درصد تخفیف نوروزی ویژه کارگاه‌ها و فیلم‌های آموزشی

اصول تنظیم قراردادها

پروپوزال نویسی

آموزش مهارت‌های کاربردی در ندوین و چاپ مقاله
Prevalence of Malnutrition in under 6-year Olds in South Khorasan, Iran

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Abstract

Objective: Malnutrition is one of the important health problems throughout the world, particularly in developing countries, which has undesirable effects on mental and physical health of children. The aim of this study was to find out the prevalence of malnutrition in children under 6 years old in Province South Khorasan, Iran, in 2007.

Methods: This cross sectional and descriptive analytical study was conducted on children under 6 years old in South Khorasan Iran, belonging to six urban and rural regions applying multistage cluster sampling methodology. Data were collected through measuring weight and height, structural questionnaires Anthropometric Nutrition Indicators Survey, and face-to-face interviews with mothers. Malnutrition was measured on the basis of the indices underweight, wasting and stunting. The obtained data was analyzed by means of chi-square test in the packages SPSS and EPI-Info 2000, taking α= 0.05 as the significant level.

Findings: Out of 1807 children 51.7% were males, 52.2% living in urban areas, and 37% were under 24 months old. Weight index was normal in 52.2% children, 34.4% lightly underweight, 11.7% moderately underweight and 1.2% severely underweight. Prevalence of underweight had a significant relationship to habitation, mothers' job and parents' education level. According to stunting criteria, 55% were normal, 28.4% lightly stunted 12.7% were moderate, and 3.9% severe stunted. Stunting also had a significant relationship to habitation, age, mother's job, and parents' level of education. Wasting criteria showed that 67.8% were normal 24.7% light, 5.9% moderate and 1.6% had severe wasting. This had a significant relationship to sex and habitation.

Conclusion: Prevalence of malnutrition was in children and its relationship to socioeconomic variables, measures such as increasing parents' education - especially mothers' knowledge - constancy of breast feeding until the age of 2 years, and promoting nutrition status of children under 6 years are recommended.

Key Words: Malnutrition; Underweight; Wasting; Stunting; Children

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Introduction

Protein energy malnutrition (PEM) is one of the most important nutritional diseases in developing countries the prevalence of which has caused the mortality of children and their physical disturbance; lack of economical and social development in these countries\(^1\). Imbalance between food intake and actual metabolic needs can cause clinical symptoms of PEM which is followed by a vast range of clinical disorders in varying degrees\(^2\). PEM, due to suitable cultural and economical reasons, has more prevalence in developing countries. Intermittent population growth and unavailability of food in addition to low level of knowledge in different sectors of the community, are among the factors affecting the prevalence of PEM; particularly in under five year old children in these countries\(^3\).

According to WHO’s report, 27% of children under five years of age in developing countries are underweight that caused about 3.4 million deaths during the year 2000, 1.2 millions of which happened in Asian countries\(^4\). In our country (Iran), too, civil studies carried out in 1997 and 1995 show that malnutrition has a high prevalence in children under five\(^5\). The last civil study in Iran in 1998 showed that 15.4% of children under 5 have nutritional stunting, 10.9% suffer from average or acute low weight, and 4.9% are stunted. However, if weak cases are added, the problem will be more tangible\(^6\).

Since various studies regarding children’s nutrition have been conducted in different areas of Iran\(^7\)–\(^16\) but so far no studies have been done with respect to demographic malnutrition in children under six years in south Khorasan and considering that in previous studies carried out in 1991, 1995, and 1998 - under the topic studying Body Mass Index in under five year old children - the present South Khorasan used to be regarded a sub-division of the previous large Khorasan, it was necessary to do an independent study on the nutritional status of under five year old children in South Khorasan. After performing such a study, the health professionals and planners of the province will be able to do a better programming regarding nutrition status, taking the conditions and facilities into consideration. Thus the present study was carried out in South Khorasan in 2007.

Subjects and Methods

This study was a descriptive-analytical and cross sectional one in which children under six years old in the urban and rural areas in 6 of South Khorasan were screened. Thus, 1807 children under five were selected through proportional randomized multi-stage cluster sampling. In each city (Birjand, Sarbisheh, Darmiyan, Nehbandan, Chayen, and Sarayan) top clusters were determined on the basis of poliomyelitis vaccination plan in the urban areas in 2007 and in the rural areas based on vital zig in the software DTARH (a software programme used in the health-care systems in Iran) in South Khorasan health center. In the whole province 87 urban clusters and 95 rural clusters, each having ten under-six year old children, were chosen. Those children who had a certain disease affecting their present weight were excluded from the study (including edema, diarrhea, cleft lip and other diseases related to weight change). In order to gather data the standard civil questionnaire "Anthropometric Nutrition Indicators Survey" (ANIS) used to study the anthropometric indicators and nutritional patterns of under-six year old children in 1998 was applied. Six enquiring teams each including two health associates and a trained family-health bachelor who had attended a one-day workshop before carrying out the project and a driver were responsible for data collection.

