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COMPARISON OF SERUM IRON STATUS IN BOTTLE FED AND BREAST FED INFANTS AND ITS EVALUATION BY TRANSFERRIN SATURATION AND TOTAL IRON BINDING CAPACITY

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Abstract:
Objective: *To evaluate the iron status of infants who are breast fed or fed by bottle using transferring saturation and TIBC and comparison of iron status.*
Study Design: *This is a randomized cross-sectional study.*
Place and Duration: *In the Pediatrics department of People's Medical College Hospital, Nawabshah for one year duration from October 2016 to October 2017.*
Subjects and methods: *Ninety infants of six to eight-month-old divided into three groups and were registered at the pediatric department of People's Medical College Hospital, Nawabshah and were declared healthy. In addition, group I breastfeeding (human milk), group IIA milk formula was fed and group IIB animal milk was fed. Healthy infants who were reported to be healthy by the preventive pediatric care department were included in the study. Iron supplements were not included, although there were sick babies. The Performa was based on information and laboratory investigations. Standard laboratory procedures for iron, TIBC and transfer saturation were calculated.*
Results: *Serum TIBC was in the range of 281-303 µg / dl in lactating group I. 293.67 ± 4.73 was the mean value. In Group IIA (milk formula fed), TIBC ranged from 289.3 ± 6.06 to 280-300 µg / dl. The serum TIBC value in the IIB group (fed with animal milk) was 339-400 µg / dl with an average of 336.60 ± 10.3. The transferrin saturation in the group I was 32.1 ± 1.26 with a mean of 29-35%, in Group IIA with a mean of 35.98 ± 1.66, the mean of Group IIB of 8,52-11,84 was a mean of 32,6-39,2%, averaging 9.87 ± 0.73 .*
Conclusion: *The infants' serum TIBC fed with breast milk and infants fed with formula milk were similar in the same range. The same pattern was observed in Transferrin saturation in these two groups and within normal range. In children fed by animal milk, TIBC was in a lower range with the saturation transfer. Therefore, it must be noted that the status of iron in breast-fed infants is the same as that of formula-fed infants. Iron levels are low in Babies fed with animal milk. Breastfeeding should be encouraged to prevent iron deficiency in infants.*
Key words: *The capacity of the unit of total inhibition of serum, status of iron, Formula Milk.*

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INTRODUCTION:

There is strong evidence that in infants iron deficiency may cause persistent neurocognitive disorders before the stage of anemia. The exact association between iron deficiency anemia and its effects on development is not still clear, but only when for a long time there is severe iron deficiency. Maternal iron reserves are enough for up to four months. Therefore, the supplementation of iron and provision in infants is emphasized. Weaned babies receive iron-supplemented diets. WHO emphasized that iron should be added in all formula milk. Due to poor socioeconomic conditions, the most common presence in third world countries is considered as serum iron deficiency. It is because of lack of public awareness and weak / non-enriched diets. In addition, dietary factors and various physiological, healthy and robust duodenal epithelial tissue and so on. Like vitamin C plays an important role in the absorption of iron. The iron content in human milk is not that high, but its bioavailability is in great amount than other origin. Therefore, it meets the need for iron in periods of high iron ore demand (ie from 6 months to 2 years). 4 to 6 months old baby consumes his life. Formula milk (fortified) also contains enough iron, but as human milk has good absorption animal milk don't have. Animal milk has very little iron content (0.16 ng / L) and the very weak bioavailability. The iron daily recommended dose for 6-12 months (RDA) is 12 mg / day and this demand is mainly met with breast milk or formula milk (fortified) because it is the main iron source. The tolerance and absorption of human milk is much good than that of formula milk and animal milk. Cow's milk is a source of very low vitamin C and iron. At the same time, it is a type specific for human milk, whereas intestinal irritation and diarrhea, which can cause iron-containing baby food, minerals and vital nutrients (Ca, PO4, etc.) and iron containing and is better for infants in terms of tolerance and absorption. The risk of developing iron deficiency anemia is greater in the milk of all cow milk-fed babies and in the milk of the animals during childhood. In apparently healthy infants, determination of iron status by fed milk and breast milk. Research studies are not considered a problem in the underdeveloped countries (iron deficiency anemia). Therefore, in order to evaluate the iron status in infants, clocks are required to study according to other parameters than simple estimation of hemoglobin. The aim of this study is to determine the state of saturation transfer iron by using TDBK in infants and to determine the status of iron in the serum iron is due to the inability to transfer the hypothalamus with saturation transfer and TIBC are important serum iron status indicators to compare.

MATERIALS AND METHODS:

Ninety infants were selected for this study. Into three groups patients were divided. Group I (breastfeeding) 30 infants are breastfed and weaned. Group II (bottle-fed infants) consists of 61 children. It was sub divided into two groups. (Milk formula-fed infants) in subgroup IIA and (Animal milk-fed) in subgroup IIB. Healthy babies reported by the respective preventive pediatric departments were selected. Patients with chronic or acute disease, after 7 months, and those who took iron supplements (hematonics) were not selected for the study. The parents has given consent to collect samples, under aseptic measures venous samples were taken in BD syringes. From the blood samples, Serum iron was separated and spectrophotometry was performed using Randox kits and serum iron and TIBC. The results are given using statistical terms such as (SD) standard deviations and mean.

