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THE RELATION BETWEEN RESIDENCY AND IRON DEFICIENCY ANAEMIA IN CHILDREN IN DIYALA PROVINCE / IRAQ

Hussam Aldeen Hameed (F.I.B.M.S)[1], Oday Abbood Khalil (F.I.B.M.S)[2], Emad Wissam (F.I.B.M.S)[3], Najdat Shukur Mahmood (F.I.B.M.S)*[4]

[1,2,3]Pediatrician, Al-Batool Teaching Hospital, Diyala-Iraq.
[4]Pediatrician, College of Medicine/ University of Diyala.

***Corresponding Author: Najdat Shukur Mahmood (F.I.B.M.S)**
Pediatrician, College of Medicine/ University of Diyala.

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ABSTRACT

Background: Anemia affects more than one billion people worldwide, studies have shown that nutritional deficiencies, specifically due to a decrease in the amount of iron rich food consumed, appears to be the most common cause of anemia. It is more often found in low and middle-income countries. **Objective:** To study the prevalence and severity of iron deficiency anemia in children of different regions of Diyala province/ Iraq. **Patients and method:** A cross sectional study conducted in Al-Batool Teaching hospital in Baaquba / Diyala-Iraq from March to Sept 2018. Children was classified according to the residency into two groups (Rural & Urban areas), anemia was graded 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 less than 7 gm/dl. The data was analyzed using Statistical Package of Social Sciences (SPSS) software version 22. **Results:** The included children in the study were 117 of ages 6 mo – 9 yrs; 58.1% males and 41.9% females, 104 children (88.9%) were less than 3.5 yrs and 13 (11.1%) children of 3.5 yrs and more. Out of 117 children, 16 (13.7%) were having normal Hb level and the remaining were anemic as follow: 35.9% mild anaemia, 46.1% moderate anaemia, 4.3% severe anaemia, p value (0.000). It was found that 67 (57.3%) of the whole sample of children belongs to family lived in urban areas, while 50 (42.7%) of children live in rural area. The number of children who had moderate anaemia were more in rural area, p value 0.008. **Conclusion:** Most of the included children had moderate degree of anemia and this might be due to many factors, including residency in rural areas.

KEYWORDS: Anemia, residency, Diyala.

INTRODUCTION

Anemia affects more than one billion people worldwide, with pregnant women and children under five years of age comprising the vast majority of those afflicted. The development of anemia is multi-factorial and could stem from a variety of factors. Nutritional deficiencies especially iron, but also folate, vitamin B12, vitamin A, and protein appear to be the biggest factor. Infectious diseases, such as malaria and intestinal helminthes, as well as environmental pollutants, such as lead, could also lead to the development of anemia.[1-4] Furthermore, anemia could arise due to abnormalities in the genetic makeup of an individual leading to one of many types of hemoglobinopathies.[1-5] Although there are many factors that influence the development of anemia, studies have shown that nutritional deficiencies, specifically due to a decrease in the amount of iron rich food consumed, appears to be the most common cause of anemia, with over one million cases diagnosed.[2-4]. It is more often found in low and middle-income countries, with South East Asia and Africa being the most affected. The consequences of childhood anemia range from increased susceptibility to infectious diseases, fatigue, decreased physical capacity, and, if persistent, lower cognitive function and economic productivity in adulthood.[6-9]. When a large part of the population is affected, this can have large scale consequences for the economic productivity.[10] Anemia is rare in newborn babies, since their mother provides them with a generous supply of iron upon birth, especially in cases of delayed cord clamping. 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.[11] Although breast milk is not a rich source of iron, its absorption is enhanced by the presence of lactoferrin. Formulas usually contain a higher amount of iron to compensate for the lack of lactoferrin. Therefore, anemia often appears after the age of 6 months. This roughly coincides with the

introduction of complementary foods, but also with the period that children start to explore their world and are frequently exposed to contaminants. During school age, the risk of anemia is usually much lower, but it peaks again during puberty, especially in girls after menarche and during pregnancy, due to the sharp increase in iron requirement during the second and third trimester.[12] WHO was considered the problem of anemia prevalence as severe if the prevalence rate >40%, moderate if the rate is 20% to 39.9%, and mild if the is 5% to 19.9%.[13]

This article was established to study the prevalence and severity of anemia in children of different regions of Diyala province/ Iraq as it is one of demographic criteria may affect the child health.

PATIENTS AND METHODS

This study was conducted in Al-Batool Teaching hospital for Maternity and Children in Baaquba / Diyala – Iraq from March to September 2018 as a cross sectional study.

Children was classified according to the residency into two groups (Rural & Urban areas); the following variables were taken for each group (age of the child and the mother, gender, number of children in the family, the birth interval in the family, birth order, weight (kg), and type of feeding). Pre-term infants and children on haematinics were excluded. The final sample size was 117 children, age from 6 months to 9 years.

