Prevalence and Associated Factors of Under Nutrition Among Under-Five Children in Babylon Province, Iraq,2016

Ismael Hasan Jawad
Babylon College of Nursing
KahtanHadi AL- Jubori
University of Babylon
Hasan Alwan Baiee
Babylon College of Nursing
Vcacaoffice@uobabylon.edu.iq

Abstract

Background:Malnutrition in children under five years of age is high priority public health problems especially in middle and low income countries including Iraq, it is +associated with high morbidity and mortality among infants and young children

Objectives:To identify the prevalence and the correlates of under nutrition (underweight, stunting and wasting) among children under 5 years of age living in Babylon province, Iraq.

Methodology:A cross-sectional descriptive study was conducted, to collect primary information from mothers of1000 children attending ten randomly selected primary health care centers (five rural and five urban centers) in Babylon province during the period from January through June 2016 ,a scientific questionnaire, anthropometric measurements (weight for age, length/height for age and weight for height), were used to assess the nutritional status of the child .

Results: The study revealed that the prevalence of underweight , stunting and wasting were 7.6%, , 20.6%, and 6.6% respectively . Significant statistical associations were found between all types of under nutrition and the following independent variables p<0.05 ; age,(gender , more common in boys), low level of mother education , types of breast feeding and family income.

Conclusion:The study concluded that chronic malnutrition in the study area is still a concern that needs timely intervention by governmental and non-governmental organizations. We conclude that improvements in child feeding, and better maternal education are needed to maintain the children's nutritional status.

Keywords :Underweight , stunting, wasting , children . under-fives ,Babylon , Iraq

الخلاصة

خلفية البحث:يعتبر نقص التغذية من المشكلات التي لها الأولوية في حقل الصحة العامة خاصة في الدول المحدودة او المتوسـطة الدخل ومنها العراق ، ان نقص التغذية سبب رئيسي للمرض والموت في الأطفال.

هدف البحث:تحديد انتشار نقص التغذية والعوامل المرتبطة بها بين الأطفال تحت عمر خمس سنوات.

طرائق العمل :تم تطبيق دراسة المقطع العرضي لـ١٠٠٠طفل تحت سن الخامسة من العمرمن المراجعين لعشرة مراكـز رعايــة صحية أولية اختيرت عشوائيا من مجموع المراكز الصحية الأولية في مدينة الحلة– محافظة بابل– العراق. امتدت الدراسة مـن تشرين الأول ٢٠١٥ إلى أب ٢٠١٦، جمعت البيانات من خلال ورقة استبانة علمية استخدمت لاستجواب الأمهـات المـشاركات ،تضمنت الاستبانة معلومات ديموغرافية ومعلومات عن أنماط الرضاعة وعمر الفطام للطفل وطريقة الولادة ومدة الحمل . تم قياس وزن الطفل وطوله بالطريقة القياسية حسب دليل منظمة الصحة العالمية لتحديد نقص التغذية ، الوزن للعمر (نقص الوزن)،الطول للعمر(التقزيم)، والوزن للطول (الهزال). تم التحليل الإحصائي لربط بين المتغيرات المعتمدة والمتغيرات المستقلة.

النتائج :أظهرت الدراسة ان نسب انتشار الوزن للعمر (نقص الوزن)،الطول للعمر(التقزيم)، والوزن للطول (الهزال).هي ٧،٦% و٢٠،٦%و٦،٦%على التوالي وأوضحت الدراسة وجود علاقة إحصائية ذات دلالة إحصائية معنوية (P<0.05) بين مؤشرات نقص التغذية المذكورة والمتغيرات المستقلة الأتية: كانخفاض مستوى التحصيل الدراسـي للأمهـات والرضـاعة المختلطة وجنس الطفل حيث تأثر الذكور بنقص الوزن اكثر من الإناث وكان الأطفال الذين هم بعمر ٢٤-٣٦ شـهرهم الأكثـر تعرضا لنقص التغذية من الفئات العمرية الأخرى وبدلالة إحصائية مهمة.

الاستنتاج:نقص التغذية بين الأطفال دون الخامسة في مدينة الحلة لا يزال مقلقا في الوقت الحاضر ويحتاج الى تدخل منهجي للحد منه والسيطرة عليه.

