NUTRITIONAL STATUS OF CHILDREN UNDER FIVE YEARS IN BAGHDAD

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ABSTRACT

Nutritional status: is the condition of health of the individual as influenced by utilization of nutrients. Nutrition is a science that studies all the interaction that occurs between living organisms and food, the psychological, social, cultural, economic and technological factors that influence which foods we choose to eat and the biological processes by which we consume food and utilize the nutrient it contains.

Nutrients are substance contained in food that are necessary to maintain life and allow growth and reproduction. Nutrients provide energy, contribute to structure, and regulate biological processes. Anthropometric measurements; refers to comparative measurement of human body. This measurement commonly used as indices growth and development for infants include body weight, height/ length, occipitofrontal circumference and midarm circumference. Typically, growth is evaluated by comparing individual measurements to reference standards, represented by percentile curves and a growth chart.

Aim of the study

Assessment of nutritional status of children under five years in two areas in Baghdad and Compare of nutritional status of children between high socioeconomic area and low socioeconomic area in Baghdad.

A cross-sectional study conducts on 200 children under five years (6m to 60m) living in Baghdad to assess the nutritional status of children living in low and high socioeconomic areas. Data collection included interviews the mothers of children focused on demographics and socioeconomic status of the family and anthropometric measurements of the children by using growth chart (Bwt/age, Bwt/height, and height/age), to assess the nutritional status of children.

The study shows that the children affected with acute malnutrition (wasting) are more in low socioeconomic area than in high socioeconomic area but there is no significant difference, while children affected with chronic malnutrition (stunting) are more in low socioeconomic area with significant difference. With using arm circumference, we found children with malnutrition are more in low socioeconomic area than children in high socioeconomic area with significant difference.

According to the age group, there is significant difference between children under 1 year, while there is no significant difference between children above 1 year.

Malnutrition still a big problem facing Iraqi community in pediatrician, there is a high number of children with acute and chronic malnutrition especially in low socioeconomic area. Children with the chronic malnutrition rather than acute malnutrition are more in low socioeconomic area than in high socioeconomic area with significant difference.
INTRODUCTION

Malnutrition is estimated to contribute to more than one third of child death. Malnutrition is defined as; a state in which a deficiency or excess of energy, protein and micronutrient caused adverse effect on tissue, body form and function(1). An individual suffer from acute malnutrition when he is very thin, at risk of death and need immediate treatment(2).

The most common diagnosis of pediatric under nutrition in the U.S.A is often termed failure to thrive and is estimated to have a prevalence of 5% to 10% among young children. Psychosocial risk factors may develop as a result of medical problems or may be a primary cause of undernutrition (3). Inadequate and delayed complementary feeding leads to growth failure in young children, the administration of supplementary diet after age 6 months is essential (4, 5). Thousands of infants die every year because of food insufficiency either in the quantity or quality, so WHO had recommended exclusive breast feeding for 6 months with introducing of complementary foods (6).

The retardation of growth which commences in the later half of the first year, points to the grim reality that weaning foods given to the babies may not be nutritionally adequate to meet special dietary needs of the growing (7).

The food needs to be eaten by children is the same food that makes up healthy adult diet, only smaller amounts. Milk and milk products, meat or meat alternatives (such as eggs, dried peas, or beans, etc), vegetables and fruits, bread and cereals should be included. Fat and salt are needed in a minimum amounts because of their early link to heart disease in adulthood (8).

Nutritional status of under 5 year children in particular is often considered as one of the most important indicator of households living standard and also an important determinant of child survival (9).

Attempts have been made to study various aspects of nutrition and food security during famine, war, flood, drought and economic crisis at international 2-5 and national 6-8 levels (10).

The term anthropometric refers to comparative measurement of human body. The anthropometric measurement commonly used as indices growth and development for infants include body weight, height/length, occipitofrontal circumference and mid arm circumference. Typically, growth is evaluated by comparing individual measurements to reference standards, represented by percentile curves and a growth chart (11).

