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Anemia as Public Health Problem among Child under Five Years Age

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Abstract

Anemia has serious consequences effects on child growth, development, and survival. Analytical, cross-sectional, non-probability convenient study done with sampling of 240 children aged less than five years (6-60 months) which was conducted in five primary health care centers in Al-Resafa sector and two pediatric hospitals in Baghdad city (Central child hospital and Ibn Al-Baldi hospital). The study started from 1st March till 31 of August 2017. The data was collected by direct interview with parent using special questionnaire to obtain information. The results of the study revealed that the age of child is known to be a important and a significant factor associated with anemia 38.3% of the anemic child were at 13-24 months age, 56.3% were male, 60.9% mother age were ≥ 20, 35.8% of mother had primary degree of education, 77.5% of them were unemployed, 68.7% had anemia during pregnancy, 45.8% of family income of anemic child were intermediate, 64.2% of family drinking untreated water, 59.6% had pad sewage system, 73.7% of them sometime eating meat and egg. The study showed no significant differences between anemia in children and anthropometric measures. Other results showed that 69.5% of child had continuous breast feeding, 81.7% had no history of cow milk consumption, 40.8% given complementary feeding at age of < 4 months, 74.2% had no history of consumption of fortified milk. Regarding causes of anemia iron deficiency was the major causes in 67.9% of child under five years age.

Keywords: anemia, children, risk factors.

الخلاصة

لفقر الدم اثار خطيرة على نمو وتطور وبقاء الطفل. أجريت دراسة تحليليه مقطعيه غير احتماليه متوافقة لعينه من ٢٤٠ طفل بعمر اقل من خمسه سنوات بين (٦-٦٠ شهر) والتي نفذت في خمسه مراكز رعاية صحيه اوليه في قطاع الرصافة ومستشفيان للأطفال في بغداد (مستشفى الطفل المركزي ومستشفى ابن البلدي). بدأت الدراسة من الاول من شهر اذار ولغايه الاول من ايلول/ ٢٠١٧. تم جمع البيانات عن طريق المقابلة المباشرة مع احد الابوين باستعمال استبيان خاص لجمع المعلومات. أظهرت نتائج الدراسة ان عمر الطفل عامل مهم متعلق بفقر الدم عند الاطفال وان ٣٨٬٣% منهم كان بعمر ١٣-٢٤ شهر, وان ٥٦٬٣% كانوا من الذكور, ٦٠٬٩% كانت اعمار امهاتهم اكبر من ٢٠ سنه, ٣٥٬٨% من الامهات كانت قد اكملت المرحلة الابتدائية من التعليم و٧٧٬٥%غير موظفات و٦٨٬٧% كن مصابات بفقر الدم اثناء الحمل ٤٥٬٨%.من عوائل الاطفال المصابين بفقر الدم لديهم دخل شهري متوسط, ٦٤٬٢% من العوائل تشرب الماء الغير معالج ٥٩٬٦, % لديهم نظام تصريف صحي غير جيد, ٧٣٬٧% من العوائل تأكل احيانا اللحم والبيض. كما واظهرت النتائج انه ليس هناك فروقات معنويه بين فقر الدم عند الاطفال وبين القياسات الانثروبومتريه . نتائج اخرى للبحث اشارت الى ان ٦٩٬٥% من الاطفال استمروا بالرضاعة الطبيعية و٨١٬٧% منهم ليس لديهم تاريخ لشرب حليب البقر وان ٤٠٬٨% منهم اعطي الأغذية التكميلية في سن اصغر من ٤ اشهر و ٧٤٬٢% من الاطفال لم يتناولوا الحليب المدعوم. وفيما يتعلق بأسباب فقر الدم وجد ان السبب الغالب هو نقص الحديد في ٦٧٬٩% من الاطفال المصابين بفقر الدم .

Introduction

Anemia stay as a major nutritional problem in the world and it affects 1.62 billion people. Anemia is a worldwide public health problem that spread among both developed and developing countries. The preschool children are widely affected, with a prevalence of 47.4%. The most prevalent type of anemia worldwide is iron deficiency, and it especially affects women in reproductive periods and child less than 5 years. It may results to serious health problems, like poor cognitive and motor development and behavioral problems in children [1].

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Anemia is the most extensive pandemics, "Its strongly affected developing countries. About 3.5 billion people affected by anemia in developing countries". In many cases anemia is caused by iron deficiency, although a smaller proportion is due to deficiencies of micronutrients such as B12, folate, and vitamins A, and some diseases with blood loss and parasitic infections. "Anemia in children under five years of age is of particular relevance because of bad impacts mental development and future social performance". Children with iron deficiency anemia during their first two years of life have poorer school performance and slower cognitive development [2].

