

**Haematological Study for Women in Two Villages
in Najaf Governorate**

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2012

Abstract

The present investigation was an attempt to obtain profiler of a major public health problem among women in the reproductive age group. On the basis of prevalence studies that (20 – 30 %) of women suffer from anaemia .

The mean age of the women was (26.54 ± 8.45) years . The mean haemoglobin and PCV values were (12.71 ± 4.09) and (37.99 ± 4.47) respectively . Among the (610) women included in the study , (96) were pregnant at the time of the survey . The prevalence rates of anaemia among the pregnant and non-pregnant women based upon the haemoglobin values were estimated to be (36 - 46 %) and (25 – 48 %) respectively . The difference between the two values was found to be highly significant (p < 0.001) . The corresponding haemotocrit values for the two groups were (35.72 ± 5.31) and (38.42 ± 4.30) respectively . When the relationship of two factors of age and parity was examined , it was found that there was a decline in haemoglobin level with increase in parity .

Blood film morphology : The hypochromic microcytic type of anaemia indicative of iron deficiency , accounted for (63 %) of the cases where as among the nonpregnant women this was found to exist to the extent of (46.3 %) . Haemoglobin genotype among the (610) women (108) (17.7 %) showed evidence of sickle cell disease , a good majority (16 %) carried the sickle cell anaemia . It was seen that in the case of subject with ss gene , the haemoglobin values ranged from (8.6 – 11.5) (mean 9.65 ± 0.9 grams %) where as those with As gene had haemoglobin values ranging from (8.5 – 16.2) (mean 12.17 ± 1.65 grams %) .

دراسة دموية للنساء في قريتين تابعتين لمحافظة النجف الأشرف

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الخلاصة :

كانت الدراسة الحالية محاولة للحصول على حل لمشكلة صحية شعبية رئيسية بين النساء في عمر الإنجاب . وعلى أساس ما هو موجود في الدراسات السابقة فإن (20 – 30) بالمائة من النساء أعلاه يعانين من فقر الدم .

كان متوسط العمر (الوسط الحسابي) للنساء قيد الدراسة (26,54 ± 8,45) سنة وكانت قيم الوسط الحسابي للهيموكلوبين وحجم الخلايا المضغوطة (12,71 ± 4,09) و (37,99 ± 4,47) على التوالي .

من بين حجم العينة الكلي المشمولة بالدراسة (610 أمراه) كان عدد النساء الحوامل (96) في وقت إجراء الدراسة . معدلات فقر الدم بين النساء الحوامل وغير الحوامل استناداً على قيم الهيموكلوبين كان يقدر بحوالي (36,46 %) و (25,48 %) على التوالي . أما إحصائياً فقد

كانت الاختلافات بين القيمتين أعلاه وجدت بأنها كانت ذات فروقات معنوية عالية (نسبة الاحتمالية أقل من 0,001) وطبقاً لذلك فقد كانت قيم حجم الخلايا المضغوطة لكلا المجموعتين ($5,31 \pm 35,72$) و ($4,30 \pm 38,42$) على التوالي .

عندما أختبرت العلاقة بين كلا العاملين (العمر و القيمة المساوية له) وجد بأن هناك هبوط في مستوى الهيموكلوبين مع الزيادة في القيمة المعادلة له .

هناك إشارة لنقص الحديد في فقر الدم نوع (hypochromic microcytic) قدرت بحوالي (63 %) من الحالات بينما كانت قيمتها بين النساء غير الحوامل حوالي (46,3 %) وراثياً ، الهيموكلوبين بين الحجم الكلي للعينة (610) أمراه كان هناك 108 (نسبة 17,7 %) أظهرت دليل الإصابة بفقر الدم المنجلي ، كانت نسبة رئيسية جيدة (16 %) تحمل صفات فقر الدم المنجلي .