MATERIALS & METHODS

A descriptive, cross-sectional study, was conducted to assess the nutritional and health status of children under 5 yrs attending health centers in Baghdad.

Samples collected from two areas in Baghdad, Alffadal is low socioeconomic area because of overcrowded and families with high parity, Alkarada are high socioeconomic area, people who live in this area with high education and families with low parity.
The study sample:-

The sample was composed of 200 children aged 6 months to 60 months, collected from two health centers in Baghdad, 100 children from Al-Sheikh Omar health center (in Alffadal area), and 100 children from Al-Karada health center (in Alkarada area).

Collection of the samples was limited to those attending primary health care centers for routine visit of apparently healthy children. An excluding children with any chronic illness can participate malnutrition.

Method:-
1- Data were collected by direct interviewing of every child smother by using questionnaire from appendix.
2- The anthropometric measurements were taken during the time of the interview are:
   - Weight.
   - Height or length.
   - Arm circumference.
   - Laboratory data.

Weight:-

A balance scale provided by UNICF was used for the purpose of the study. The scale was checked frequently. Each baby was weighted with lightest cloths. The children below 2 years of age were weighed with a balance beam table model (seca type) to the nearest 10 gram, after placing them in supine position and the scale was checked every time before measurement. The older children over 2 years were weighed on a floor model beam balance (adult beam, detecto type) to the nearest 100 grams and the balance was checked before each measurement.

Height:-

The length of the baby was measured to the nearest 0.1 cm using a measurement length of the babies. The infant was laid down on the board with his shoes and socks off, his head is placed toward the fixed vertical board and his legs are directed to the other side, The mother was asked to hold the head of the baby firmly keeping his vertex in close contact with fixed head board, The examiner holds with one hand the infant's feet firmly to keep the knee in full extension and bring the moveable feet board to rest firmly against the infant's heels and the length measured by a tape measure in centimeters fixed alongside the measuring board.

Statistics

The statistical methods used are;
1- Chi-square tests are used in the statistic of growth chart.
2- Independent samples test are used in the measure of p-value of the arm circumference

The p-value below 0.05 considered significant

RESULTS

The results of study from 200 children samples shows that in low socioeconomic area (Alffadal) according to growth chart (Bwt/Age) are:

12 children < 3rd centile and 8 children < 5th centile
While the results in high socioeconomic area (alkarada) according to growth chart (Bwt/Age) are:
6 children < 3rd centile and 7 children < 5th centile
As shown in following table 1

**Table 1:** Bwt/age for 200 children in Alffadal & Alkarada health centers

<table>
<thead>
<tr>
<th>percentile</th>
<th>Alffadal</th>
<th>Alkarada</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>12</td>
<td>6</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>12%</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>7</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>8%</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>11</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>10%</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>31</td>
<td>16</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>31%</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>12</td>
<td>17</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>12%</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>12</td>
<td>23</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>12%</td>
<td>23%</td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>8</td>
<td>13</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>8%</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>95</td>
<td>3</td>
<td>3</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>3%</td>
<td>3%</td>
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</tr>
<tr>
<td>97</td>
<td>4</td>
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<tr>
<td></td>
<td>4%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

From the results of the study the number of children according growth chart (height or length/Age) is as shown in the following table 2

**Table 2:** Height or length/age for 200 children in Alffadal & Alkarada health centers

<table>
<thead>
<tr>
<th>percentile</th>
<th>Alffadal</th>
<th>Alkarada</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>18</td>
<td>5</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>18%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>3</td>
<td>7.21</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>4</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>11%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>18</td>
<td>13</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
From the study the number of children according growth chart (weight/height or length) is
As shown in the following table:

