Epidemiological Study of Anemia in Diyala Province / Iraq

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Abstract

Background: More than one billion people worldwide are affected with anemia. Studies have shown that nutritional deficiency, particularly a decrease in iron-rich food consumed, seems to be the most common cause of anemia.

Objective: To study some demographic characteristics of anemia in children of different residencies of Diyala governorate/ Iraq.

Patients and Methods: A cross-sectional descriptive study piloted in Al-Batool Teaching hospital in Baqubah / Diyala- Iraq from February 1st to Sept 30th 2019. Children was categorized according to the residency into two groups (rural & urban regions), anemia was sorted according to WHO classification: normal Hb 11 gm/dL, mild anemia 10- 10.9 gm/dL, moderate 7- 9.9 gm/ dL, and severe anemia Hb < 7 gm/dl.

Results: One hundred seventeen children aged 6 months – 9 years were included in the study; 58.1% males and 41.9% females, 104 children 88.9% were less than 3.5 years, and 13 (11.1%) children of 3.5 years and more. Sixteen children 13.7% were having normal Hb level and the remaining was anemic as follow: 35.9% mild anemia, 46.1% moderate anemia, 4.3% severe anemia, p-value 0.000. It was found that 57.3% of children belongs to family lived in urban areas, while 50 (42.7%) of them live in rural areas. The number of children who had moderate anemia was more in rural areas, p-value 0.008.

Conclusion: Most of the studied children had a moderate degree of anemia and this might be due to many factors, including a residency in rural areas.

Keywords: Anemia,Children, Diyala , Iraq

Introduction

Anemia upsets more than one billion people worldwide, with pregnant women and children under 5 years of age encompassing the majority of those suffering [1,2]. The development of anemia is multi-factorial and could branch from a diversity of factors. Nutritional deficiencies especially iron, but also folate, vitamin B12, and protein appear to be the major factors [3,4]. Infectious diseases, such as malaria and intestinal worms, as well as environmental pollutants, like lead, could also result in an expansion of anemia [5-7].

There are many factors that impact the development of anemia, studies have shown that nutritional shortages, precisely due to a reduction in the amount of iron-rich food used up, seems to be the most common cause of anemia [2,8-10]. Anemia is commonly found in low and middle-income countries, with South East Asia and Africa being the most affected. The costs of childhood anemia range from increased susceptibility to infectious diseases, fatigue, reduced physical ability, and, if persistent, lower cognitive function and economic productivity in adulthood [6,11-13]. When a large part of the population is affected, this can have bad consequences for economic productivity [10,14,15]. There is evidence that antenatal iron supplementation, as recommended by the World Health Organization (WHO), improves neonatal iron stores, thus delaying the age at which iron deficiency anemia is likely to develop during infancy [12,16-18]. WHO considered the problem of anemia prevalence among the community as severe if the prevalence rate >40%, moderate if the rate is 20% to 39.9%, and mild if it is 5% to

19.9% [13,19-21]. The aim of this study is to check the prevalence and severity of anemia among children of different areas of Diyala province/ Iraq.

Patients and Methods

Design, setting and participants: This study was carried out in Al-Batool Teaching hospital in Baqubah / Diyala – Iraq from 1st of February to 30th of September 2019 as a cross-sectional study. Children were categorized according to the residency into two groups (rural & urban regions); the followings were taken for each group (age of the child and his mother, sex, number of children in the family, the birth interlude in the family, birth order, weight in kg, and sort of feeding). Pre-term babies and children on hematinics were excluded. So the sample size was 117 children, aged 6 months - 9 years. Blood was taken to check hemoglobin level (gm/dL). It was categorized according to WHO classification: normal Hb 11 gm/dL, mild anemia 10- 10.9 gm/dL, moderate 7- 9.9 gm/ dL, and severe anemia < 7 gm/dL [14].

Statistical analysis

The data was scrutinized by Statistical Package of Social Sciences (SPSS) software version 23. Chi-square test was used to test the relationship between variables. The p-value was set at the level of 0.05 to be significant.

Results

The children were included in the study were 117 aged 6 months – 9 years. There were 68 (58.1%) males with a ratio of M: F 1.4:1 and 104 children (88.9%) were less than 3.5 years constituting the largest group of the study population, and 13 (11.1%)

children of 3.5 year and more. Out of 117 children, only 13.7% were maintained normal hemoglobin levels (i.e., 11gm/dL or more) and the remaining 86.3% children were having various degrees of anemia, 42 (35.9%) had mild anemia, 54 (46.1%) children had moderate anemia, 5 (4.3%) children had severe anemia, p-value (<0.001). Eighty 75.2% children belong to mothers of 20 – 30-year age group which constitutes the largest group, followed by mothers with age group more than 30 years,

and lastly mothers of age group less than 20 years, 5 (4.3%). The order of the child in the family, 28 23.9% of children were 1st child in the family and this constitutes the biggest group, whereas 24 children 20.5% were 3rd child in the family. The major group of children 65.8% had a birth interval of < 2 years which is a risk factor for normal growth, whereas 40 34.2% of children had a birth interval of > 2 years or they were the first baby in the birth order, as shown in Table (1).

