EVALUATION OF ABSENCE OF CLINICAL PALLOR IN RECRUITS

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Abstract

Objective: Clinical findings such as pallor of the conjunctivae, nail beds, lips, oral mucosa and palmar creases have been used by physicians in the diagnosis of anaemia. This study was carried out to determine the value of absence of clinical pallor in ruling out anaemia in recruits by measuring blood haemoglobin concentration as a true standard.
Study Design: A cross-sectional descriptive study.
Place and duration of Study: Pathology department of Combined Military Hospital Sargodha from Jan 2009 to Jun 2009.
Subjects and Methods: Young adults selected for recruitment in army after medical examination by general duty medical officers were included in the study. Haemoglobin estimation was done on Sysmex KX-21 semi automated haematology analyzer.
Results: Out of total 1760 individuals who were not having conjunctival pallor as per assessment of the doctors, 109 (6.19%) were found anaemic (haemoglobin<13.5g/dL) by haemoglobin estimation. Among the anaemic recruits, 88 (80.73%) were having haemoglobin 13.49 to 10.00 g/dL.
Conclusion: The absence of clinical pallor is not likely to rule out mild anaemia in all selected recruits.

Keywords : Anaemia, Haemoglobin, Pallor.

Article

INTRODUCTION

The global prevalence of anaemia is estimated in 2 billion people, that is, in about 30% of the worldwide population1. Every 9 of 10 persons affected of anaemia live in developing countries and Pakistan has the highest rates of anaemia in South Asia2. The commonest and reliable method of diagnosing anaemia is by determining haemoglobin levels but it is not cost effective and not available everywhere and this has led to screening of anaemia by clinical pallor particularly in developing countries3. Traditionally pallor of conjunctivae, nail beds, face, palms and palmar creases are clinical signs used for the physical diagnosis of anaemia4,5. It is also a known fact that pallor is useful in the evaluation of patients suspected of severe anaemia but its significance in patients with mild anaemia is doubtful6. Similarly pallor absence may be misleading due to race, conjunctivae hue, increased pigmentation with iron, melanin, or bilirubin7- 9.
Medical examination of recruits is vitally important because everyone entering the armed forces must be in good health to endure the challenges of basic training and military service. Recruiting Regulations 1977, SPAO 11/78 and various general instructions issued by GHQ PA Dte provide guidelines for recruitment and it is the responsibility of the recruiting medical officer to ensure that recruits below physical/medical standard are not selected. Anaemia affects the physical and mental development of the individual and its impact is considerable when enhanced physical fitness is required10. Anaemia is ruled out by the absence of pallor of the conjunctivae, face, mucous membranes, palms and haemoglobin estimation is not carried out on a routine basis in our selected recruits. This study was carried out to find the accuracy of absence of clinical pallor judged by general duty medical officers to exclude the presence of anaemia in these recruits.
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SUBJECTS AND METHODS

It was a descriptive study carried out from January 2009 to June 2009. A total of 1760 individuals

referred to Pathology department of Combined Military Hospital-Sargodha for hepatitis B, C and HIV screening from Regimental Medical Officers (RMOs) of Army Selection & Recruitment Offices of Sargodha and Faisalabad were included. The average age of the participants was 18.9 year (median 19 years). They were not having clinical pallor as per physical examination by the recruiting medical officers and declared non-anaemic. Additional two millilitres (mL) of blood was collected in EDTA anticoagulant container and complete blood counts (CBC) were performed on Sysmex KX-21 semi-automated haematology analyzer. Normal and abnormal controls were run daily as quality assurance measure. Individuals with haemoglobin <13.5 g/dL were labelled anaemic. They were further subdivided into 13.49-10.00, 9.99-7, <7.00 g/dL groups for the purpose of severity of anaemia. Results were compiled on SPSS 10.0 and expressed in descriptive statistical terms.

RESULTS

The overall frequency of anaemia among recruits was 6.19 %.

Table: Frequency of anaemia among recruits.

	Total recruits	Anaemic recruits (%)
Army Selection & Recruitment Office-Sargodha	1137	75 (6.59%)
Army Selection & Recruitment Office-Faisalabad	623	34 (5.45%)
Total	1760	109 (6.19%)

Table depicts the frequency of anaemia in recruits from AS&RO Sargodha and Faisalabad.