The questionnaire was filled out during an interview with each mother at home and the weight of every child was measured by means of German Seca scale with the accuracy of ±50 gm.

The height of every child was measured by means of a height-measurer, the accuracy of which was 0.5 centimeter in standard situation while each case had the least clothes and no shoes on (the height of over-2 year olds was measured in standing position and that of under-2 in supine position). All the scales and height measurers were the same in all researching
teams. Moreover, the scales were calibrated before every weighing using 2 and 5 Kg weights.

Five provincial supervisors, too, actively supervised the teams’ activities.

In this study, children's anthropometric data were compared with those in National Center of Health Standards (NCHS) of USA, which has been accepted as a reference by WHO. The parameters used for body mass index were the following:

a. weight/height as the present nutrition indicator or wasting.

b. height/age as the past nutrition indicator or nutritive stunting.

c. weight/age as the present and past indicator or underweight.

In order to differentiate between normal condition and malnutrition Z-score was used. Then, standard deviation degree for weight, height, and "height and weight" to the height of the child under study according to the standardized distribution of weight, “height and weight” to the height of children of the same age and sex in the referred population was calculated by means of the following formula:

\[
Z\text{-score} = \frac{\text{mean weight}}{\text{Standard deviation of weight}} - \frac{\text{Children's height}}{\text{height of the children of the same age and sex in the referred population}}
\]

Besides, the percentage of the age-group in the population under study which was beyond -3 to -1 standard deviation from the mean of the same population in the standardized distribution of weight, height, and weight/height to height of the same age-group of the referred population was classified as acute, medium and slight underweight, stunting, and wasting (Table 1)\[13\].

Information collected was confidential, and the study before obtaining parental consent and the project objectives were justified.

The obtained data was fed into EPI-Info 2000 and SPSS softwares. Meanwhile, descriptive statistics of the data was presented and analysed using chi–square test at the significant level \(\alpha = 0.05\).

**Findings**

This study was done on 1807 children under 6 years old including 935 (51.7%) males and 872 (48.3%) females. 52.2% (944) of the children were from rural and 47.8% (863) cases from urban areas. 37% (669) of the children were under two years of age and 63% (1138) of the cases were over two. 41.6% (751) children were from Birjand township, 27% (487) cases from Gayen, 8.5% (154) from Nehbandan, 6.9% (125) of the subjects from Sarbisheh, 5% (91) of individuals from Sarayan, and 11% (199) children belonged to Darmiyan. With respect to wasting, stunting, and underweight indices it was found that they respectively had different ranks of 32.2%, 45%, and 47.8% due to such malnutrition (Table 2).

| Table 1: Classification of nutrition status in the children studied |
|-----------------|-----------------|-----------------|
| Nutrition       | status classification | Z-score |
| weight to age for wasting | normal           | ≤-1SD          |
|                  | slight           | -1SD < Z ≤ -2SD |
|                  | medium           | -2 SD < Z ≤ -3SD |
|                  | acute            | -3SD <         |
| Height to age for underweight | normal           | ≤-1SD          |
|                  | slight           | -1SD < Z ≤ -2SD |
|                  | medium           | -2 SD < Z ≤ -3SD |
|                  | acute            | -3SD <         |
| Weight to height for stunting | normal           | ≤-1SD          |
|                  | slight           | -1SD < Z ≤ -2SD |
|                  | medium           | -2 SD < Z ≤ -3SD |
|                  | acute            | -3SD <         |
Table 2: Frequency distribution of the three indices wasting, underweight, and stunting in the children studied

| Index level | Underweight Distribution (%) | Stunting Distribution (%) | Wasting Distribution (%) |
|-------------|-------------------------------|---------------------------|-------------------------|
| Normal      | 943 (52.2)                   | 993 (55)                  | 1225 (67.8)             |
| Slight      | 631 (34.9)                   | 514 (28.4)                | 447 (24.7)              |
| Medium      | 212 (11.7)                   | 230 (12.7)                | 106 (5.9)               |
| Acute       | 21 (1.2)                     | 70 (3.9)                  | 29 (1.6)                |
| Total       | 1807 (100)                   | 1807 (100)                | 1807 (100)              |

Prevalence of underweight and stunting had a significant relationship to mother’s residence, education, and job so that education level was in inverse proportion to malnutrition. This was more tangible in the case of employed mothers compared to housewives; and more in rural children rather than in urban subjects, separately mentioned in tables 3 and 4 (P<0.05). But there was no significant difference between the two sexes regarding this. Moreover, prevalence of underweight in under-two year old children and over-two year olds did not show a significant difference but prevalence of stunting in under-two year old children was significantly higher.

