Prevalence and Some Associated Factors of Stunting Among Under-Five Children in Hilla City-Babylon Province, Iraq

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Abstract

Stunting among children under five years of age is a serious health problem especially in middle and low income countries including Iraq, it is associated with high morbidity and mortality among infants and young children the objective of this study was to identify the prevalence and some correlates of stunting among children under 5 years of age. A cross-sectional descriptive study was conducted, to collect primary information from mothers of 1000 children attending ten randomly selected primary health care centers(five rural and five from city center) in Babylon province- AL-Hilla city during the period from Octobar,2015 through June 2016 a pre tested questionnaire, anthropometric measurements (length/height for age) were used to assess children's stunting according to -2SD length/ height for age of the World Health Organization Standard Median. The results revealed that the prevalence rate of stunting among 1000 under five children included in this study were 20.6%. Significant statistical associations were found between stunting and the following independent variables; age groups: more in the age group 24>60 months, gender: highly prevalent in boys, maternal education: highly distributed in children with poorly educated mothers, breast feeding: peaked among mixed breast feeders and among children of low family income p<0.05. In conclusion Stunting (chronic malnutrition) in the study area is still a concern that needs intervention by governmental and non-governmental organizations, improvements in child feeding, and better maternal education are needed to maintain the children's nutritional status to prevent and control this serious health problem.

Keywords: Under weight, Stunting, Children. Under-fives, Babylon, Iraq.

Introduction

Annually under five mortality declined from 143 per 1,000 live births in 1970 to 44 in 2013 in the globe [1] but minor improvement has been achieved in childhood growth [2].Stunting is recognized as one of the major potential risk factors for failure physical and mental development of children [3].

It is defined as a deficit in height relative to a child's age [4]. Stunting is one of key factor of chronic under nutrition [5] Stunting is the most prevalent form of children malnutrition with an estimated 161 million children worldwide in 2013 falling below -2SD of length or height for age according to WHO Child Growth standards median, stunting is an indicator of children's wellbeing and an accurate reflection of social inequalities [6]. Importantly, stunting is a major contributor to child morbidity and mortality [7–8]. About 14% of children deaths were attributed to stunting in the globe [9]. Stunting has a long-term effect on cognitive development, educational performance and economic productivity in adulthood and on maternal reproductive outcomes [10]. Stunting can coexist with underweight or with overweight/obesity [11]. In the line of coexistence of stunting and overweight in children, these are risk factors for chronic diseases in adulthood [12]. If we fail to reduce the stunting condition, children will be exposed to the long term effects of stunting and may not reach their full growth potential [13,14].World Health Assembly set a target to reduce by 40% the number of stunted children globally by 2025 [15]. Observational studies have identified a large number of risk factors for poor childhood growth and stunting [16-18]. However, the impact of these risk factors on stunting at the
population level (globally, regionally, and at the country level) is not known, this study was conducted to estimate the prevalence and some associated factors of stunting among children under-fives in Al–Hilla city-Babylon province–Iraq.

Materials and Methods

This was a primary health care centers-based cross-sectional study among under-five children in Babylon province- Al- Hilla city. Babylon province is located in the south central region of Iraq, 65 miles south Baghdad populated about 1850000, while 780000 were living in Al-Hilla city which is the capital of the province, about 17% of the population are under-five years children. This study was conducted in ten primary health care centers which were randomly selected by simple random sampling technique, five from peripheral rural areas and the other five centers were selected from urban districts.

Approval of the study protocol was obtained from the Iraqi ministry of health and Babylon Nursing College Research Ethical Committee. The unit of study was the under 5 years child residing in a rural and urban field practice areas. All the children aged 0-5 years present at the time of survey and whose mothers gave consents to participate in this research were included in the study, whereas children whose parents or guardians did not give consents and children who were severely ill were excluded from the study. The sample size was estimated according to the following equation[19]:

\[ n = \frac{1.96^2 \times p(1-p)}{d^2} \]

Where:

- \( n \): sample size.
- 1.96: is statistical parameter, corresponding to the confidence level of 95%.
- \( p \): is the proportion (50%).
- \( d \): Relative precision = 0.05.