لقد شوهد بأن في حالة وجود الجين (ss) تراوحت قيم الهيموكلوبين (8,6 – 11,5) بمتوسط حسابي قيمته ($9,65 \pm 0,9$ غم %) بينما في حالة وجود الجين (As) كانت قيم الهيموكلوبين تتراوح بين (8,5 – 16,2) بمتوسط حسابي قيمته ($12,17 \pm 1,65$ غم %)

Introduction :

Haematological disorders constitute a major public health problem among women especially , in the reproductive age group in most of the tropical countries in the developing world . On the basis of prevalence studies it is estimated that 20 to 30 per cent of women suffer from anaemia (Ramalingaswamy , 2004) . There is need to undertake community diagnostic studies for haematological disorders and diseases as it is known that their nature as well as pattern of distribution vary considerably not only from region to region but even among communities living within the same region. For instance , wide variability in the prevalence rates of haemoglobinopathies have been reported from the different regions of the world (WHO , 1996) .

It is known that Iraq shares common morbidity problems including haematological disorders with the other countries of the region and it has been reported that in addition , there are a variety of haemoglobinopathies in the country (WHO , 1996) . But for small scale investigations on specific disease problems (AL-kasab *etal* , 2011) , there has hardly been any community studies conducted in middle of Iraq with the purpose of finding out the nature and extent of the problem of haematological disorders in general . The present enquiry was therefore , undertaken to look into the haematological profile of women of the reproductive age group with a view to bring to light the prevailing pattern of haematological disorders in chosen community of this region.

Materials and Methods :

Study population :

Two representative villages namely, AL-Wahaby and AL-Zurfat were selected at random from among the villages falling within the jurisdiction of AL-Kufa district of Najaf governorate of middle of Iraq . AL-Kufa district with its main centre and four subcentres is serving as the field practice unit of college of Medicine , Najaf since 2008 . An initial demographic survey was done in these villages to identify the target population to be covered in the survey . Blood specimens were collected from women belonging to the reproductive age group (15 – 44 years) who were present in the village at the time of survey . A representative of the local branch of the " General Association of Iraqi Women " accompanied the team during the home visits to help in establishing rapport with the families and to ensure the much needed cooperation of the community in the effort . Girls, falling within the target age group who were attending schools and therefore were absent from their homes during the visit of the team, were contacted in the schools. A total of 610 women were covered in the study (290 from AL-Zurfat and 320 from AL-Wahaby . The overall response rate was 91.5 per cent .

Method of investigation : From each subject 2.5 ml of venous blood was drawn using disposable syringes and transferred to specimen tubes containing Ethylene diamino tetra-acetic acid (EDTA). The blood samples were transported to the haematological laboratory of the AL-Sader Hospital , Najaf , and the investigations were done within 24 hours of collection of the specimens .

The haematological investigations included estimation of haemoglobin and packed cell volume (PCV), study of peripheral blood smear, blood grouping and the genotyping of haemoglobin. The techniques advocated by Dade and Lewis were employed for the purpose.

Haemoglobin was estimated using the Gyanmet—haemoglobin method employing a photo-electric colorimeter which was calibrated and checked at regular intervals against a standard cyanmet-haemoglobin solution.

The PCV was determined using heparinised microhaematocrit capillary tubes (supplied by Sherwood Medical Industries, U.S.A.). The genotyping of haemoglobin was done by cellulose acetate haemoglobin electrophoresis at pH 8.6 using a barbitone buffer. Slide method was employed to determine the blood groups. Specificity and potency of the anti-sera were checked with standard RBCs before starting the work.

Genotyping of the blood samples were done to identify sickle cell disease or trait. In the present study the term 'sickle cell disease' is used to refer to the various disease states where HbS gene is present and includes both sickle cell anaemia and sickle cell trait. Sickle cell anaemia is sickle cell disease in which the patient is homozygous for the HbS gene and the term trait indicates all heterozygotes for an abnormal haemoglobin in the BbA (WHO, 1996). The haemoglobin level and PCV were estimated in order to estimate the prevalence of anaemia in the group. With a view to identify the nature and extent of this problem in relation to pregnancy, the subjects were classified as pregnant or nonpregnant at the time of survey. For diagnosing anaemia in this group of women, the haemoglobin values of 11 grams and 12 grams were taken as the cut-off points for the pregnant and the nonpregnant women respectively as recommended by WHO (1998). The type of anaemia was determined by morphological study of the peripheral blood smears. Blood grouping was done for all the respondents.

