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FREQUENCY OF RISK FACTORS AND CLINICAL FEATURES OF IRON DEFICIENCY ANEMIA IN CHILDREN

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Abstract:

Objective: *To determine the frequency of risk factors and clinical features of iron deficiency anemia in children.*

Material & Methods: *This descriptive study was held in pediatric department of LUMHS duration of six month from May 2015 to October 2015. Total 100 anemic children were included in the study. All children having anemia due to malignant disease and history of any genetic disorder were excluded from the study. All the information was recorded on self-made proforma. Information was gathered regarding iron deficiency anemia, its risk factors and clinical features.*

Results: *Anemia was found mostly in male children i.e. 70% as compare to females i.e. 30%. Majority of cases i.e. 85% belong to low socioeconomic status, history of excessive milk intake was in 30%, 50% had prolong bottle feeding, history of premature birth was in 17% children, 10% children were overweight and 5% had unknown risk factors. Regarding clinical features, majority of the children i.e. 80% had paleness of conjunctiva, 70% were fatigue, 15% had poor concentration and 10% had hepatomegaly.*

Conclusion: *We concluded that majority of children with iron deficiency anemia had poor socioeconomic status, and this was the commonest and basic risk factor of anemia in children, and most common clinical features were paleness of conjunctiva and fatigue.*

Key Words: *Iron deficiency anemia, risk factors, clinical features*

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INTRODUCTION:

Anemia in children is a worldwide public health challenge in both developed & underdeveloped nations with vital effects on an individual health. During 2002, (WHO) World Health Organization projected that anemia, caused by (ID) iron deficiency, was a most significant influencing factors of disease burden globally [1]. It is expected that worldwide 47% preschool children acquire anemia, a greatest incidence of any populace group [2]. A major risk factor of iron deficiency in children at early age is low iron consumption at the stage of rich iron prerequisite. Children >1 year, do not receive standard supplemental iron formulations suggested for infants aged between 6 & 12-month who are entirely breast-fed dependent[3]. Additionally low dietetic iron intake, socioeconomic factors for example low income & parental educational qualification, sex, child age, and size of the family impose a major consequence over anemia [4]. In Israel, the incidence of anemia among infants was nearly 40% prior to 1985. It dropped after the Public Wellbeing Service instructions advocating supplementation of iron for the infants aged 4 months to 12 month, in addition to (Hb) hemoglobin routine testing at 12 months as well as prevention of milk derived from cow within infants' diet. This happened with respect to the quick economic growth of nation & escalated accessibility of iron-fortified formulations [5]. However, the IDA problem is yet present among some groups. A cross-sectional survey in 34,512 infants aged between 9 & 18 months exhibited 15.5% incidence of anemia. The incidence of anemia among ultraorthodox Jews was further close to the non-Jewish populace (18.9%)[6]. ID anemia befalls if iron storage of body fall very low to assist standard production of (RBC) red blood cell. Insufficient nutritional iron, bleeding, reduced iron ingestion, or loss iron from body by urine can possibly be the factor [7]. The standard overall body iron of newborn healthy infants is (80 ppm) 250 mg, acquired from maternal resources. This declines to nearly 60 ppm during initial 6 months of life, whereas the infant uses a milk diet deficit in iron. Babies feeding on cow milk have a higher prevalence of iron deficit as bovine milk in rich in calcium that competes for absorption against iron. Thus, growing babies need to acquire nearly 0.5 mg further iron per day than is lost for maintaining a 60 ppm body concentration. In the course of adult life, gain & body loss equilibrium is retained. Infants further readily acquire IDA. In some of the geographic regions, hookworm contributes to be challenging. Children more readily stroll in soil with bare foot and acquire substantial infestations. Iron deficiency anemia in infants is yet poorly diagnosed because newborn blood sampling and getting adequate blood volume for iron deficiency anemia detection in laboratory are problematic. Majority of infants escape blood tests till no satisfactory clinical measures are found. Additionally, the IDA symptoms (pica, irritability, lethargy, fatigue, poor feeding, and pallor) are not specific. Even though iron deficiency anemia is generally adjusted up till 2 to 3 years of age, children are badly influenced by iron deficiency anemia. IDA is correlated with reduced neurocognitive event and exercise intolerance[8-10], and this correlation is observed even following its effective therapy. Thus, preventing the iron deficiency progression is specifically vital in the course of early childhood and infancy when the development rate & rapid growth, particularly of the brain, enhances the susceptibility to IDA-provoked deficiency. To our knowledge no local study was found on risk factors and clinical features of iron deficiency anemia, so we conducted this study to find out the risk factors and clinical features of iron deficiency anemia in children.