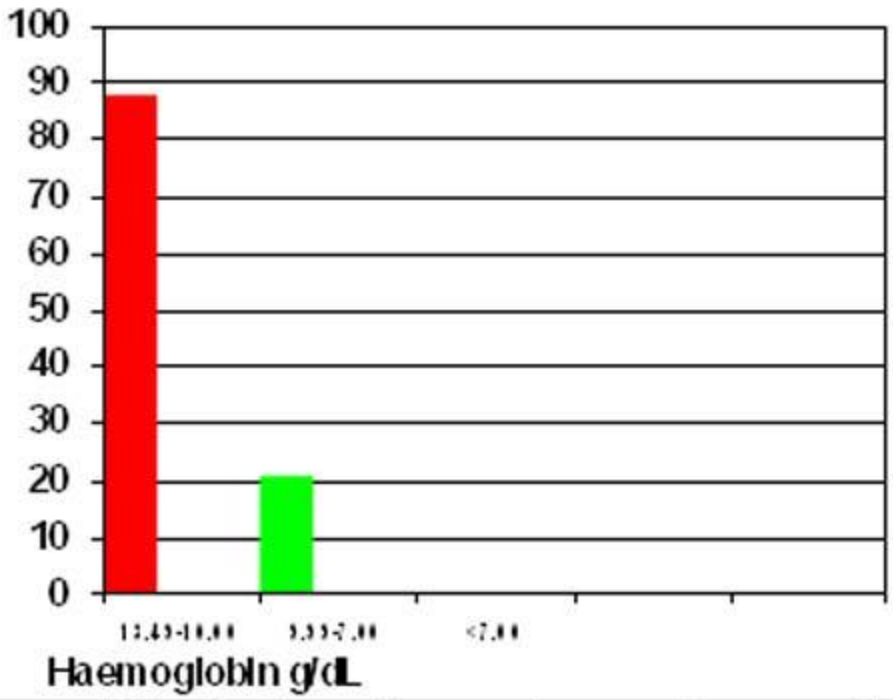

Figure: Distribution of anaemic recruits according to haemoglobin levels.

Figure shows the distribution of anaemic recruits according to haemoglobin levels. Most of the anaemic recruits 88 (80.73%) had haemoglobin level between 10.00 to 13.49g/dL. Rest of the 21 recruits (19.27%) had haemoglobin from 7.00 to 9.99g/dL.

DISCUSSION

There is now a lot of evidence suggesting that anaemia can impair physical and mental performance in young recruits11. Moreover incidence of anaemia increases in strenuously trained combat soldiers over passage of time12. Therefore it is of paramount importance that young recruits entering military service are medically fit and are not placed at risk during rigorous military training by virtue of pre-existing anaemia. Traditionally pallor of conjunctivae, nail beds, face, palms and palmar creases are signs used for the physical diagnosis of anaemia13. In Pakistan and Bangladesh conjunctival pallor had the highest sensitivity of all sites for detecting anaemia14,5. Studies in Africa and of whites in the United States have shown that the nail beds and palm are the best sites for assessing pallor15,4. All the studies seem to agree upon is that assessment at several sites is definitely better than assessment at any single site16,17. The reliability and validity of the presence of clinical pallor for anaemia detection purposes have been evaluated by several studies. Strobach et al. noted a statistically significant correlation between haemoglobin concentration and the colour tint of the lower eyelid conjunctiva, nail-bed rubor, nail-bed blanching, and palmar crease rubor3. The results from comparing anaemia diagnoses made by palmar and conjunctival examination with haemoglobin levels determined by blood cell count showed low levels of agreement in a study by Spinelli et al18.

In our study, out of total 1760 individuals who did not have clinical pallor as per assessment of the doctors, 109 (6.19%) were found anaemic (haemoglobin<13.5g/dL) by haemoglobin estimation. A number of studies have been carried out to evaluate the accuracy of physical signs of anaemia with haemoglobin estimation. Sheth et al evaluated the value of conjunctival pallor in the diagnosis of anaemia and found the likelihood ratio were 4.9 for the presence of conjunctival pallor and 0.61 for the absence of conjunctival pallor. They concluded that the presence of conjunctival pallor was reason enough to perform haemoglobin estimation but absence of conjunctival pallor does not allow the clinician to rule out anaemia19. Wurapa et al found sensitivity of 18.6% and specificity of 95.8%

and concluded that conjunctival pallor was not a good screening tool for anaemia20. Wallace et al revealed that neither experience nor specialisation significantly influenced the ability to diagnose anaemia, based on conjunctival inspection. Overall accuracy in diagnosing anaemia ranged from 0.61-0.69, sensitivity 0.52-0.65 and specificity 0.62-0.83 by ophthalmologists, general surgeon and their registrars21.

Levels of anaemia are classified as severe, moderate, or mild based on the haemoglobin concentration in the blood. According to criteria developed by the World Health Organization; haemoglobin concentrations less than 7.0 g/dl are considered severe anaemia; concentrations of 7.0 to 9.9 g/dl are considered moderate anaemia; concentrations of 10.0 to 11.9 g/dl (10.0-10.9 g/dl for pregnant women and children under the age of three years) are considered mild anaemia22. In our study all the individuals were in the mild to moderate grade of anaemia and 68 (62.38%) were having haemoglobin from 12.5 to 13.49 g/dL. This suggests that conjunctival usefulness is very limited in the diagnosis of mild anaemia. Kalter et al have reported low to moderate sensitivity of clinical pallor for mild anaemia5.

CONCLUSION

We conclude that clinical examination alone may not be sufficient to exclude the presence of anaemia in adults particularly individuals with mild and moderate anaemia. It is suggested that a larger study at a bigger institute should be carried to find the sensitivity and specificity of clinical pallor so that appropriate strategy could be adopted regarding haemoglobin estimation of the recruits.