الكلمات المفتاحية: نقص الوزن، التقزيم، الهزال، أطفال تحت الخامسة، بابل – العراق

Introduction

Malnutrition is the most common nutritional disorder in the developing countries and it remains one of the most common causes of morbidity and mortality among children worldwide(Musaa,2014).

Under nutrition in children remains a high priority public health problem in many of the developing countries,forty-five percent of all deaths in children aged under 5 years were attribut to the simple fact that thse children were underweight. (Christine and Allen,2015).

The causes of undernutrition are diverse but in most cases include limited quality or quantity of food, suboptimal feeding practices, and high rates of infectious diseases(WHO,2012;Savethe children,2012)

Acute undernutrition (wasting) occurs as a consequence of short-term response to inadequate intake or an infectious disease episode (WHO,2010) and can be reversed if the child has an access to adequate dietary intake in an environment that is free from infectious disease (Saaka *et al*.,2014)

Stunting affects about one-quarter of children under five worldwide (Richard,2016)

The contribution of economic growth to the reduction in early childhood undernutrition in developing countries is insignificant (Vollmer ,2014),

The devastating effects of undernutrition on child performance, health, and survival are well established today(Singh ,2016)

Iraqis have faced difficult living conditions since the outbreak of war on 20 March 2003.though those deseases .decreased among Iraqi children since 1995. although The prevalence of underweight, stunting, and wasting among under five years children was decreasing since 1995 among Iraqi children (UNICEF, 2013; Aljasim,2015).

This study, thus, posed and addressed the following two questions: (1) What is the prevalence of underweight stunting children 0–59 months of age in the study area? (2) What are some key associated factors with the above indicators that reflected undernutrition among under-fives?

Methodology

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, 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 10 randomly selected primary health care centers five Center wer from 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 from Babylon Nursing College Research Ethical Committee

The Sample of the study includes children under the age of five ; they were residing residing in a rural and urban field practice areas. All the children were present at the time of survey and their mothers gave their consents to participate in this research, Whereas children whose parents or guardians did not give consents and children who were severely ill were excluded from the study. A sample of 1000 children from the 10 randomly selected primary health care centers was studied. was studied consecutively by the researchers during the period from October 1st 2015 to August 27nd 2016.as The desired sample size required for the study was 1000, Hence,150 children from each urban primary health care center and 50 children from the peripheral centers in rural regions were enrolled in the study. There was an

interview with the caregiver which is included in the questionnaire, the schedule, interview of the caregiver was conducted and entered in a questionnaire , the schedule of this tool comprised three parts:

a. Personal information of a child and mothers

b. Detailed history of a child on various aspects

c. Anthropometric measurements of child.

The Face validity of the questionnaire was tested by experts (including a statistician) The Center validity was checked through the pilot test, which was conducted on 50 children from two primary health care centers(Shaheed-Aslaam and Ibrahem AL-kalel) in urban and rural districts respectively, (these children would be excluded from the main study sample) .

The age of each child was determined by reviewing the birth certificate and if the birth certificate was not available, the age was listed as it is told by the mother. Anthropometric measurements were carried out in light of the standard methods. The data included weight, recumbent length (for children aged less than 24 months), and height (for children aged more than 24 months). Weight was measured to the nearest 0.1 kg and Salter weighing machine was used for weight measurement. 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. Socioeconomic status was also recorded .

The height and the weight of each child were compared with the World Health Organization (WHO) child growth standards, reference data for his/her particular age and sex, to obtain weight for age, height for age, and weight for height indices. Children below two standard deviations (SDs) of the reference median on any of these indices were considered as undernourished and termed as underweight, stunted, and wasted, respectively..

Underweight

The percentage of children 0-59 months old who were below minus two SDs from median weight for age according to WHO Child Growth Standards were considered underweight.

Wasting

The percentage of whose ages range (0-59 months old) and who were below minus two SDs of median weight for height according to WHO Child Growth Standards were considered wasted.

Stunting

The percentage of children whose ages range (0-59 months old) and who were below minus two SDs of median height for age according to WHO Child Growth Standards were considered stunted.

These indices can be expressed in terms of z- scores which allow the comparison of a child or a group of children with a reference population (Onis and Blossner, 2003).

The data were collected, entered, and analyzed by using the Statistical Package for Social Sciences (SPSS) version 20.

Table (1): Distribution of the Study Sample by Their Demographic characteristics of Children.