"Anemia remains a major and serious public health problem at a global scale, particularly in developing countries, where it affects a fairly high percentage of biologically vulnerable groups such as children. Iron deficiency has been identified as the most common cause of anemia but the proportions are not fully yet established as they vary depending on age, gender, socioeconomic conditions and the prevalence of other causes of anemia [3].

It still a major cause of morbidity mortality and in developing countries where the efforts to determine the etiological factors remain poor. The highest anemia prevalence (according to WHO), was in Africa, where in Asian region shows the highest number of people being affected with 58 % of the anemia. In India (according to recent information) from the South Asian region, the prevalence of anemia among children 6–35 months aged was about 79 %, while In Nepal, the prevalence among children <5 years was 46 %. The prevalence of Anemia in Bangladesh was about 51 % in 2011. The largest number of cases was in India (147.9 million), followed by China (75.8 million) and Nigeria (24.7 million) [4].

Prevalence of anemia among children (% of children under 5) in Iraq was 35.90 as of 2011. Its highest value over the past 21 years was 52.10 in 1990, while its lowest value was 35.90 in 2011[5].

Anemia characterized by low hemoglobin (Hb) concentration, red-cell count, or packed-cell volume, with subsequent impairment in meeting the oxygen de-livery to demands of tissues. Hb concentration and thus anemia is affected by personal / individual characteristics such as age, sex, and pregnancy status, as well as environmental factors such as smoking and altitude [6].

"Causes of anemia can be multifactorial and often coincide, but the primary cause is a diet with inadequate iron sources (quantitatively and qualitative-ly); iron deficiency causes an estimated 50% of anemia cases worldwide" [7]. Iron-deficiency anemia is the world's most common single-nutrient deficiency disorder. Infants in the 6- to 24-month age range are at particularly high risk, but children in the entire preschool-age period may be vulnerable, especially in developing countries. In most areas of the world, iron deficiency affects primarily infants and young children, because of their higher iron requirements related to growth, and women of childbearing age, as a result of menstrual loss and pregnancy [8].

Materials and Methodologies

Analytical, cross-sectional, convenient study with a e sample of 240 children aged less than five years (6-60 months) which was conducted in five primary health care centers in Al-Resafa sector and two pediatric hospitals in Bagdad city (Central child hospital and Ibn Al-Baladi hospital). The study started from 1st March till 31 of August 2017. The data was collected by direct interview using special questionnaire to obtain information. Anemia was diagnosed by means of hemoglobin assays. Data col-lection was conducted through interviews with parents. Bivariate association tests were performed followed by multiple logistic regression adjustment. All patients at the time of admission /contact in outpatient department who appeared to be clinically having nutritional deficiency as a cause of anemia were investigated. A detailed history of each patient was taken. We excluded children receiving hematinic, or who received blood transfusion within last two months.

Instrument of the study

Review of available literature.

The questionnaire was composed of two parts:

Part I: Demo graphic Information Sheet

It consisted of four items which included: age, gender, complete vaccination and if Child suffering from repeated illness

Part2: Questionnaire related to Maternal factors which included Mother age, mother education, Mother employed, No. of pregnancy and anemia during pregnancy.

Part3: Socioeconomic and environ-mental factors related to anemia which included SES, father education, Number of working member in the family, Housing condition.

Socio-economic status scales (SES):SES is defined in terms of a standard sociological paradigm consisting of three components: (a) occupation; (b) education; and (c) income. The income component for this study is difficult to be obtained directly from the patients or their family. However, the investigator attempts to calculate through the following objective indicators: Crowding index; house ownership; house expenses (properties) and possession of a car. Each item has scored according to its importance and its score ranged from (150-89 and less) as the following: High score=150-121, intermediate score=120-90, Low score=89 & less [10].

Part 4: include Nutritional status of anemic child:

A weight-for-age indicator was used to evaluate nutritional status. Weight was measured according to the routine procedures of the centers. To analyze this variable, the z-score was used, with classification based on WHO standards: the indices of weight for age and height for age and Weight /height-Index were used to assess the children's nutritional status. The weight/age index was used in accordance with the following : criteria: < -2 z-scores = low weight or very low weight and ≥ -2 z-scores = adequate weight or eutrophic state; and the height/weight index as follows: < -2 z-scores = short height and ≥ -2 z-scores = adequate height. Also information about Continuous breast feeding, History of cow milk consumption, Age of given complementary feeding, History of Statistical Analysis, meat consumption, History of fruit consumption, and

History of consumption fortified milk was collected.

