

When is it Necessary to Screen Women for Anemia?

E. Dusch. Clinical Screening: Everyone Does It But How Sensitive Is It? A Forthcoming MotherCare Working Paper.

Introduction

Most Ministries of Health in developing countries have policies to screen pregnant women for anemia (low hemoglobin [Hb]) and to give those with anemia iron pills. However, where anemia prevalence is high, it is more cost-effective to give iron pills to all pregnant women to meet their increased requirements for iron (ACC/SCN, 1991).

Because of the life-threatening consequences of severe anemia (Hb <7g/dL) for the mother and her infant, it would be useful to identify, treat and follow-up with women who are severely anemic. However, because laboratory tests that would be able to detect the majority of women with anemia are expensive, it is unrealistic to recommend laboratory screening for these cases. While clinical or pallor screening is low in cost, it is a poor way to detect mild to moderate anemia (Hb 7-11g/dL). However, it may be useful in identifying women with severe anemia.

Pallor screening is the identification of anemia by examining the face, inner lower eyelids or conjunctiva, palms, nailbeds and other body parts for paleness or pallor which may be a sign of anemia. The objective of this review was to determine just how *sensitive* (the ability of a test to correctly identify individuals who are truly anemic) pallor screening is to identify individuals with severe anemia so they might be treated appropriately. For our purposes, we were interested in identifying women who were truly severely anemic; therefore, we focused on sensitivity. Results on *specificity* (the ability of a test to correctly identify individuals without anemia) are generally higher for clinical screening than for sensitivity and will not be presented here.

Methods

A Medline search of the literature from 1978-1995 was used to identify studies for review. Key words used to conduct the search included: "anemia and pallor"; "anemia and clinical signs"; "testing, sensitivity, and anemia"; and "anemia and physical examinations". Sixteen studies were found in which clinical signs, mainly pallor, were used to identify anemia. These studies included mixed populations of men, women, pregnant women and children from both developed and developing countries. Physicians and other health workers of various skill levels and experience were used to conduct the screening. Most of these studies examined paleness of several different areas, such as the face, nailbeds, tongue, palms and conjunctiva. Six studies (Thaver and Baig, 1994; Khan, *et al.* 1990; Kalra, 1986; Wurapa, *et al.* 1986; Glass, *et al.* 1980; Jacobs, *et al.* 1979) examined the sensitivity of pallor or clinical signs for identifying mild anemia, and ten studies (Luby, *et al.* 1995; Meda, *et al.* 1993; Gujral, *et al.* 1989; Sanchez-Carrillo, 1989; Sanchez-Carrillo, *et al.* 1989; Nardone, *et al.* 1990; Strobach, *et al.* 1988; Shah, *et al.* 1984; Gjorup, *et al.* 1986; Ghosh and Mohan, 1978) examined the sensitivities for a number of different cutoffs used to detect mild to severe anemia. (**See Box 3 in the center pullout for Hb Cutoffs.**) To determine sensitivities, clinical signs were compared with a "gold standard" for measuring Hb, usually a laboratory test.

Results

Pallor is most sensitive in detecting severe anemia (in pregnant women Hb <7g/dL and in children Hb<5g/dL). One study found that the sensitivity of clinical screening was as high as 93% for identifying children who were severely anemic (Hb <5g/dL) (Luby, *et al.*, 1995) and another study including men, women and children identified 100% of people with Hb <6g/dL (Ghosh and Mohan, 1978). Yet, Meda, *et al.* identified only 63% of anemic women with Hb <9g/dL and only 16% of women with Hb<11g/dL. Nardone *et al.* achieved sensitivities of 65%, 77% and 80% for clinical signs

using Hb cutoffs of 13g/dL, 12g/dL, and 10g/dL, respectively. The sensitivity of clinical screening for severe anemia in men (defined as Hb <10g/dL) was 81%, while the sensitivity of using clinical signs to identify men with moderate anemia was only 50% (Strobach, *et al.*, 1988). These studies confirm that pallor is not sensitive enough to identify moderate to mild anemia, but it becomes a better test for severe anemia.