Table (1): Demographic criteria of patients of the study

Variable	Frequency n. (%)	Severity of anemia				p-value
		Normal (11 gm/dL) n. (%)	Mild(10- 10.9 gm/dL) n. (%)	Moderate (7- 9.9 gm/ dL) n. (%)	Severe(< 7 gm/dL) n. (%)	
		Age of children				
<3.5year	104(88 .9)	16(15.4)	36(34.6)	47(45.2)	5 (4.8)	0.356
≥3.5year	13(11.1)	0	6(46.2)	7(53.8)	0	
		Gender				
Males	68(58.1)	7(10.3)	26(38.3)	32(47)	3(4.4)	0.650
females	49(41.9)	9(18.4)	16(32.7)	22(44.9)	2(4)	
		Age of mother				
<20yr	5(4.3)	0	2(40)	3(60)	0	0.781
20-30 yr	88(75.2)	13(14.8)	32(36.3)	38(43.2)	5(5.7)	
>30year	24(20.5)	3(12.5)	8(33.3)	13(54.2)	0	
		Birth order				
1st child	28(23.9)	3(10.7)	9(32.1)	15(53.6)	1(3.6)	0.548
2nd child	20(17)	5(25)	9(45)	6(30)	0	
3rd child	24(20.5)	4(16.7)	6(25)	13(54.2)	1(4.1)	
≥4th child	45(38.5)	4(8.9)	18(40)	20(44.4)	3(6.7)	
		Birth interval				
<2year	77(65.8)	9(11.7)	27(30.1)	37(48)	4(5.2)	0.725
≥2year/ 1st child	40(34.2)	7(17.5)	15(37.5)	17(42.5)	1(2.5)	

Table (2) showed that 67 57.3% of children belong to family lived in urban areas, while 50 42.7% of children live in rural areas.

Table (2): Severity of anemia in children according to residency

| Residency | Frequency n. (%) | Severity of anemia | | | | P value |
		Normal (11 gm/dL) n. (%)	Mild (10-10.9 gm/dL) n. (%)	Moderate (7- 9.9 gm/ dL) n. (%)	Severe (< 7 gm/dL) n. (%)	
Urban area	67(57.3)	12(17.9)	30(44.8)	24(35.8)	1(1.5)	0.008*
Rural area	50(42.7)	4(8)	12(24)	30(60)	4(8)	

* significant

Feeding in children of ≤2 years, the number was 90 out of 117 children, 56 (62.2%) children were kept on formula feeding and this constituted the biggest age group, followed by 20 (22.2%) children with partially breastfeeding and 14 (15.6%) children with breastfeeding as shown in Table (3).

Table (3): Severity of anemia in children ≤2 years* according to the type of feeding

| Type of feeding | Frequency n. (%) | Severity of anemia | | | | P value |
		Normal (11 gm/dL) n. (%)	Mild (10- 10.9 gm/dL) n. (%)	Moderate (7- 9.9 gm/ dL) n. (%)	Severe (< 7 gm/dL) n. (%)	
Breast feeding	14(15.6)	2(14.3)	5(35.7)	7(50)	0	0.026*
Partially breast feeding	20(22.2)	8(40)	3(15)	8(40)	1(5)	
Formula feeding	56(62.2)	4(7.1)	24(42.9)	26(46.4)	2(3.6)	

*Out of 117 children,90 children ≤2 years included in this

Discussion

In this study, out of 117 children, 16 (13.7%) patients had normal Hb level, but 101 (86.3%) have various degrees of anemia (mild 35.9%; moderate 46.1%; severe 4.3%). The bulk of children had moderate anemia which is similar to that found in the Sailaja et al study [15], it may be due to poverty and educational level which lead to late seeking medical counsel, particularly in rural regions in contrast to urban areas, and the rural regions are distant from hospital or health centers. We found no variation between the gender and anemia, although it was slightly more in boys but it was statistically insignificant. This finding was similar to the study done by Sailaja et al [15] and Windy Saufia et al [17], but it differs from Brittany Noel Robles et al [16] study which revealed the frequency of anemic girls 343 (54.7%) more than anemic boys 283(45.2%), anyway these insignificant alterations might be due to dissimilar sample size of study. It was found that the number of anemic children is more among mothers with an age range from 20-30-year, 88 children (75.2%) and this may be due to that maternal age group is the most common childbearing age, but there is an insignificant difference between the age of mother and the grade of anemia, p-value 0.78. Our study also showed the slight dominance of anemia in the 1st born child 28 (23.93%) and this may be due to less experience of mother to deal with the 1st child regarding complementary food intake, but there is no substantial difference between birth order and grades of anemia, p-value 0.54. The number of anemic children of birth interval < 2 year is more than that of interval

2 years or more, but this was statistically insignificant, which is alike to that of Saijaja et al study [15]. In our study, most children ≤2 years were formula-fed, followed by partial breastfed children and finally exclusive breast fed babies, this may reflect the family approach to breastfeeding. Concerning anemia prevalence and severity, there was a substantial difference between feeding type and grades of anemia, p-value 0.026. It was found that children from the urban area were 67 (57.3%) and rural area was 50 (42.7%), a number of children who had moderate anemia were more in a rural area (p-value 0.008). This might be due to different educational levels and financial status between urban and rural regions, in addition to the discrepancy of availability of medical facilities among areas from rural versus urban regions which are similar to other Iraqi, Egyptian and Chinese studies [19-21 but different from a study done in Iran by Bijan Keikhaei etal[18], who found that iron deficiency anemia was more in urban rather than rural regions. This may be due to different socio-demographic characteristics between states.

Conclusions

Most of the comprised children had a moderate degree of anemia and which might be related to many factors, including a residency in rural regions.

Recommendations

Many steps must be taken to overcome such valuable avoidable problems in a wealthy country like Iraq, including health education, socio-economic progress, and medical facilities. Iron-sufficient diets should be advised by health care workers. Prophylactic iron supplements should be given to all breastfed infants.

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