However, prevalence of wasting was more in girls than in boys (P<0.001), and more in urban children than in rural ones (P=0.006; Tables 3 and 4). Besides, prevalence of different types of malnutrition had a reverse statistical relationship to father’s level of education (P<0.001). In addition, 8.7% (157) of mothers were unaware of the aim of developmental evaluation, 10.2% (184) of them did not know "development card", 8% (145) did not have any cards, and for 8.1% (164) mothers "development curve" had not been printed in the cards.

**Discussion**

According to the studies done, nutrition deficiencies not only affect physical and mental development significantly but also cause the mortality of 14 million children in the world[1]. Nutrition deficiencies primarily influence susceptible groups, especially the two very sensitive groups; i.e. children and women (at fertility age). Various factors such as poverty, poor literacy, unfair nutrition beliefs, deficient nourishment, and occurrence of infectious and parasitic diseases are among the factors

Table 3: Comparison of the prevalence of wasting, underweight, and Stunting with respect to habitation, sex, and age of a child

| Variables       | Underweight Positive (%) | Negative (%) | Stunting Positive (%) | Negative (%) | Wasting Positive (%) | Negative (%) |
|-----------------|--------------------------|-------------|-----------------------|-------------|----------------------|-------------|
| **Sex**         |                          |             |                       |             |                      |             |
| male            | 435 (46.5)               | 500 (53.5)  | 433 (46.3)            | 502 (53.7)  | 266 (28.4)           | 669 (71.6)  |
| female          | 429 (49.2)               | 443 (50.8)  | 381 (43.7)            | 491 (56.3)  | 316 (36.2)           | 556 (63.8)  |
| P-value*        |                         | P=0.3       |                       | P=0.3       |                      | P<0.001     |
| **Habitation**  |                          |             |                       |             |                      |             |
| rural           | 459 (53.2)               | 404 (46.8)  | 462 (53.5)            | 401 (46.5)  | 251 (29.1)           | 612 (70.9)  |
| urban           | 405 (42.9)               | 539 (57.1)  | 352 (37.3)            | 592 (62.7)  | 331 (35.1)           | 613 (64.9)  |
| P-value*        |                         | P<0.001     |                       | P<0.001     |                      | P=0.006*    |
| **Age**         |                          |             |                       |             |                      |             |
| ≤2 yr           | 337 (50.4)               | 332 (49.6)  | 484 (72.3)            | 185 (27.7)  | 206 (30.8)           | 463 (69.2)  |
| >2yr            | 527 (46.3)               | 611 (53.7)  | 330 (29)              | 808 (71)    | 376 (33)             | 762 (67)    |
| P-value*        |                         | P=0.09      |                       | P<0.001     |                      | P=0.3       |

* Chi-square test, P is significant at the level α =0.05
precipitating malnutrition among these people.

The results of this study show that malnutrition is a severe problem of under-six year old children in South Khorasan, Iran because 32.2% of the children under study were wasted, 41.3% underweight, and 45% stunted for their age. These rates were much higher compared with the results of similar studies including the civil study of 1998 in which prevalence of wasting was 5.8%, stunting 19.2%, and under-weight 29.5%[6]. In the study carried out in Booshehr, Iran, too, prevalence of underweight was 11.9%, stunting 14.4%, and wasting 5.3%[11].

In a study on children between 6 and 59 months old in Bam, Iran, prevalence of medium and acute underweight, medium and acute stunting; and medium and acute wasting were 15.2%, 8.9%, and 5.6% respectively[14]. According to the study carried out on under-two-year old children in Golestan, Iran province prevalence of slight to acute underweight, slight to acute wasting and slight to acute stunting were 21.4%, 16.5%, and 31.4% respectively[15]. Moreover, in a study on 25-36 months old children under the care of Kerman, Iran rural health houses prevalence of underweight, wasting, and shortness was worked out 16.1%, 7.2%, and 15.6% respectively[16]. Perhaps acute deprivation of living facilities, recent droughts in the South Khorasan, poverty, and finally unfavorable nutrition of children all over the province are the reasons why the results of this study are very much different from those of other studies in the country[6-16]. This is worth thinking and working towards more nutritional solutions.

As for foreign studies, the study carried out on 1497 children under six in the health-care center of Anganwadi in 2007 to survey malnutrition on the basis of NCHS measures showed that 53% of the children were underweight while 15% of these suffered acute underweight[17] which was higher than the rate in our study. In another study on 1400 children in Aydin in Turkey, prevalence of underweight was 4.8%, wasting 8.2%, and nutritive stunting 10.9%[18]. In a study done in a rural area of Nigeria, it was found that prevalence of underweight was 23.1%, wasting 9%, and that of nutritional stunting 26.7%[19]; thus, compared to our study, prevalence of malnutrition was lower.