Child Demographic Data	F N=1000	%
Gender		
Male	527	52.7
Female	473	47.3
Total	1000	100%
Age (months)		
0- 10	82	8.2
11 – 22	122	12.2
23 – 34	530	53
35 – 46	180	18
47+	86	8.6
Total	1000	100%
Types of Feeding		
Breast feeding	448	44.8
Mixed feeding	552	55.2
Total	1000	100%

F= Frequency, %= Percentage

Table(1) depicts that males occupy (52.3%) while the female occupy(47.3%) of the total number the subjects in this study.

Concerning the age of children in the study, the majority of them wase within the range of (23 34) Months .

The child's feeding pattern was distributed in to (44.8%) for breast feeding ; and (53%) for mixed feeding pattern .

Table (2):Distribution of the Study Sample by Their Demographic Data for mothers.

General Information (Parents' Data)	F N=1000	%
Mother Education Level		
Not able to read and write	294	29.4
read and write	158	15.8
Primary school	396	39.6
Middle school	62	6.2
High school	30	3
Institute	10	1
Bachelor	44	4.4
Postgraduate	6	0.6
Total	1000	100%
Monthly Income		
Sufficient	466	46.6
Insufficient	534	53.4
Total	1000	100%

*crowding index (number of family member / number of rooms), F= Frequency, %= Percentage

Table (2) represents the distribution of the mothers demographic data in term of frequencies and percentage. The mothers education is poor, i.e (39.6%) of mothers had primary school level and 45% of them had the lowest levels of education i.e they are mainly illiterate .

Concerning monthly income, the proportion of families with insufficient income constituted (53.4%) of the total number of families participated in the stud .

Table (3) Distribution of Study Sample by Their Nutrition Status through Anthropometric Measurement (WAZ, HAZ, and WHZ)

Nutrition Status Domain	(F) N=1000	%
Weight for age score		
Normal	770	77
Overweight	114	11.4
Obesity	40	4
Underweight	76	7.6
Total	1000	100%
Height for age score		
Normal	658	65.8
Tall	136	13.6
Stunting	206	20.6
Total	1000	100%
Height for weight score		
Normal	800	80
Overweight	114	11.4
Obesity	20	2
Wasting	66	6.6
Total	1000	100%

* In assessing Nutritional Status by (WAZ) :Weight for age z Scores, (HAZ) : Height for age z Scores, and (WHZ) :Weight for Height z Scores . F= Frequency, %= Percentage

Table (3)reveals the distributions of the study sample according to the nutritional status indicators in term of WAZ, HAZ, and WHZ. The prevalence of underweight takes up 7.6%, the prevalence of stunting in this age group occupies 20.6%. The weight for height indicator shows that the wasting prevalence is 6.6%.

Table (4) Association between the Weight for Age (WAZ) and Demographic Data for Children

Demographic data	Rating	Weight for Age Z				Total	x^2	D.f	p. value
		Normal	Overweight	Obesity	Under Weight				
Gender	Male	362 36.2%	100 10.0%	15 1.5%	50 5.0%	527			
	Female	253 25.3%	78 7.8%	16 1.6%	26 2.6%	473	12.613	3	0.006 HS
	Total	715 71.5%	178 17.8%	31 3.1%	76 7.6%	1000			
Age/months	0- 10	70 7.0%	0 0.0%	4 0.4%	8 0.8%	82			
	11-22	100 10.0%	8 0.8%	0 0.0%	14 1.4%	122			0.001 HS
	23 – 34	460 46.0%	32 3.2%	8 8.0%	30 7.0%	530	1.4122	12	
	35 – 46	74 7.4%	68 6.8%	24 2.4%	14 1.4%	180			
	47+	66 6.6%	6 0.6%	4 0.4%	10 1.0%	86			
	Total	770 77.0%	118 11.8%	40 4.0%	76 7.6%	1000			
Type of feeding	Exclusive feeding	338 23.8%	48 4.8%	12 1.2%	30 3.0%	428	13.920	6	0.031
	Mixed feeding	452 45.2%	65 6.5%	9 0.9%	46 4.6%	558			S
	Total	790 79.0%	113 11.3%	21 2.1%	76 7.6%	1000			

$x^2 =$ **Chi-square, Df= Degree of freedom, P-value= Probability value**

Table(4)reveals that the children demographic characteristics in relation to the weight for age nutritional indicators .The findings indicate that there is a highly significant relationship between children gender(male)with underweight p<0.05 , the underweight prevalence is highest among age group(23-34 months), as well as there is a significant relationship between the types of feeding and the underweight prevalence breast feeders are at significantly lower rate.

