



## **Anemia caused by iron deficiency in infants (A Review)**

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### **Abstract**

Iron deficiency and iron-induced anemia are among the most important health problems in the world, especially in Iran, which can impair development, lead to poor coordination of the nervous system, decrease learning power, cause academic failure, and even impair the immune system (1). After birth, under the influence of conditions such as the extra-uterine peroxygenase, the control of erythropoietin secretion and the rate of hemorrhage are reduced and, on the other hand, due to the short duration of life of the blood cells containing embryonic hemoglobin, which forms the majority of neonatal hemoglobin, the rate of infant hemoglobin decreases when it is physiologically between 8 and 12 weeks of age. Searches were conducted by two independent researchers in international (PubMed, Web of science, Scopus and Google scholar) and national (SID, Magiran) databases for related studies from the inception of the databases to September 2017 (without time limitation) in English and Persian languages. To ensure literature saturation, the reference lists of included studies or relevant reviews identified through the search were scanned. The specific search strategies were created by a Health Sciences Librarian with expertise in systematic review search using the MESH terms and free terms according to the PRESS standard. At birth, the hemoglobin level of the umbilical cord blood is about 14-20gr / dl. The infant is diagnosed with anemia if the level of hemoglobin is lower than the normal range for birth weight and postpartum birth weight. The factors affecting hemoglobin levels include age, sex, pregnancy, smoking, and height.

**Keywords:** Anemia, iron deficiency, infants

### **Introduction**

Iron deficiency and iron-induced anemia are among the most important health problems in the world, especially in Iran, which can impair development, lead to poor coordination of the nervous system, decrease learning power, cause academic failure, and even impair the immune system (1). After birth, under the influence of conditions such as the extra-uterine peroxygenase, the control of erythropoietin secretion and the rate of hemorrhage are reduced and, on the other hand,

due to the short duration of life of the blood cells containing embryonic hemoglobin, which forms the majority of neonatal hemoglobin, the rate of infant hemoglobin decreases when it is physiologically between 8 and 12 weeks of age (2). Breast milk does not suffice for providing the iron necessary for curing anemia. There are two main sources of iron to deal with anemia and they include the iron stored in the baby's liver and the amount of hemoglobin at birth. (3)

## Methods:

### Search strategy

Searches were conducted by two independent researchers in international (PubMed, Web of science, Scopus and Google scholar) and national (SID, Magiran) databases for related studies from the inception of the databases to September 2017 (without time limitation) in English and Persian languages. To ensure literature saturation, the reference lists of included studies or relevant reviews identified through the search were scanned. The specific search strategies were created by a Health Sciences Librarian with expertise in systematic review search using the MESH terms and free terms according to the PRESS standard. After the MEDLINE strategy was finalized, it was adapted to search in other databases. Accordingly, PROSPERO was searched for ongoing or recently related completed systematic reviews. The key words used in the search strategy were “Anemia, iron deficiency, infants” and Iran which were combined with Boolean operators including AND, OR, and NOT.

### Study selection

Results of the Literature review were exported to Endnote. Prior to the formal screening process, a calibration exercise was undertaken to pilot and refine the screening. Formal screening process of titles and abstracts were conducted by two researchers according to the eligibility criteria, and consensus method was used for solving controversies among the two researchers. The full text was obtained for all titles that met the inclusion criteria. Additional information was retrieved from the study authors in order to resolve queries regarding the eligibility criteria. The reasons for the exclusion criteria were recorded. Neither of the review authors was blinded to the journal titles, the study authors or institutions.

### Iron deficiency anemia:

Iron deficiency anemia is the most common nutritional disorder found worldwide; in the

United States, 9% of children aged 12 to 36 months suffer from iron deficiency and 30% struggle with progressive anemia of iron deficiency (4). At birth, the hemoglobin level of the umbilical cord blood is about 14-20gr / dl. The infant is diagnosed with anemia if the level of hemoglobin is lower than the normal range for birth weight and postpartum birth weight. The factors affecting hemoglobin levels include age, sex, pregnancy, smoking, and height (5). The factors that change the amount of ferritin are like the followings;

**A)**Cases where the level of ferritin increases, including hemochromatosis, hemosiderosis, iron poisoning, megaloblastic anemia, hemolytic anemia, inflammatory hepatocellular infections, alcoholism, inflammatory disease, advanced cancers, chronic diseases such as leukemia, Cirrhosis, chronic hepatitis or vascular collagen disease, and frequent revascularization of red blood cells. (6)