Results :

The age distribution of the women included in the study is shown in table 2. The mean age of the women was 26.54 ± 8.45 years. The mean haemoglobin and PCV values were 12.71 ± 4.09 and 37.99 ± 4.47 respectively. Among the 610 women included in the study, 96 were pregnant at the time of survey. The prevalence rates of anaemia among the pregnant and nonpregnant women based upon the haemoglobin values were estimated to be 36.46 per cent and 25.48 per cent respectively. The difference between the two values was found to be highly significant ($P < .001$). The corresponding haematocrit values for the two groups were 35.72 ± 5.31 and 38.42 ± 4.30 respectively (table 3). Further the haemoglobin values of lactating women were looked into and it was found that among a total of 59 mothers in this group, the haemoglobin values ranged from 6.9 to 16.4 with a mean of 12.15 ± 1.36 .

There is a consistent reduction in average haemoglobin value with increase in parity which was found to be statistically significant from simple regression analysis ($P < 0.001$). Although a similar reduction was found with respect to age, the rate of reduction observed was found to be very much less marked than that of parity. When the relationship of the two factors of age and parity was examined, each independently of the other variable, it was found that there was a decline in haemoglobin level with increase in parity. However, in the lower parity group haemoglobin was found to increase with increase in age whereas in the case of those women with middle and high parity this feature was not discernible (table 4).

Blood film morphology:- Result of examination of peripheral smears of those identified to be anaemic among women who did not show evidence of sickle cell disease is shown in table 5. The hypochromic microcytic type of anaemia indicative of iron deficiency, accounted for 63 per cent of the cases whereas among the nonpregnant women this was found to exist to the extent of 46.3 per cent.

Haemoglobin genotyping:- Among the 610 women, 108 (17.7 per cent) showed evidence of sickle cell disease. A good majority (16 per cent) carried the sickle cell trait whereas the remainder (1.7 per cent) had sickle cell anaemia. The prevalence rate of the disease in the two villages were found to be identical.

The haemoglobin values among these two groups with sickle cell disease were further examined. It was seen that in the case of subjects with SS, the haemoglobin values ranged from 8.6 to 11.5 (mean 9.65 ± 0.9

grams per cent) whereas those with As had haemoglobin values ranging from 8.5 to 16.2 (mean 12.17 ± 1.65 grams per cent).

Table (1) The blood groups of the respondents

Blood groups	Number	Per cent
O	281	46.4
B	158	26.0
A	147	24.1
AB	21	3.4

590 out of 610 women (96.7 per cent) were Rh positive and 20 (3.3 per cent) were Rh negative.

Discussion:

The present enquiry throws light into the haematological profile of a rural community in Iraq focussing on women in the reproductive age group and has brought out the nature and extent of certain haematological disorders prevalent among them. It has helped to establish the fact that while the community in question shares with other countries of the region certain haematological disorders, particularly anaemia, it has in addition problems of haemoglobinopathies especially, sickle cell disease that aggravates the overall problem of morbidity.

Albeit the problem of anaemia may not appear to be as acute as in many other tropical countries, the significance of the overall prevalence rate of anaemias particularly, in the target group as revealed in the study deserves serious consideration. The finding that nearly one-third of the pregnant women in the study population has deficient haemoglobin level (below 11 grams per cent) is a disturbing observation.

Classification of anemia on the basis of examination of peripheral blood smear has shown that the anaemia is attributable to deficiency of iron as well as that of B₁₂ and folate. In several instances the morphological feature that emerged was of a mixed type of anaemia. It may be remembered that reliance can be placed on this method of classification of anaemia as the morphological picture is considered to provide a reliable index for typing anaemia in general (WHO, 2006). While search for the factors responsible for this nutritional deficiency is not strictly within the term of reference of the study, it may be pointed out that there is impelling need to undertake detailed studies to investigate the factors that lead to these deficiency states. Such a probe would inter alia be directed to find out the extent and nature of utilization of the local health facilities especially, maternal care services. This assumes special significance in the local setting where health centre facilities are made available within easy reach of people. Further, there is need to investigate the interplay of environmental factors particularly, the role of parasites in bringing about the existing pattern of the disease. Here it is worthy of mention that indigenous malaria has ceased to be a problem in Najaf from 1979 onwards (Ossi, 2009).