Table (5) Association between Weight for Age (WAZ) and Demographic Data for Mothers.

Demographic data	Rating	Weight for Age Z				Total	x^2	D.f	p. value
		Normal	Overweight	Obesity	Under Weight				
Educational level of mother	Not able to read and write	250 25.0%	38 3.8%	6 0.6%	30 3.0%	294			
	read and write	136 13.6%	11 1.1%	1 0.1%	18 1.8%	166			
	Primary school	364 36.4%	13 1.3%	3 0.3%	16 1.6%	396			0.001
	Middle school	49 4.9%	2 0.2%	1 0.1%	10 1.0%	62	1.2242	21	HS
	High school	22 2.2%	0 0.0%	0 0.0%	10 1.0%	32			
Monthly Income	Sufficient	320 32.0%	86 8.6%	24 2.4%	36 3.6%	466			
	Insufficient	442 44.2%	34 3.4%	18 1.8%	40 4.0%	534	37.606	3	0.001
	Total	762 76.2%	120 12.0%	42 4.2%	76 7.6%	1000			HS

$x^2 =$ **Chi-square, Df= Degree of freedom, P-value= Probability value**

Table(5)depicts that there is a significant relationship between weight for age and demographic data at p-value less than 0.05.The level of education of child's mother is inversely associated with the underweight prevalence and the family income.

Table (6) Association between the Height for Age (HAZ) and Demographic Data for Children.

Demographic data	Rating	Height for Age score			Total	x^2	D.f	p. value
		Normal	Tall	Stunting				
Gender	Male	362 36.2%	50 5.0%	136 13.6%	477	12.613	3	0.006 HS
	Female	253 25.3%	29 2.9%	70 7.0%	347			
	Total	715 71.5%	79 7.9%	206 20.6%	1000			
Age (months)	0- 10	50 5.0%	4 0.4%	28 2.8%	82	2.232	8	0.001 HS
	11 – 22	100 10.0%	0 0.0%	22 2.2%	122			
	23 – 34	418 41.8%	12 1.2%	`100 10%	530			
	35 – 46	54 5.4%	100 10.0%	26 2.6%	180			
	47+	38 3.8%	18 1.8%	30 3.0%	86			
	Total	660 66.0%	134 13.4%	206 20.6%	1000			
Type of feeding	Exclusve feeding	359 36.0%	76 7.6%	12 1.2%	448	1.257	4	0.001 HS
	Mixed feeding	298 29.8%	60 6.0%	194 19.4%	552			
	Total	657 65.7%	137 13.7%	206 20.6%	1000			

$x^2 =$ **Chi-square, Df= Degree of freedom, P-value= Probability value**

In table (6) there is a high significant relationship between the gender and stunting, boys are significantly more prone to be shorter than girls.The prevalence of stunting is increasing significantly with the increasing age of the child. Artificial feeding of children is significantly highly associated with the increasing stunting proportion p <0.0.1.

Table (7) Association between the Height for Age (HAZ) and Demographic Data for mothers.

Demographic data	Rating	Height for Age score			Total	x^2	D.f	p. value
		Normal	Tall	Stunting				
Educational level of mother	Not able to read and write	202 20.2%	2 0.2%	100 13.0%	304	1.1562	12	0.001 HS
	Read and write	108 10.8%	4 0.4%	36 3.6%	148			
	Primary school	366 36.6%	6 0.6%	24 2.4%	396			
	Middle school	28 2.8%	10 0.8%	24 2.4%	62			
	High school	14 1.4%	0 0.0%	16 1.6%	30			
	Institute	10 10.0%	0 0.0%	4 0.4%	14			
	Bachelor	38 3.8%	0 0.0%	2 0.2%	40			
	Postgraduate	0 0.0%	6 0.6%	0 0.0%	6			
	Total	766 76.6%	28 2.8%	206 20.6%	1000			
Monthly Income	Sufficient	380 38.0%	80 8.0%	6 0.6%	466	34.790	2	0.001 HS
	Insufficient	290 29.0%	44 4.4%	200 20.0%	534			
	Total	670 67.0%	124 12.4%	206 20.6.%	1000			

The results in table(7) reveal that there is a high significant relationship between the increasing stunting rates and the lower levels of education of child's mother and their insufficient family incomes a p<0.001.