Statistical Analysis

Objectives of the study

1- To identify the associated factors of anemia in children aged 6-60 months.

2- To evaluate the risk factors associated with anemia.

3- To assess the nutritional status of anemic child under 5 years.

Results and Discussion

This chapter presents the analysis of the data after being processed and tabulated, the results were analyzed through the application of statistical procedures which were manipulated and interpreted.

Table 1 revealed that 38.3% of child were at 13-24 years age, 56.3% of them were female, 82.5% were complete their vaccination and about 69.2% of them were suffering from repeated illness.

Table 1: Distribution of anemic child under five years age according to some variables.

Variables			
Age(months)	F.	%	P-value
6-12	87	36.2	
13-24	92	38.3	0.001
25-60	61	25.4	
Total	240	100	
Gender			
Male	105	43.7	
Female	135	56.3	0.7
Total	240	100	
Complete vaccination			
Yes	198	82.5	
No	42	17.5	0.15
Total	240	100	
Child suffering from repeated illness			
Yes	166	69.2	
No	74	30.8	0.3
Total	240	100	

Table 2 showed the maternal factors associated with anemia among child in this age, revealed that 60.9% of them were at age < 20 years, 35.8% of them had primary school degree of education, 77.5% of them were unemployed, 53.3% had 1-2 pregnancy, and 68.7% had anemia during pregnancy.

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Table 2: Maternal factors related to anemia among child under five years.

Maternal factors			
Mother age	F.	%	P-value
> 20	94	39.1	
≥ 20	146	60.9	0.07
Total	240	100	
Mother education			
Illiterate	72	30	
Primary	86	35.8	
Secondary	58	24.2	0.09
Higher education	24	10	
Total	240	100	
Mother employed			
Yes	54	22.5	
No	186	77.5	0.09
Total	240	100	
No. of pregnancy			
1-2	128	53.3	
3 and above	112	46.7	0.9
Total	240	100	
Anemia during pregnancy			
Present	165	68.7	
Absent	75	31.3	0.05
Total	240	100	

Table 3 showed that SES of 45.8% of family /month were intermediate level, 37.1% of father were illiterate, 69.2% of families had 1-2 number of working family member, 53.3% had > 4 member in the family, 64.2% drinking untreated water, 59.6% of them had pad sewage system, and 73.7% were some time eat meat and egg.

Table 3: Socioeconomic and environmental factors related to anemia among under five.

Related factors			
SES*	F.	%	P-value
Low	70	29.2	
Intermediate	110	45.8	0.002
High	60	25	
Father education			
Illiterate	89	37.1	
Primary	76	31.6	
Secondary	8	3.4	0.06
Higher education	67	27.9	
Number of working member in the family			
1-2	160	69.2	
3 and more	74	30.8	0.09
Housing condition			
1. Number of family member <4	128	53.3	
5-8	52	21.7	0.04
>9	60	25	
2. Drinking water			
Treated	86	45.8	
Not treated	154	64.2	0.01
3. Sweage system			
Good	97	40.4	
Bad	143	59.6	0.02
Family food/meat and egg			
Always	63	26.3	
Some time	177	73.7	0.03

*SES-socioeconomic status

Table 4 showed that 82.1% of the anemic child had ≥ − 2 Z scores for weight/height index, 69.5% of them had continuous breast feeding, 81.3% had no history of cow milk consumption, 40.8% of child had given complementary feeding at > 4 age, 77.5% had no history of meat consumption, 59.5% of them had no history of fruit consumption, and 74.2% of the child had no history of consumption of fortified milk.

Table 4: Nutritional status of anemic child under five years age.

Variable			
Weight /age- Index	F.	%	P-value
< − 2 Z scores	62	25.8	
≥ − 2 Z scores	178	74.2	0.36
Height/age -Index			
< − 2 Z scores	55	22.9	
≥ − 2 Z scores	185	77.1	0.33
Weight /height-Index			
< − 2 Z scores	43	17.9	
≥ − 2 Z scores	197	82.1	0.18
Continuous breast feeding			
Yes	167	69.5	
No	73	30.5	0.008
History of cow milk consumption			
Yes	45	18.7	
No	195	81.3	0.06
Age of given complementary feeding			
<4	98	40.8	
4-5	77	32.1	0.001
≥ 6	65	27.1	
History of meat consumption			
Yes	54	22.5	
No	186	77.5	0.05
History of fruit consumption			
Yes	97	40.5	
No	143	59.5	0.9
History of consumption fortified milk			
Yes	62	25.8	
No	178	74.2	0.001

Table 5 revealed that 67.9% of anemic child had iron deficiency as a major cause of anemia while 1.6% of them had R.B.C enzyme defect/ G6PD.