Iron Deficiency Stages

Stage	Prelatent	Latent	IDA
Parameter	Reduced iron stores with normal serum iron levels	Exhausted iron stores with normal haemoglobin	Low haemoglobin
Haemoglobin	Normal	Normal	Decreased
MCV/MCH	Normal	Normal	Decreased
Serum iron	Normal	Decreased	Decreased
TIBC	Normal	Increased	Increased
Transferrin saturation	Normal	Decreased	Decreased
Serum ferritin	Decreased	Decreased	Decreased
Marrow iron	Decreased	Absent	Absent

Abbreviations: IDA, iron deficiency anaemia; MCH, mean corpuscular haemoglobin; MCV, mean corpuscular volume; TIBC, total iron binding capacity.

Slide courtesy of Dr. Adlette C. Inati, MD.

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RESULTS:

Group I (breastfeeding), serum iron, binding capacities and transferrin saturation were between 94.43 g / 87 and 102 mg / dl in a series of dl 3.1, TIBC 293.63 ± 3.5, and range 280-102 µg / dl, transfer of saturation to 32.16% (the range was 29.19-35.17%. IIA group (fed milk formula), serum iron 104.0 ± 4.0 (range 99-111 mg / dL) 289.3 ± TIBC was 3.7 (range 282-301 mg / dl) and saturation was transferred to 36.08% (range 33.06% -38.92). In the IIB group (fed with animal milk), the serum iron was 37.98 ± 2.4 in the range of 35-46 µg / dl. The TIBC serum was 99-100 mg / dl in a sequence of 386.6 and the saturation transfer was 9-11% in a series of 8.5-11.84% (Table 1).

Table 1: Mean±standard deviations of all parameters of total groups

Parameter	Group I	Group IIA	Group IIB
Serum iron	94.43±3.68 (87-102 µg/dl)	94.43±3.0 (98-110µg/dl)	38.13±2.37(34.45µg/dl)
Serum TIBC	293.63±4.73 (280-302 µg)	293.63±3.6 (280-302µg)	396.60±3.6 (280-300µg)
Trasferrin saturation	32.16 (29.1-35.17%)	35.98 (32.6-39.6%)	9.87 (8.5-11.94%)

DISCUSSION:

This study showed that serum iron levels indicated by TIBC and saturation transfer were higher in breast-fed infants (Group I) compared to group IIB (fed infants) Breymann et al. In infants fed with formula milk, serum iron was equal to or higher than the breastfed babies tested by Emziren, Bhutta and Salami. Low iron intake in the food in Weaning is associated with a diet supplemented with a food / iron supplement to iron deficiency only after breastfeeding to reduce iron deficiency. TIBC has been shown to be a good indicator of serum iron status because it differentiates other causes of iron deficiency, such as chronic infections. Iron deficiency is higher, but normal in chronic disorders.

Table 4 - Matrix of correlations between iron assessment parameters , in children < 5 years old at public daycare centers in Recife, PE, Brazil, 1999

Parameters	Hb	FerS	FEP	FeS	TIBC	%TS
Hb	-	-0.07	-0.49*	0.17	-0.05	0.16
SF	-0.07	-	-0.35*	0.37*	-0.53*	0.44*
FEP	-0.49	-0.35*	-	-0.40*	0.51*	-0.54*
SI	0.17	0.37*	-0.40*	-	-0.49*	0.90*
TIBC	-0.05	-0.53*	0.51*	-0.49*	-	-0.65*
%TSat	0.16	0.44*	-0.54*	0.90*	-0.65*	-

* p < 0.05, Pearson's correlation test (r).
FEP = free erythrocyte protoporphyrin; Hb = hemoglobin; SF = serum ferritin; SI = serum iron; TIBC = total iron binding capacity; %TSat = transferrin saturation percentage.

Animal milk is more common than in other countries, where babies are not used to as food / diet for infants in body conditions, parts of India and Pakistan, animal milk with iron deficiency for babies such as Ghana. In addition, the rules and policies enrichment formula is implemented by health ministries in many parts of the world. As a result of these measures, iron deficiency anemia is decreasing in these countries. In these infants, as shown in infants with iron deficiency anemia, iron parameters improved in breastfed babies (breast milk). This is mainly due to the general consciousness of the media and especially the health departments related to the importance of breast milk. Screening programs for the assessment of iron status in developing regions in terms of the prevalence of iron deficiency anemia have not been widely developed. Indicators for iron deficiency anemia include red blood cell indexes, hemoglobin, red blood cell redistribution, blood smear examination, TIBC, ferritin, serum iron, transferrin saturation. This may mean the iron phase in the body, but the acute phase reagent between serum ferritin; The serum ferritin value may increase to other factors not associated with malnutrition and iron inflammation21. TIBC and serum transferrin saturation are unaffected (even not apparent) by the acute phase and inflammatory conditions of the trunk, so serum iron is run to assess the status of these simple and simple indicators. iron

CONCLUSION:

TIBC and serum saturation transfer are significantly better parameters to determine iron status. Given the prevalence of iron deficiency in infants women in the age of fertility and nutritional deficiencies of general socio-economic conditions due to the general socio-economic conditions of our country, this part of the population is needed hours of research.

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