The study provided an estimate of the prevalence of sickle cell disease among women of reproductive age group belonging to the local community. The prevalence rate of sickle cell anaemia (1.7 per cent) was found to be higher than the estimated national prevalence rate of one per cent (WHO, 1996). A higher prevalence rate of sickle cell anaemia (2.6 per cent) among school children (10-12 years) belonging to the same community was reported by Alkasab *etal* (2011).

The prevalence rate of sickle cell disease in general (17.6 per cent) appears to be similar to that reported from other neighbouring countries. For example, Lehmann *etal* (1993) reported a prevalence rate ranging from 11-20 per cent in Saudi Arabia.

It is observed that sickle cell trait accounts for a large proportion of cases in the present series (16-per cent) and this again conforms to the pattern reported from other regions.

The haemoglobin values among those with the sickle cell trait was almost identical with that of the general population who do not show evidence of the disease. This might partially explain the earlier observation that the disease in the community in question tends to run a milder course (Alkasab *etal*, 2010).

It is difficult to interpret the differences in prevalence of sickle cell anaemia seen among children and adults. It is likely that the disease might have been responsible for eliminating a few individual during their childhood, with the result

that among those subjects of the cohort who reached their adulthood, the rate of prevalence of the disease tends to be lower. There has been considerable variation observed in the gravity of the disease during the various phases of life among the communities in the different regions. While it is true that the disease appears to be more serious in early childhood and is responsible for a heavy toll of life, a long term follow up study of children with sickle cell disease conducted in Saudi Arabia showed that mortality experience was more among older children and young adolescents, possibly reflecting a slower progression of pathological changes (Perrine *etal*, 2008). This brings out the need to undertake cohort studies to determine the behaviour of the disease in the various phases of life as well as under different environmental influences. It is believed that environmental factors especially, improvements in life style and health care have a telling effect on the prognosis of sickle cell disease in general (Konotey, 2004). It assumes special importance in a country like Iraq which is on the threshold of rapid socio—economic development and where significant advancements have taken place in the delivery of health care services in recent years.

Table 2
Age distribution of respondents

Age in years	Number	Per cent
15-19	168	27.54
20-24	144	18.69
25-29	103	16.89
30-34	80	13.11
35-39	75	12.29
40-44	70	11.48
Total	610	100.00

Table 3
Haemoglobin (g/100 ml) and Haematocrit (per cent) values for women of reproductive age

Reproduction stage	Haemoglobin values									Haematocrit						
	No.	Mean ± S.D.*	6	6-7.9	8-9.9	10-11.9	12-13.9	14-15.9	16+	Mean ± S.D.*	30	30-34	35-39	40-44	45-49	50+
Non pregnant	514	12.91±4.37	0	2	27	102	280	93	10	38.42±4.30	21	75	177	208	31	2
pregnant	69	11.61±1.98	1	2	14	35	32	11	1	35.72±5.31	8	35	32	17	4	0

* Standard deviation

Table 4

Mean \pm S.E.M.* of haemoglobin by parity and age

Parity	Age group (in years)			All
	25	25-34	35+	
0	13.32 \pm 0.15	14.90 \pm 0.7	0.0 \pm 0.0	13.35 \pm 0.15
1-2	13.38 \pm 0.20	14.19 \pm 0.34	15.56 \pm 0.54	13.77 \pm 0.18
3-4	12.52 \pm 0.21	13.14 \pm 0.11	13.23 \pm 0.1	12.97 \pm 0.09
5+	11.14 \pm 0.56	11.04 \pm 0.29	11.56 \pm 0.15	11.48 \pm +0.13
All	13.12 \pm 0.11	12.38 \pm 0.17	12.22 \pm 0.14	

* Standard error of mean.

Table 5

Morphological types of anaemia seen in three groups of women

Morphological type	Number & percentage of anaemic women					
	Nonpregnant		Lactating		Pregnant	
	No	Per cent	No	Per cent	No	Per cent
Microcytic hypochromic	38	46.3	4	31.0	17	62.9
Macrocytic hyperchromic	4	4.8	2	15.5	3	11.11
Mixed picture 1+2	10	14.0	2	15.5	3	11.11
Normochromic normocytic	30	36.3	5	46.2	4	14.8

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