Table(8)Association between the Weight for Height (WHZ) and Demographic Data for Children.

Demographic data	Rating	Weight for Height score				Total	x^2	D.f	p. value
		Normal	Overweight	Obesity	wasting				
Gender	Male	397 39.7%	80 8.0%	14 1.4%	36 3.6%	527	11.379	3	0.01 HS
	Female	307 30.7%	130 13.0%	6 0.6%	30 3.0%	473			
	Total	704 70.4%	210 21.0%	20 2.0%	66 6.6%	1000			
Age/months	0- 10	59 5.9%	9 0.9%	2 0.2%	12 1.2%	82	1.1312	12	0.001 HS
	11-22	102 10.0%	7 0.7%	2 0.2%	11 1.1%	122			
	23 – 34	405 40.5%	75 7.5%	30 3.0%	20 2.0%	530			
	35 – 46	11 7 11.7%	37 3.7%	14 1.4%	12 1.2%	180			
	47+	52 5.2%	21 2.1%	2 0.2%	11 1.1%	86			
	Total	732 73.2%	149 14.9%	50 5.0%	66 6.6%	1000			
Type of feeding	Breast feeding	368 36.8%	48 4.8%	12 1.2%	20 2.0%	448	13.920a	6	0.031
	Mixed eding	458 45.8%	60 6.6%	8 0.8%	46 4.6%	552			
	Total	806 80.6%	108 10.8%	20 2.0%	66 6.6%	1000			HS

$x^2 =$ Chi-square, Df= Degree of freedom, P-value= Probability value

Findings in table (8) indicate that there are a significant relationship between children gender, type of feeding and wasting p< 0.05.

Table (9) Association between the Weight for Height (WHZ) and Demographic Data of Mothers .

Demographic data	Rating	Weight for Age Z				Total	x^2	D.f	p. value
		Normal	Overweight	Obesity	Under Weight				
Educational level of mother	Not able to read and writ	252 25.2%	0 0.0%	0 0.0%	42 4.2%	294	47.494	21	0.001 HS
	Read and write	148 14.8%	2 0.2%	0 0.0%	8 0.8%	158			
	Primary school	379 37.9%	8 0.8%	5 0.05%	4 0.4%	396			
	Middle school	50 5.0%	6 0.6%	0 0.0%	6 0.6%	62			
	High school	26 2.6%	2 0.2%	0 0.0%	4 0.4%	32			
	Institute	10 1.0%	0 0.0%	0 0.0%	2 0.2%	12			
	Bachelor	40 4.0%	0 0.0%	0 0.0%	0 0.0%	40			
	Postgraduate	4 0.4%	2 0.2%	0 0.0%	0 0.0%	6			
	Total	909 90.9%	20 2.0%	5 0.5%	66 6.6%	1000			
Monthly Income	Sufficient	376 37.6%	64 6.4%	14 1.4%	10 1.0%	464	15.164	3	0.087
	Insufficient	424 42.4%	50 5.0%	6 0.6%	56 5.6%	536			
	Total	800 80.0%	114 11.4%	20 2.0%	66 6.6%	1000			NS

$X2 =$ Chi-square, Df= Degree of freedom, P-value= Probability value

Table(9)depicts that there is a significant relationship between weight for height indicator (Wasting)and the low level of mother education , no-significant relationship between the weight for height and the monthly income p>0.05.

