**

Percentile	W. Loss									
	Zero		First		Second		Thirth		Total	
	n	%	n	%	n	%	n	%	n	%
≤3%	37	4.4	35	15.5	13	24.1	2	50	87	7.7
>3%	804	95.6	191	84.5	41	75.9	2	50	1038	92.3
Total	841	100	226	100	24	100	4	100	1125	100

$\chi^2 = 26.36$; P< 0.001

Table 3. **Total and proportional distributioon of diarrheal affection (in 3 months before study) according to weight percentile**

Percentile	W. Loss											
	Zero		First		Second		Thirth		Fourth		Total	
	n	%	n	%	n%	n	%	n	%	n	%	n	%
≤3%	19	2.9	7	6.7	34	12.8	25	26.2	2	25	87	7.7
>3%	633	97.1	98	93.3	232	87.2	69	73.4	6	75	1038	92.3
Total	652	100	105	100	266	100	94	100	8	100	1125	100

$\chi^2 = 81.11$, $P < 0.001$

Table 4. **Total and proportional distribution of diarrheal affection (in 3 months before study) according to weight percentile**

Percentile	ARI number									
	Zero		First		Second		Thirth		Total	
	n	%	n	%	n	%	n	%	n	%
≤3%	21	3.2	16	9.1	30	14	20	28.9	87	7.7
>3%	645	96.8	159	90.9	184	86	50	21.4	1038	92.3
Total	666	100	175	100	214	100	70	100	1125	100

$\chi^2 = 81.11$; $P < 0.001$

Table 5. **Total and proportional distribution of breast feeding duration according to weight percentile**

Percentile	B.Feeding									
	Zero		1-6 months		6-12 months		1-2 y		Total	
	n	%	n	%	n	%	n	%	n	%
≤3%	2	18.2	23	14.8	30	10.5	32	4.5	87	7.7
>3%	9	81.8	132	85.2	257	89.5	640	95.5	1038	92.3
Total	11	100	155	100	287	100	672	100	1125	100

$\chi^2 = 23.58$; $P < 0.001$

Table 6. **Total and proportional distribution of birth weight according to weight percentile**

Percentile	Birth weight					
	<2100 gr.		> 2100 gr.		Total	
	n	%	n	%	n	%
≤3%	8	47.1	79	7.1	87	7.7
>3%	9	52.9	1029	92.9	1038	92.3
Total	17	100	1109	100	1125	100

$\chi^2 = 37.41; P<0.001$

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