The total sample size required according to the equation will be of 1000 children was studied consecutively by the researchers from the 10 randomly selected primary health care centers, the period of the study started from October 1st 2015 to August 27th 2016. Interview of the caregiver was conducted and entered in a questionaire, the schedule of this tool comprised three parts:

- Personal information of child and parents
- Detailed history of child on various aspects
- Anthropometric measurements of child.

The validity of the questionnaire was tested by experts (including a statistician) for language and by analyzing the pilot study, which was conducted on 50 children from two primary health care centers (Shaheed-Aslaam and Ibrahim AL-kalel) in urban and rural districts respectively, these would be excluded from the main study sample, the response rate was 72%. The desired sample size was 1000 (730 estimated sample size according to the sample size equation(19) and addition number (205) to substitute the non-response according to the results of pilot study, there fore from each urban primary health care center 150 children while 50 children from the peripheral centers in rural regions were enrolled in.

Each consecutive under-five child was selected till the desired number of study subjects was obtained. The age of each child was determined by reviewing the birth certificate and if the birth certificate was not present, age was listed as told by the mother. Anthropometric measurements were carried out following standard methods. The data included recumbent length (for children aged less than 24 months), and height (for children aged more than 24 months).

Height was measured against a non-stretchable tape fixed to a vertical wall, with the participant standing on a firm surface; to the nearest 0.5 cm. recumbent length was measured by using an infant measuring board.

Family income was determined according to sufficient insufficient level status, educational levels was determined according to the grade levels of schools achievements, breast feeding was classified as exclusive breast feeding in the first six months or mixed breast feeding when artificial breast milk was provided.

The height and age of each child was compared with the World Health Organization (WHO) child growth standards, reference data for his/her particular age and
sex, to obtain length/ height for age index. Children below two standard deviations (SDs) of the reference median on this index can be expressed in terms of z-scores which enable the comparison of a child or a group of children with a reference population [20] (Onis and Bloss).


The data were collected, entered, and analyzed by using the Statistical Package for Social Sciences (SPSS) version 20. Chi square was used to identify the associations between stunting and other independent variables, p<0.05 considered statistically significant.

**Results**

Figure 1 shows the prevalence rate of stunting among 1000 children who attended 10 primary health care centers in Al Hilla city, according to WHO-2SD Standard Median is (20.6%). Figure (2) explains the gender difference of stunted children, the male to female ratio is 1.97:1, this difference is statistically significant p =0.006. Table (1) reveals that the majority of stunting cases occur in the age group (24 to 34 months) this difference in age group is statistically significant; this table depicts that breast feeders of stunted children are significantly lower than mixed breast feeders indicating a strong association between mixed breast feeding and stunting p<0.01.

Table (2) shows that the majority of mothers of stunted children have very low levels of education this difference reach a highly significant level p<0.001, the same table demonstrate a strong significant relationship between stunting and low family income p<0.001.
Table 1: Distribution of the study group by gender, age, breast feeding status

<table>
<thead>
<tr>
<th>Gender</th>
<th>Rating</th>
<th>Height for Age score</th>
<th>Total</th>
<th>( \chi^2 )</th>
<th>D.f.</th>
<th>p. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Normal</td>
<td>Tall</td>
<td>Stunting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>367</td>
<td>36.7%</td>
<td>50</td>
<td>136</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>348</td>
<td>34.8%</td>
<td>29</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>715</td>
<td>71.5%</td>
<td>79</td>
<td>206</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( \chi^2 = \text{Chi-square}, \text{D.f.} = \text{Degree of freedom}, \text{P-value}= \text{Probability value} \)

Table 2: Distribution of stunting by maternal education occupation of mothers and family income

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Rating</th>
<th>Height for Age score</th>
<th>Total</th>
<th>( \chi^2 )</th>
<th>D.f.</th>
<th>p. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Normal</td>
<td>Tall</td>
<td>Stunting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not able to read and write</td>
<td>202</td>
<td>20.2%</td>
<td>2</td>
<td>0.2%</td>
<td>100</td>
<td>13.0%</td>
</tr>
<tr>
<td>Read and write</td>
<td>108</td>
<td>10.8%</td>
<td>4</td>
<td>0.4%</td>
<td>36</td>
<td>3.6%</td>
</tr>
<tr>
<td>Educational level of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mother</td>
<td>Primary school</td>
<td>366</td>
<td>6</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Middle school</td>
<td>28</td>
<td>10</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>14</td>
<td>0</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Institute</td>
<td>10</td>
<td>0</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor</td>
<td>38</td>
<td>0</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Postgraduate</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>766</td>
<td>28</td>
<td>206</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sufficient</td>
<td>380</td>
<td>80</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monthly Income</td>
<td>Insufficient</td>
<td>290</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>670</td>
<td>124</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