**Table3: Weight/height or length for 200 children in Alffadal & Alkarada Health centers**

<table>
<thead>
<tr>
<th>percentile</th>
<th>Alffadal</th>
<th>Alkarada</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>15 (15%)</td>
<td>9 (9%)</td>
<td>0.04</td>
</tr>
<tr>
<td>5</td>
<td>1 (1%)</td>
<td>5 (5%)</td>
<td>0.03</td>
</tr>
<tr>
<td>10</td>
<td>9 (9%)</td>
<td>5 (5%)</td>
<td>0.02</td>
</tr>
<tr>
<td>25</td>
<td>14 (14%)</td>
<td>16 (16%)</td>
<td>0.01</td>
</tr>
<tr>
<td>50</td>
<td>24 (24%)</td>
<td>27 (27%)</td>
<td>0.01</td>
</tr>
<tr>
<td>75</td>
<td>17 (17%)</td>
<td>19 (19%)</td>
<td>0.01</td>
</tr>
<tr>
<td>90</td>
<td>11 (61.1%)</td>
<td>7 (7%)</td>
<td>0.04</td>
</tr>
<tr>
<td>95</td>
<td>1 (1%)</td>
<td>3 (3%)</td>
<td>0.01</td>
</tr>
<tr>
<td>97</td>
<td>8 (8%)</td>
<td>9 (9%)</td>
<td>0.01</td>
</tr>
<tr>
<td>Total</td>
<td>100 (50%)</td>
<td>100 (50%)</td>
<td></td>
</tr>
</tbody>
</table>
The number of children with acute malnutrition in low socioeconomic area (Alffadal) according to growth chart (Bwt/Age) is: 20 children < 5th centile.

The number of children with acute malnutrition in high socioeconomic area (Alkarada) according to growth chart (Bwt/Age) is: 13 children < 5th centile

P-value: 0.134 which is not significant

The number of children with acute malnutrition according to growth chart (Bwt/Age) is: As shown in figure 1

![Figure 1: No. of children with acute malnutrition (Bwt/age)](image)

The number of children with chronic malnutrition in low socioeconomic area (Alffadal) according to growth chart (Height/Age) is: 23 children < 5th centile.

The number of children with chronic malnutrition in high socioeconomic area (Alkarada) according to growth chart (Height/Age) is: 8 children < 5th centile and the P-value is: 0.015 which is significant

And this is shown in figure 2
Figure 2: No. of children with chronic malnutrition (Height/age)

The number of children with chronic malnutrition in low socioeconomic area (Alffadal) according to growth chart (Bwt/Height or length) is: 16 children < 5th centile.

The number of children with chronic malnutrition in high socioeconomic area (Alkarada) according to growth chart (Bwt/Height or length) is: 14 children < 5th centile. And the P-value is: 0.466 And this is shown in figure 3

**DISCUSSION**

The result of study, number of children with acute & chronic malnutrition high in low socioeconomic area, same in Iraq study in 1996. There is a high number of children with acute and chronic malnutrition and especially in low socioeconomic area. Prevalence % of malnutrition (moderate/ severe). MICS 1996

<table>
<thead>
<tr>
<th>Malnutrition- IRAQ</th>
<th>South &amp; center</th>
<th>North</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight 22.9</td>
<td>23.4</td>
<td>19.3</td>
</tr>
<tr>
<td>Chronic(stunting)31.3</td>
<td>32</td>
<td>26.3</td>
</tr>
<tr>
<td>Acute(wasting) 10.1</td>
<td>11</td>
<td>3.8</td>
</tr>
</tbody>
</table>

In that situation; the household survey throughout Iraq to assess the nutritional status of young children was the 1996 Multiple Indicator Cluster Survey (MICS) done by Iraq's central statistical organization, in collaboration with UNCEF. Combining the results for each report (taking into account the different population), the prevalence of underweight was 22.9%; of chronic malnutrition (stunting) 31.3% and
acute malnutrition (wasting) was 10.1%, for an explanation; these levels indicate that Iraq has a serious problem of malnutrition in young children equivalent to that encountered in very needy countries of the world. Such levels reflect not only the current damage to child survival and development of children in Iraq, but also the adverse impact on future generations due to the life time consequences.