Blood was aspirated to measure Hemoglobin (gm/dl). It was graded 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 less than 7 gm/dl.[14]

Statistical analysis

The data was analyzed using Statistical Package of Social Sciences (SPSS) software version 22. Chi-square test was applied to test the relation between variables, p value was taken at level of (0.05).

RESULTS

The children were included in the study were 117 of ages 6 mo – 9 yrs. They were 68 (58.1%) males and 49 (41.9%) females with a ratio of M:F 1.4:1, 104 children (88.9%) were less than 3.5 year constituting the largest group of the study population and 13 (11.1%) children of 3.5 year and more. Out of 117 children, only 16 (13.7%) were maintaining normal haemoglobin levels (i.e., 11 or more) and the remaining (86.3%) children were suffering from various grades of anaemia, 42(35.9%) had mild anaemia, 54 (46.1%) children had moderate anaemia, 5 (4.3%) children had severe anaemia, p value (0.000).

Eighty (75.2%) children belongs to mother of 20 – 30 year age group which constitute the largest group, followed by mothers with age group more than 30 year, and lastly mothers with age group less than 20 year, 5 children (4.3%). Regarding order of the child in the family, 28 (23.9%) of children were 1st child in the family and this constitute the largest group, whereas 24 children (20.5%) were 3rd child in the family. A large percentage of children (65.8%) had 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, table (1).

Table 1: Demographic criteria of patients of the study.

Variable	Frequency n. (%)	Severity of anemia				p value
		Normal n. (%)	Mild n. (%)	Moderate n. (%)	Severe 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)	
≥4thchild	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/ 1stchild	40(34.2)	7(17.5)	15(37.5)	17(42.5)	1(2.5)	

Table (2) showed that 67 (7.3%) of children belong to family lived in urban areas, while 50 (42.7%) of children live in rural area.

Table 2: Severity of anaemia in children according to residency.

Residency	Frequency n. (%)	Severity of anaemia				P value
		Normal n. (%)	Mild n. (%)	Moderate n. (%)	Severe 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.

Regarding feeding in children ≤2 years, the number was 90 out of 117 children, 56 children (62.2%) were kept on formula feeding and this was constitutes the largest age group, followed by 20 children (22.2%) with partially breast feeding and 14 children (15.6%) with breast feeding, table (3)

Table 3: Severity of anaemia in children ≤2 years* according to the type of feeding.

Type of feeding	Frequency n. (%)	Severity of anaemia				P value
		Normal n. (%)	Mild n. (%)	Moderate n. (%)	Severe 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 table.

DISCUSSION

In the present study, out of 117 children 16(13.7%) subject had normal haemoglobin level, 101(86.3%) were suffering from various degrees of anaemia (mild 35.9%, moderate 46.1%, sever 4.3%). The majority of children were suffering from moderate anaemia and this is the same to that found in K. Sailaja et al study[15], it may be due to low socio-economic class and educational level which lead to late to seek medical advice, especially in rural areas in comparison to urban areas, in addition to that rural areas are far away from hospital or health centers.

In this study, there was no difference between the gender and anaemia, although it was slightly more in males, but it was statistically not significant. This finding was concurrent to the study done by K. Sailaja et al[15] and Windy Saufia et al[17], but it was different from brittany Noel Robles et al[16] study which showed the frequency of anemic females 343(54.7%) more than anemic males 283(45.2%), anyhow these negligible differences might be due to different sample size of study.

In this study the number of anaemic children is more among mothers with age range from 20-30 year 88 children(75.2%) and this may be due to that this maternal age group is the most common child- bearing age, but there is no significant difference between the age of mother and the grade of anaemia, p value (0.781).

This study also shows the slight dominance of anaemia in the 1st child 28(23.93%) and this may be due to less experience of mother to deal with the 1st child, but there is no significant difference between birth order and grades of anaemia, p value (0.548). The number of anaemic children of birth interval < 2year is more than that of interval 2 years or more, but this was statistically not significant, this was similar to that of K. Saijaja et al study[15].

In the present study, most children≤2 years were formula feeding, followed by partially breast fed children and lastly exclusive breast fed babies, this may reflect the family attitude about breast feeding. Regarding anemia prevalence and severity, there was significant difference between feeding type and grades of anaemia, p value (0.026).

It was found that children from urban area was 67 (57.3%) and rural area were 50 (42.7%), number of children who had moderate anaemia were more in rural area (p value 0.008), this might be due to different education level and economic status between urban and rural areas, in addition to the disparity of availability of medical services among regions from urban versus urban areas. A study done by Safaa A Faraj et al[19] in Iraq showed the same results of the current study, while it was different from study done in Iran by Bijan Keikhaei etal[18], where they found that iron deficiency anemia was more in urban rather than rural areas, this may be due to different socio-demographic characters between states.

CONCLUSION AND RECOMMENDATION

Most of the included children had moderate degree of anemia and this might be due to many factors, including residency in rural areas. Many steps must be taken to overcome such a valuable preventable problem in a rich country like Iraq, including health education, socio-economic advances, and medical services.

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