Table 5: Causes of anemia among child under five years age.

Causes	F	%	P-value
Iron deficiency	163	67.9	0.05
Concurrent infection	56	23.3	0.002
Drug use	8	3.4	0.3
Blood loss	4	1.6	0.01
Disorder of hgb structure or synthesis *Thalassemia *Sickle cell anemia	5	2.2	0.9
R.B.C enzyme defect /G6PD	4	1.6	0.35

Discussion

This study was carried out to determine the possible risk factors associated with anemia among children under five years, the results showed that the distribution of anemia by age group increase in the first two years and its (38.3%) which is statistically higher than (25.4%) at age three to five years, one reason for this decline may be that older children benefit from a greater variety of food choices than younger children, this results agree with a study done in Brazil in which the prevalence of anemia in age under 24 months is greater than among older children [9].

This statistically significant difference in prevalence of anemia between the ages can mainly be explained by the accelerated growth and consequent in-creased requirement for iron during the first years of life [10].

Gender difference show no association with anemia, this result agree with a study in Tanzania [11] and Brazil [9] found that sex difference did not show association with anemia.

Children of mothers with on formal education (30%) and primary education (35.8%)were higher than secondary and higher degree this results explain that mothers' level of education may positively influence practices related to the health care and feeding practice of their children. Educated mothers are more conscious of their children's health and introducing scientifically proved feeding practices, which help to improve their children nutritional status [12]. It is also confirmed that, maternal education is strong predictor for nutritional outcomes of children. The results similar to a study done in Ghana [13].

Anemia during pregnancy showed association with anemia among child especially after six months of age it may be due to poor maternal iron reserve during pregnancy. It is known that the anemic pregnant mothers are more likely to give birth of child with poor iron stores [14].

We found that anemia was significantly more prevalent among families with less educated parents and low income families, indicating the role of social inequality in the development of anemia, this results disagree with result of a study done in Tanzania [10].

Assessing the socioeconomic conditions based on indicators of housing conditions, poor sewage system and drinking untreated water had significant association with anemia, this was attributed to poor sanitary and environmental conditions, which may influence the nutritional status of children this results similar to a study done in Nigeria [15].

The study showed no significant differences between anemia in children and anthropometric measures this is disagree with a study done in Ethiopia where the prevalence of anemia was significantly higher in children whose BMI/A was below -2 Z score [16] but similar to what has been observed in studies conducted in Brazil [12].

Continuous breast feeding had significantly association with anemia ,this may be due to the fact that breast milk has minimal iron to fulfill nutritional requirement of growing infant given that providing breast milk alone coupled with rapid iron depletion beyond six months also increases risk of anemia for younger infant. The results revealed that (40.8%) of anemic child were given complementary food at age > 4 months , It is evident that most digestive en-zymes are inadequate until the first six months of age and introducing liquid or solid food during this time causes interference with absorption of iron in the "breast milk" [17].

Early exposure of infants (before six months of age) to microbial pathogens due to complementary foods "increases the risk of infection" for diarrheal dis-ease, thereby mal absorption [16].

The results indicated that children with poor dietary diversity score were likely to be anemic due to micronutrient deficiency in diet ,this results agree with a study done in Indonesia in 2008 [18].

Other results of the study regarding the causes of anemia found that (67.9%) were iron deficiency anemia, this low hemoglobin concentration in children may be due to micronutrient (especially iron) deficiencies attributable to poor nutritional intake

compounded by adverse socioeconomic conditions, this factor remained to be significant, suggesting, improvement in intake of iron via nutrition will definitely improve the hemoglobin level of the child, this results agree with the result of a study done in Iran in 2016 [19].

Conclusion

The study revealed that more than one third of anemic child were at 1-2 years age, and mother age, mother education, mother employed and anemia during pregnancy had been significantly associated with anemia. Poor sanitary and health conditions and poor socioeconomic condition are the main determinants of developing of anemia. Other risk factors like continuous breast feeding, history of (cow milk, meat and fortified milk) consumption, and age of given complementary feeding were significantly associated with present of anemia among child under five years. Also the study showed that the major cause of anemia in this age group was iron deficiency.

Recommendations

This study present anemia as public health problem, the researcher recommended application of screening pro-gram for anemia to determine the severity of anemia, and increase community awareness about the dangers of anemia, especially severe anemia in children and Thus, actions to improve housing and sanitation of the population should be considered. With regard to the special feature of ferrous sulfate distribution among child in this age and at school age.

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