Discussion

In this study, the prevalence of underweight, stunting, wasting in children under-fives and the relation of these dependent variables to various epidemiological factors were assessed in 1000 children. The prevalence of underweight, stunting and wasting are 7.6% ,20.6% and6.6% respectively, These percentages are higher than the ones reported by other study conducted by Ergin *et al*.,2007 inTurky who found the prevalencewas 4.8%, 8.2% and 10,9 respectively (Ergin *et al*.,2007),while our findings are much lower than the findings of other researchers in different districts in many developing countries, such as the studies conducted by Dhatrak*et al*. in Nagpur (46%, 52%, and 20.7%)(Dhatrak *et al*.,2013) , Sengupta*et al*.2010in Ludhiana 9%, 74%, and 42% (Sengupta *et al*.,2010), Biswas *et al*,2011.in Kolkata 64.9%, 64.9%, and 20.3%(Biswas *et al*.,2011), Rao*et al*.205in Jabalpur 61.6%, 51.6%, and 32.9% (RaoVG *et al*., 2005), Sharifzadeh*et al*.2010 in south Khorasanin Iran 41.3%, 45%, and 32.2%(Sharifzadeh *et al*.,2019), These variations may be due to the variation in socioeconomic wellbeing status or the variations in the study designs and sample sizes. Our results are lower than that reported by a hospital based local study conducted   in Karbala province in the south central region in Iraq (Abushrayda, 2009) .

Regarding the gender as a factor associated with underweight , stunting and wasting, males are more liable to be affected with undernutrion , this finding disagrees with the finding of   Shukla Y *et al* 2016 in central India and other studies (Joseph *et al*.,2002; Gangadharan *et al*.,2011;Priyanka *et al*.,2016) which reported that females are more affected this may be related to cultural or study difference related factors (Joseph *et al*.,2002; Gangadharan *et al*., 2011;Priyanka,2916) .

Cornering the age as predictor factor of under nutrition in this study sample the results show that the peak age group of undernutrion indicators is (23-34) months this finding dis agrees with the finding of other researcher(Sing H et al,2016) which shows that the peak age group of under nuritioment was between (6- 18) months , this may be related to types of feedings and tender fives health care services in different locations , (Singh *et al*.,2016)

Socioeconomic status, and maternal education are significantly associated with underweight, stunting and wasting in our study, this finding goes with the findings of other researchers (Singh *et al*.,2016)

This finding; however Is not similar to the findings in a study done by Mathad *et al*, which found that mother's literacy status was not significantly associated with under-weight and stunting. Family income is one of the most essential factors in providing the access to health care, education facilities, and the factors precipitating malnutrition. Besides, knowledge together with enough income can improve the nutritional status of the family, compared to the inability of many illiterate parents to do so.(Mathad *et al*,2011) .

In the current study the children who live in rural area were at ahigher risk of under nutrition,as compared to their counterparts in urban areas . Similar findings were observed by Sachdeve *et al*.,In the present study there is a significant association between under nutrition and mixed feeding in the first year of life

coupled with inappropriate or inadequate feeding practices.This May be contributed to faltering nutritional status among children, because infant formulas (which are often watered down) and other types of milk do not provide comparable anutrition to breast milk for infants less than six months of age. Additionally,

improper sanitary conditions with bottle feeding can introduce pathogens that cause infectious diseases and depress their nutritional status. For these reasons, bottle feeding puts infants at a higher risk of illness and malnutrition. The result is compatible with the successive studies (Beka *et al*., 2009; CSA, 2011) .

Finally, this study had some drawbacks worth mentioning. The study provides a single/snap shot look at the study population, and hence, it may not be a sound base for studying the underlying causes and mechanisms related to the unacceptably high level of malnutrition among children aged under five. It is also worth mentioning that the current study did not compare the prevalence of malnutrition with other urban based studies in the region due to the lack or ever the absence of such studies. Despite these weakness points, it is believed that this work contributes to our understanding of the depth of the problem in the area. Its findings can also be applicable to other populations with similar characteristics.

Conclusion and recommendation

In conclusion, the result of this study has depicted the existence of unacceptably prevalence of under nutrition (especially stunting) among children aged under five in Hilla city. Further, it was noted that several demographic, socioeconomic and practices of feeding variables have appeared to- be significant predictors of the under nutritional status among under-five children . The authors suggest that Iraqi health institutions at all levels should integrate nutrition as a health component and conduct close monitoring, evaluations and improvement of the health services , Nongovernmental health organization should be motivated to reduce this public health problem.

Aknowledgements

References

Abushrayda A.J.,2009,Malnutrition in children admitted to Karbala pediatric teaching hospital. Prevalence and associated risk factors,KufaMed.Journal.12 (2.)