Also from this study there is no significant difference in number of children with acute malnutrition between low & high socioeconomic areas, same result of Iraq study in1996 shows that there is no significant difference between the two areas (low & high socioeconomic areas is same)\(^{(12)}\). Level of children malnutrition based on WHO standards in countries of the Eastern Mediterranean Region, 1995-2009.

In Iraq at 2009, severe undernutrition 2.5%, moderate & severe malnutrition 7.1%, moderate & severe stunting 27.5%, moderate & severe wasting 5.8%\(^{(13)}\). Also same result, there is high malnutrition in Sudan 2011 study revealed that prevalence of malnutrition among these children is very high 27.5% were severely malnutrition & 35% suffered from either milder moderate malnutrition probably, these problems were related to poor sanitary conditions & inadequate food intake\(^{(14)}\). Same result, high number of children with acute & chronic malnutrition in India 2010 studies. The state having lower prevalence of chronic childhood malnutrition shows much higher burden among the poor\(^{(15)}\).

The chronic malnutrition more in low socioeconomic similar to study in Malaysia in 2006, the overall prevalence of underweight and stunting of the children were 12.9% and 17.2% respectively. These levels included 2.4% severe underweight and 6% severe stunting.

The Third National Health and Morbidity Survey results indicate that Malaysia children have better nutritional status compared to children under 5 years in neighboring countries, in order to meet the targets set in the National Plan of Nutrition (2006-2015).\(^{(16)}\)

The study done in Libya in 1995, prevalence rates of underweight, wasting, stunting & overweight were determined using standard definitions reference to newly established WHO growth charts. The study revealed that 4.3% of children were underweight, 3.7% wasted, 20.7% stunted, and 16.2% overweight. A study in western Rajasthan, India in 2006 revealed growth retardation. Stunting (malnutrition of long duration) was observed in 53% of children and underweight in 60%. Wasting, an indicator of short-duration malnutrition was present in 28% of children. The prevalence of wasting was high, greater than the cut-off point of 15% stated by the World Health Organization to indicate that the severity of malnutrition is critical PEM

**CONCLUSION**

1. The chronic malnutrition (stunting) more in low socioeconomic area than high socioeconomic area with significant difference.
2. The acute malnutrition (wasting) more in low socioeconomic area but no significant difference than in high socioeconomic area.
3. Medan circumference measurement is an indicator for chronic malnutrition also high in low socioeconomic area with a significant difference.
4. The number of children with the overweight is same in both areas.
5. The HB% of the children is same in both areas.
RECOMMENDATIONS
1- Consume three regular meals daily with healthful snacks according to appetite, activity, and growth needs. Include a variety of foods with abundant vegetables and fruits.

2- Complex carbohydrates should provide > 55-60% of daily calories; emphasis should be on whole-grain, high-fiber foods. Simple sugars should be limited to <10% daily calories.

3- Fat <30% of total calories should be come from dietary fat. Saturated polyunsaturated fats should makeup <10% total calories each monounsaturated fats should provide at least 10% total calories.

4- Encourage lean cuts of meat, fish, low-fat dairy products, vegetable oils. Severe fat restriction (<15-20% total calories) should be avoided because it may result in growth failure.

5- Limit grazing behavior, eating while watching television, and regular consumption of high-calorie, low-nutrient foods.

6- Strengthening of practice and services of child healthcare in different health centers paying attention to growth monitoring activities like periodic weighting and length measurement for children which must be recorded on health cards.

7- Training of doctors and health personnel for proper application of child health intervention programs.

8- More awareness and attention of doctors to look for possible signs and symptoms of nutritional deficiencies for children attending health centers for routine health care services.

9- Health education of the mothers through regular lectures and meeting.

ETHICAL CLEARANCE
The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

CONFLICT OF INTEREST
The authors declare that they have no conflict of interest.

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