**B:**Cases where the level of ferritin decreases, including iron deficiency anemia, severe protein deficiency, hemodialysis, severe post-menstrual bleeding, severe iron deficiency and bleeding in the digestive tract (7). If anemia develops in the first days after birth, it is often the result of neonatal hemolytic disease. Neonatal hemorrhages, bleeding from an inappropriately clenched cord, intracranial hemorrhage, hematoma pottery, sub-acute hemorrhage due to rupture of the liver, spleen, adrenocortical glands, or kidneys are other causes of this form of anemia (8). Treatment for neonatal anemia depends on the severity of the symptoms, the level of hemoglobin, and the presence of a debilitating disorder (disrupted bronchopulmonary, congenital heart disease, respiratory distress syndrome) that interfere with oxygenation (9). On the other hand, the potential risks of this therapy, such as hemolytic reactions due to blood transfusion, contact with blood products and other potent toxins, increased volume of charge, increased risk of retinopathy in preterm infants, necrotic enterocolitis, transmission of certain infectious agents such as Hepatitis B and C, cytomegalovirus, parovirus, and HIV, must be fully examined (10). As the gestational age

increases, the level of hemoglobin increases in the embryo and at the time of birth, the umbilical cord carries about 16.8g / dl hemoglobin. Infants born through cesarean section are likely to have lower hematocrit than babies born by vaginal delivery (11). Delaying the clamping of the umbilical cord (about 1 to 3 minutes) does not pose endanger the life of the baby or the mother, and may be useful in preventing anemia from infancy in other health care settings (12); additionally, the effects might outlive the neonatal period for 1 to 6 months, including the increase in hematocrit, the concentration of ferritin and iron stores, and the reduction of the risk of developing anemia in childhood . Delayed closure of the umbilical cord causes the extraction of 20 to 40 cc of excess blood and transfer of 30 to 35 mg of iron during labor (13).

## References

1. Oh W, Blankenship W, Lind J. Further study of neonatal blood volume in relation to placental transfusion. *Ann Paediatr* 1966; 207: 147–59.
2. Usher R, Shephard M, Lind J. The blood volume of the newborn infant and placental transfusion. *Acta Paediatr* 1963; 52(5): 497–512.
3. Linderkamp O, Nelle M, Kraus M, Zilow EP. The effect of early and late cord-clamping on blood viscosity and other hemorheological parameters in full-term neonates. *Acta Paediatr* 1992; 81(10): 745–50.
4. Eichenbaum G. Delayed clamping of the umbilical cord: A review with Implications for practice. *J Midwifery Womens Health* 2009; 5(4): 321-326.
5. Stark M, Chavkin Y, Kupfersztain C, Guedj P, Finkel AR. Evaluation of combinations of procedures in cesarean section. *Int J Gynaecol Obstet* 1995; 48(3): 273–6.
6. Behzadmehr R, Behzadmehr R, Moghadam MN. Depression-A Review. *Int. J. Curr. Res. Chem. Pharm. Sci.* 2018;5(2):19-21.
7. Moghadam MN, Davoodi M, Behzadmehr R. The first trimester screening-A Review. *Int. J. Curr. Res. Med. Sci.* 2018;4(2):134-7.
8. Moghadam MN, Davoodi M, Behzadmehr R. Prenatal diagnosis (A Review). *Journal of Medical Practice and Review.* 2018;2(3).
9. Moghadam MN, Davoodi M, Behzadmehr R. Unjustified abnormalities of analytes in the second trimester.
10. Goddard AF, James MW, McIntyre AS, Scott BB. Guidelines for the management of iron deficiency anaemia. *British Society of Gastroenterology* 2011.
11. Schouwenburg V. Hemolytic anemia in a miniature dashshund caused by eating large amounts of onion. *J S Afr Vet Assoc* 1982; 53(3): 212.
12. Maheshwari A, Waldemar A. Carlo. 19<sup>th</sup> Edition Textbook of pediatrics. 2011. P 97.
13. Meyer WW, Rumpelt HJ, Yao AC, Lind J. Structure and closure mechanism of the human umbilical artery. *Eur J Pediatr* 1978; 128(4): 247–59.

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