The prevalence of moderate and severe underweight in Saudi children was 6.9% and 1.3%, the prevalence of moderate and severe wasting was 9.8% and 2.9%, and the prevalence of moderate and severe stunting was 10.9% and 2.8% respectively[20]. The prevalence of stunting, underweight and wasting in a poor area in China was 30.2%, 10.2% and 2.9% respectively[21] and the prevalence of underweight and stunting in children under three years old in rural areas in the western part of China was 9.5% and 9.8% respectively, but these rates of the minority children (of Han nationality) were 15.6% and

| Variables                  | Underweight | Stunting | Wasting |
|----------------------------|-------------|----------|---------|
|                            | Positive (%) | Negative (%) | Positive (%) | Negative (%) | Positive (%) | Negative (%) |
| Mother's job               |             |           |          |             |             |           |
| Employed                   | 131(41.2)   | 187(58.8) | 124(39)  | 194(61)     | 101(31.8)   | 217(68.2)  |
| Housewife                  | 733(49.2)   | 756(50.8) | 690(46.3)| 799(33.7)   | 481(32.3)   | 1008(67.7) |
| P-value                    | P=0.09      |           | P=0.02   |             | P=0.8       |             |
| Mothers education level    |             |           |          |             |             |           |
| Level 1                    | 58(33.3)    | 116(66.7) | 52(29.9) | 122(70.1)   | 58(33.3)    | 116(66.7)  |
| Level 2                    | 113(41.4)   | 160(58.6) | 91(33.3) | 182(66.7)   | 88(32.2)    | 185(67.8)  |
| Level 3                    | 81(42.2)    | 111(57.8) | 74(38.5) | 118(61.5)   | 73(38)      | 119(62)    |
| Level 4                    | 230(47.3)   | 256(52.7) | 240(49.4)| 246(50.6)   | 155(31.9)   | 331(68.1)  |
| Level 5                    | 382(56)     | 300(44)   | 357(52.4)| 325(47.6)   | 208(30.5)   | 474(69.5)  |
| P-value                    | P<0.001     |           | P<0.001  |             | P=0.4       |             |

* Chi-square test, P is significant at the level α =0.05

Level 1: university education; Level 2: high school education; Level 3: junior school education; Level 4: Primary education; Level 5: literate/poorly literate
16.55 respectively[22], thus, compared to our study, prevalence of malnutrition was lower.

In a study conducted on 1534 children under 6 years old in the urban and rural regions of Birjand it was discovered that about half (44%) of the children were underweight[20]. Besides a study on primary school children of Birjand reported a high prevalence of malnutrition because it was found that 73.7% of the subjects were underweight, 48.6% had stunting, and 36.5% showed wasting[21]. A study done on 1-36 month olds hospitalized in the pediatrics ward of Valli-e-Asr hospital, Birjand, also showed 68.6% underweight, 58.6% stunting, and 32.4% wasting[22]; all of these studies approve the results of the present study and the problem of malnutrition in South Khorasan.

In the present study, a significant difference between the two sexes with regard to prevalence of different kinds of malnutrition was not found, although prevalence of underweight and wasting was more in girls and that of stunting was more in boys. This is similar to the results of studies done in Arak[10] and Booshehr[11]. In the present study. Prevalence of underweight and stunting was significantly higher in the rural areas compared to urban areas which is justifiable in regard to the nutritional status of children in rural areas, recent droughts, and poverty in rural areas which is in accord with the results of other civil studies[6,9].

In various studies, illiteracy and low education of parents have had a relationship to the malnutrition of children[8,10,11,14,17,19,23]. This difference is due to the two factors of higher knowledge of literate parents and higher income of families with higher education compared to the illiterate ones regarding children’s nutrition.

Obviously, income is one of the important factors providing the access to health care, education, and nutrition facilities as the factors precipitating malnutrition. Besides, knowledge together with enough income can improve nutritional status of the family.

The present study showed that prevalence of different kinds of malnutrition among children whose mothers were employed was lower than children with housewife mothers. The effective factors here were also the two phenomena of knowledge and income. Regarding the age, the present study showed that underweight and stunting were higher in two-year olds in comparison with over-two-year olds, which is in accord with the study done in Bam[13] and the one carried out in Golestan[14]. This shows that children under two are more prone to malnutrition and require more nutritive care and attention.

Conclusion

Regarding the high prevalence of malnutrition among children all over the province it is necessary to promote the knowledge and education of parents - particularly mothers - and social-economical, health, and nutritional status of families. This is mainly the responsibility of the authorities to seek solutions to such problems.

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Conflict of Interest: None

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۳۰ درصد تخفیف نوروزی ویژه کارگاه‌ها و فیلم‌های آموزشی

اصول تنظیم قراردادها

پروپوزال نویسی

آموزش مهارت‌های کاربردی در تدوین و چاپ مقاله