Commentary

As the literature review showed, pallor screening should not be relied on to identify women with mild and moderate anemia. However, pallor screening may play a role in identifying women with severe anemia, especially in places with limited resources and equipment. With this in mind, MotherCare reviewed each study for possible ways to improve the sensitivity of pallor screening in a field setting. One way is to train community health workers and physicians by letting them compare their skills to identify anemia using clinical skills or pallor with a gold standard for hemoglobin measurement. Additionally, using a combination of examination sites to look for pallor and comparison aids such as color tint scales appear to improve the sensitivity of using clinical signs or

pallor to identify people with anemia. **To further investigate the usefulness of pallor to screen for anemia, MotherCare will be conducting the following activities in its programs:**

- ◆ Confirm the results of this literature review by determining the sensitivity of conjunctival pallor in identifying women with mild to moderate anemia (7-11g/dL) and those with severe anemia (5-7g/dL) and very severe anemia (<5g/dL) in baseline studies.
- ◆ If the sensitivity of pallor screening is high (80%) for severe anemia, use clinical signs or pallor screening to identify women with severe anemia to give them more iron/folate tablets and special follow-up attention including counseling on how to manage side effects. (MotherCare has arbitrarily set "high sensitivity" at 80%.)
- ◆ Train health workers to use pallor to screen for severe anemia, but to not depend upon it to identify pregnant women with mild to moderate anemia.
- ◆ Improve pallor screening techniques by training health workers to compare their estimations of pallor with blood analysis for Hb.

References

- ACC/SCN (Administrative Committee on Coordination/Subcommittee on Nutrition) (1991). Controlling iron deficiency. State-of-the-Art Series. Nutrition Policy Discussion Paper No. 9.
- Ghosh, S. and M. Mohan (1978). Screening for anaemia. *The Lancet*. i (8068), 823.
- Gjorup, T., P. Bugge, C. Hendriksen, and A. Jensen (1986). A critical evaluation of the clinical diagnosis of anemia. *American Journal of Epidemiology*. 124 (4): 657-665.
- Glass, R., R. Batres, C. Selle, R. Garcia-Ibañez, N. Solomons, and F. Viteri (1980). The value of simple conjunctival examination in field screening for anemia. *Nutrition Reports International*. March, Vol. 21, No. 3: 405-412.
- Gujral, S., R. Abbi, M.A. Anderson, P. Christian, and T. Gopaldas (1989). Agreement between hemoglobin estimation and anaemia recognition card in assessment of anaemia in pregnant women. *European Journal of Clinical Nutrition*. July, 43 (7): 473-475.
- Jacobs, H.D., P.R. Farndell, P.S. Grobbelaar, D.J. Smith, and M.E. Brofield (1979). Observer bias and error in the integrumentary clinical diagnosis of chronic anaemia. *South African Medical Journal*. 16 June: 1031-1034.
- Kalra, L., A.N. Hamlyn and B.J.M. Jones (1986). Blue sclerae: a common sign of iron deficiency? *The Lancet*. Nov., 29; 2 (8518): 1267-9.
- Khan, M.M.A., G.K. Rao, and Viqarunnisa (1990). Relationship of intestinal parasitism, malaria, and under nutrition to prevalence of anaemia in an urban community. *Journal of Communicable Diseases*. 22 (2): 116-119.
- Luby, S.P., P.N. Kazembe, S.C. Redd, C. Ziba, O.C. Nwanyanwu, A.W. Hightower, C. Franco, L. Chitsulo, J.J. Wirima, and M.A. Olivari (1995). Using clinical signs to diagnose anaemia in African children. *Bulletin of the World Health Organization*. 73(4):477-482.
- Meda, N., B. Kanki, S. Cousens, and W. Graham (1993). Identifying Strategies to control anaemia among women of reproductive age in Bobo-Dioulasso, Burkina Faso: An in-depth study. A Report to MotherCare.
- Nardone, D., K. Roth, D. Mazur, and J. McAfee (1990). Usefulness of physical examination in detecting the presence or absence of anemia. *Archives of Internal Medicine*. Jan., Vol 150: 201-204.
- Sanchez-Carrillo, C. (1989). Bias due to conjunctiva hue and the clinical assessment of anemia. *Journal of Clinical Epidemiology*. Vol.42, No. 8: 751-754.
- Sanchez-Carrillo, C., T.de Jesus Ramirez-Sanchez, M. Zembrana-Castañeda, and B. Selwyn (1989). Test of a noninvasive instrument for measuring hemoglobin concentration. *International Journal of Technology Assessment in Health Care*. 5:659-667.
- Shah, U., A. Pratinidhi, P.V. Bhatlawande, and S.V. Alekar. (1984). Using community health workers to screen for anaemia. *World Health Forum*. Vol 5: 35-36.
- Strobach, R. S., S. Anderson, D. Doll, and S. Ringenberg (1988). The value of the physical examination in the diagnosis of anemia. *Archives of Internal Medicine*. April, Vol. 148:831-832.
- Thaver, I. and L. Baig (1994). Anaemia in children: Part I. Can simple observations by primary care provider help in diagnosis? *Journal of Pakistani Medical Association*. Dec., 44 (12): 282-284.
- Wurapa, F.K., M.K. Bulsara, and B.A. Boatman (1986). Evaluation of conjunctival pallor in the diagnosis of anaemia. *Journal of Tropical Medicine and Hygiene*. Feb., 89 (1): 33-36.