Aljasimzy, 2015, Health consequences of slum dwellers in the province of Baghdad (Neighborhood Al-Montazer Case Study) Al-Adab Journal ;111(1):443

Beka T, Wambui K-M, Zewditu G, Girum T. , 2009,Magnitude and determinants of stunting in children under five years of age in food surplus region of Ethiopia: the case of West Gojam Zone. Ethiop J Health Dev;23(2):98–10

Biswas T, Mandal P K, Biswas S., 2011, Assessment of health, nutrition and immunization status amongst under 5 children in migratory brick kiln population of periurban Kolkata, India. SJPH;6:7-13,

Christine V. Allen KS,2015, Malnutrition in developing countries, Review Article. Pediatrics and Child Health; 25(9): 422-427]

CSA (Ethiopian Central Statistical Agency). Demographic and Health Survey. Ethiopia: CSA; 2011.

Ergin F, Okyay P, Atasoylu G, Beşer E., 2007, Nutritional status and risk factors of chronic malnutrition in children under-fives of age in Aydin, A western city of Turkey. Turk J Pediatr;49:283-9

Gangadharan K. , 2011, Nutritional Deprivation of children in Rural Kerala an inter cast analysis. International Conference on Social Sciences and Humanity. IPEDR;5;122-7

Joseph B, Rebello A, Kullu P, Raj VD.,2002Prevalence of Malnutrition in Rural Karnataka, South India: Comparison of Anthropometric Indicators. J health PopulNutr;20(3):239-44

Mathad V, Matqud C, Mallapur MD. ,2011,Nutritional Status of Under Fives In Rural Area Of South India.Indian J Medical Sci.;65(4):151-6

MusaT H,Musa H H. Ali FA, Musa N E.,2014,Prevalence of malnutrition among children under five years old in Khartoum State, Sudan. Polish Annals of Medicine;21(1):1-7

Onis, D., and Blossner, M.,2003, The World Health Organization Global Database on Child Growth and Malnutrition: Methodology and Applications. **International Journal of Epidemiology**;32518–526

Priyanka R, Vincent V, Jini MP, Saju CR., 2016, An assessment of the nutritional status of underfive children in a rural area of Thrissurdistrict,Kerala, India. Int J Community Med Public Health;3:3479-86

Rao VG, Yadav R, Dolla CK, Kumar S, Bhondeley MK, Ukey M., 2005, Undernutrition and childhood morbidities among tribal preschool children. Indian J Med Res;122:43

Richard D, Michelle S, Fayrouz A. Sakr A, Ruin M, Indi T, *et al.* , 2016, Child Stunting is Associated with Low Circulating Essential Amino Acids. EBioMedicine; 6: 246-252

Saaka M., Iddrisu M., 2014,Patterns and determinants of essential newborn care practices in rural areas of northern Ghana. *International Journal of Population Research*:10. doi: 10.1155/2014/404387.404387

Sachdeva S, Amir A, Ansari MA, Khalique N, Khan Z, Alam S., 2010, Potentially Modifiable MicroEnvironmental and co-morbid factors associated with severe wasting and stunting in children below 3 years of age in Aligarh district. Indian J Community Med.;35(2):353–5.Save The Children. Nutrition in the First 1,000 Days: State of the World's Mothers Save the Children, 2012.

Sengupta P, Philip N,2010,Benjamin AI. Epidemiological correlates of under-nutrition in under–5 years children in an urban slum of Ludhiana. HPPI;33:1-9

Sharifzadeh G, Mehrjoofard H, Raghebi S., 2010, Prevalence of malnutrition in under 6-years olds in South Khorasan, Iran. Iran J Pediatr;20:435-41,

Singh**Singh H,** Chaudhary **V,** Joshi **HS,** Upadhyay **Q,** Singh **A,** Katyal R.,2016, Sociodemographic correlates of nutritional status of under-five children.MJMS; 7(1) :44-49

UNICEFNutritional status survey of under five children in Bahdad,2003

VollmerS, Harttgen K, MalavikaA,Finlay S J, Klasen S, SubramaniaS V., 2014, Association between economic growth and early childhood undernutrition: evidence from 121 Demographic and Health Surveys from 36 low-income and middle-income countries.The Lancet Global Health; 2(4): e225-e234

WHO. *Fact Sheet*. 333. Geneva, Switzerland: World Health Organization; 2012. Newborn reducing mortality.

WHO. *Nutrition Landscape Information System (NLIS) Country Profile Indicators: Interpretation Guide*. Geneva, Switzerland: World Health Organization; 2010.