Reference

1.International Nutritional Anaemia Consultative Group. INACG Symposium 12 March 1999, Durban, South Africa. ILSI Research Foundation, Washington, D.C; pp. 1–60.

2.WHO. Turning the tide of malnutrition: responding to the challenge of the 21st century. Geneva: WHO (WHO/NHD.007); 2000. http://www.who.int/nut/ documents/nhd_brochure.pdf.

3.Strobach RS, Anderson SK, Doll DC, Ringenberg QS. The value of the physical examination in the diagnosis of anaemia. Correlation of the physical findings and the haemoglobin concentration. Arch Intern Med 1988; 148: 831-832.

4.Nardone DA, Roth KM, Mazur DJ, McAfee JM. Usefulness of physical examination in detecting the presence or absence of anaemia. Arch Intern Med. 1990; 150:201–4.

5.Kalter H. D., Burnham G., Kolstad P. R., Hossain M., Schillinger J. A., Khan N. Z., Saha S., de Wit V., Kenya-Mugisha N., Schwartz B., Black R. E. Evaluation of clinical signs to diagnose anaemia in Uganda and Bangladesh, in areas with and without malaria. Bull. WHO 1997; 75:103-111.

6.Stoltzfus RJ, Edward-Raj A, Dreyfuss ML, Albinico M, Montresor A, Thapa MD. Clinical pallor is useful to detect severe anaemia in populations where anaemia is prevalent and severe. J Nutr 1999; 129: 1675-1681.

7.Sanchez-Carrillo CI. Bias due to conjunctiva hue and the clinical assessment of anaemia. J Clin Epidemiol. 1989; 42(8):751-4.

8.Muhe L, Oljira B, Degefu H, Jaffar S, Weber MW. Evaluation of clinical pallor in the identification and treatment of children with moderate and severe anaemia. Trop Med Int Health 2000; 5: 805-810.

9. Weber MW, Kellingray SD, Palmer A, Jaffar S, Mulholland EK, Greenwood BM. Pallor as a clinical sign of severe anaemia in children: an investigation in Gambia. Bull WHO 1997; 75 (Suppl): 113-118.

10.World Health Organization, UNICEF & United Nations University (1998) Iron Deficiency: Indicators for Assessment and Strategies for Prevention. WHO, Geneva, Switzerland.

11.Novack V, Finestone AS, Constantini N, Shpilberg O, Weitzman S, Merkel D. The prevalence of low hemoglobin values among new infantry recruits and non linear relationship between hemoglobin concentration and physical fitness. Am J Hematol 2007; 82: 128-33.

12.Merkel D, Huerta M, Grotto I, Blum D, Rachmilewitz E, Fibach E, Epstein Y, Shpilberg O. Incidence of anemia and iron deficiency in strenuously trained adolescents: results in a longitudinal follow up study. J Adolesc Health. 2009; 45: 286-91.

13.Gjorup T., Bugge P. M., Hendriksen C., Jensen A. M. A critical evaluation of the clinical diagnosis

of anemia. Am. J. Epidemiol. 1986; 124:657-665.
14.Thaver IH, Baig L. Anaemia in children: Part I. Can simple observations by primary care provider help in diagnosis? J Pak Med Assoc 1994; 44: 282-284.
15.Zucker JR, Perkins BA, Jafari H, Otieno J, Obonyo C, Campbell CC. Clinical signs of the recognition of children with moderate or severe anemia in Western Kenya. Bull WHO 1997; 75 (Suppl): 97-102.
16.Dusch E. Clinical Screening: Everyone does it but sensitive is it? Mother Care Matters, 1996; 6: 7-8.
17.Luby SP, Kazembe PN, Redd SC, Ziba C, Nwanyanwu OC, Hightower AW, Olivar MA. Using clinical signs to diagnose anemia in African children. Bull WHO 1995; 73: 477-482.
18.Spinelli MGN, Souza JMP, Souza SB, Sesoko EH. Reliability and validity of palmar and conjunctival pallor for anemia detection purposes. Rev Saúde Pública. 2003;37 (4):404-8.
19.Sheth TN, Choudhry NK, Bowes M, Detsky AS. The relation of conjunctival pallor to the presence of anemia. J Gen Intern Med. 1997;12(2):102-6.
20.Wurapa F. K., Bulsara M. K., Boatin B. A. Evaluation of conjunctival pallor in the diagnosis of anaemia. J. Trop. Med. Hyg. 1986; 89: 33-6.
21.Wallace DE, McGreal GT, Toole GO, Holloway P, Wallace M, McDermott EW, Blake J. The influence of experience and specialisation on the reliability of a common clinical sign. Ann R Coll Surg Engl. 2000 ; 82(5): 336–8.
22. WHO: [http://www.who.int/nut/documents/nhd_brochure.pdf] Turning the tide of malnutrition: responding to the challenge of the 21st century. Geneva: WHO (WHO/NHD.007); 2000.