The current study revealed that about one fifth of the study group were stunted this finding is lower than rates reported in African countries such as that reported in Kongwa province in Tanzania where about half of under five children were affected. This result is far higher than the prevalence rate reported in by Al Jawadi and Matee who found that the prevalence of stunting among less than five years children in AL Hamdanyi district in Mosul – north Iraq was (7.9%). The role of gender is clear in this study, males are at high risk of chronic malnutrition(stunting)as compared to females the ratio of male to female is 1.97:1, male children are physically active and...
expend large amounts of energy which should have been channeled into increasing growth.

On the other hand, females are culturally expected to be less active and stay at home with their mothers during food preparation. This result is consistent with the findings of other cross-sectional studies undertook in the following countries; Iran [23], Kenya [24], Indonesia [25], Tanzania [26] and Ghana [27], other met analytic study proved this relationship [28] while local study which was conducted on under five children in north Iraq reported that no significant difference between the two sexes [22].

In a cross sectional epidemiologic study conducted in India by Rao GL etal who found that female children were at higher risk of stunting compared to males [29] this may be related to cultural factors or the difference in the sample size. The prevalence of stunting in this work is more in the age group 23 to 34 months this finding goes in line with findings in a local study [22] and other studies conducted in other countries in Ethiopia [30] and in India [31].This study indicated that increasing age of the child was significantly associated with stunting. Similar results were found by other researchers [32-34]. The finding could be explained by the protective effect of breastfeeding as most children in Nepal are breastfed even into the second year of life [35].

The high rate of stunting and severe stunting observed among children 0–59 months may be associated with inappropriate food supplementation during the weaning period. The second year of child life is critical period due to the exposure to poor feeding, because the child needs complimentary foods and the child is exposed to food-borne infection [36,37].

Children whose mothers are less educated are more likely to be stunted as compared with children with well-educated mothers this finding is similar with findings of other studies [37-39] Likewise, an educated mother would have better skills and better information for planning as well as for implementing adequately the nutritional needs of her children [40] In fact, an educated mother is more likely to have a better and efficient management of income generation than less educated one and thus is better able to meet the nutritional needs of her family. Thus, urgent campaigns are strongly requested to overcome the illitericity progressing problem in Iraq. Stunting is significantly associated with low family income this finding agrees with the findings of other studies stunting may reflect the problems associated with poverty, inequity and their resultant impact on child health.

The fact that stunting is more pronounced in areas, where poverty is widespread, underscores the link between poverty and stunting [41] This study states that the risk of stunting (chronic malnutrition) has increased due to the increasing rate of low family income and the low rate of fully breastfeeding babies [42].

These findings agree with the findings of other studies conducted in other countries, the rate of stunting in Fars province in Iran during the year 2012 was 9.53% and this problem was significantly associated with lower family income, low exclusive breast feeding of the affected child and lower maternal education [23]. A case control study conducted in Tehran in 2008 revealed that the prevalence of stunting among children is 3.7%, the breast feeding in the first three months and maternal education are protective factors [43], and these factors support the findings of this study.

In conclusion Stunting in the study area is still high and a real a concern that needs intervention by governmental and non-governmental organizations, improvements in child feeding, and better maternal education are strongly needed. The findings of this study will provide vital information to identify where health gains can be made to prevent this serious health problem.

The results may allow decision and health policy-makers to invest in the health status of the most vulnerable segments of the Iraqi population. Our findings highlight the need for community-based educational interventions aimed at improving the nutritional status of children less than five years of age in order to achieve optimal brain development and avoiding morbidity and mortality.

Limitation of the Study

This study design was a cross-sectional descriptive epidemiologic study; it has limitation in its ability to determine a causal relationship between the observed factors and stunting. However, most of the factors observed have already been proven by other
study designs with strong plausibility and consistency

Acknowledgements

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