MATERIAL & METHODS:

This observational study was held at the pediatric OPD of LUMHS over a period of six month from May 2015 to October 2015. Total 100 anemic children without any particular chronic disorder were included in the study. All children having anemia due to malignant disease, any other genetic disorder and any severe known particular disease were excluded from the study. Complete medical history, careful clinical examination and routine laboratory investigations were carries out. The WHO criteria were used to classify and define Anemia [12], and anemia severity was defined as per Hb levels of patient (Hb＜7.0 g/dL indicated severe anemia; Hb 7.0–9.9 g/dL indicated moderate anemia; and Hb 8.0–10.9 g/dL indicated mild anemia). IDA was demarcated as anemia having abnormal values for 2 out of 3 iron status considerations. The iron status parameters' cut-off values were as: ≥15% RDW elevation, ＜12 ng/mL ferritin level, and/or ＜16% transferrin saturation. All the information was recorded on self-made proforma. Information was gathered regarding clinical features and risk factors of the iron deficiency anemia in children attending paeds OPD of tertiary care hospital. The data was analyzed by SPSS 16.

RESULTS:

Total 100 anemic children were included in this study. Anemia was seen mostly in males i.e. 70(70%) children as compare to females i.e. 30(30%). **FIG:1**

Regarding clinical features, majority i.e. 80(80%) had paleness of conjunctiva, 70(70%) were fatigue, 15(15%) had poor concentration and 10(10%) had hepatomegaly. **Table 1**

Regarding risk factors, majority of cases i.e. 85% children belong to low socioeconomic class status, 30% had excessive milk intake, 50% children had history of prolong bottle feeding, 17% children had history of premature birth, 10% children were overweight and 5% had other reasons. **Table 2**

Majority of children in this study i.e. 85% were from low socioeconomic class while 12% were from middle class and 03% were from upper class. **FIG:2**

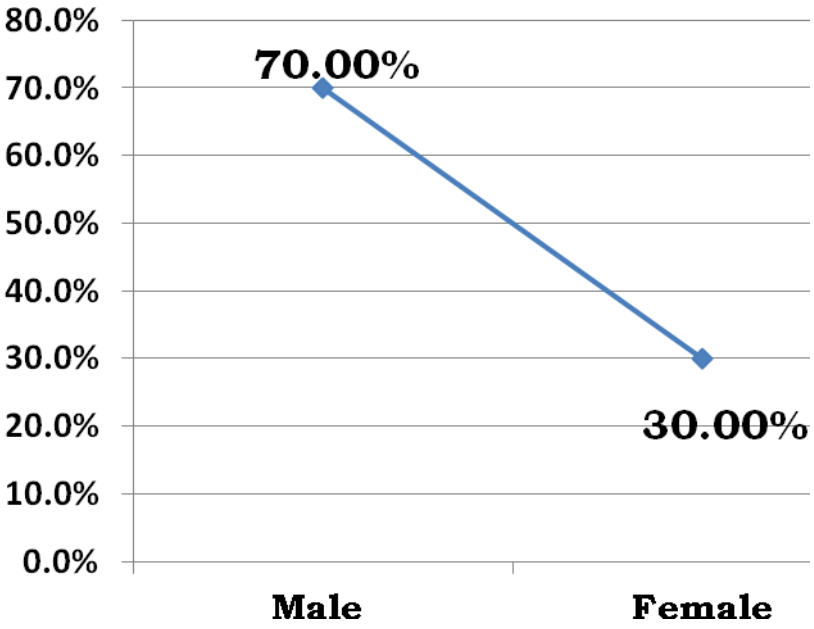

Fig:1. Gender distribution n=100

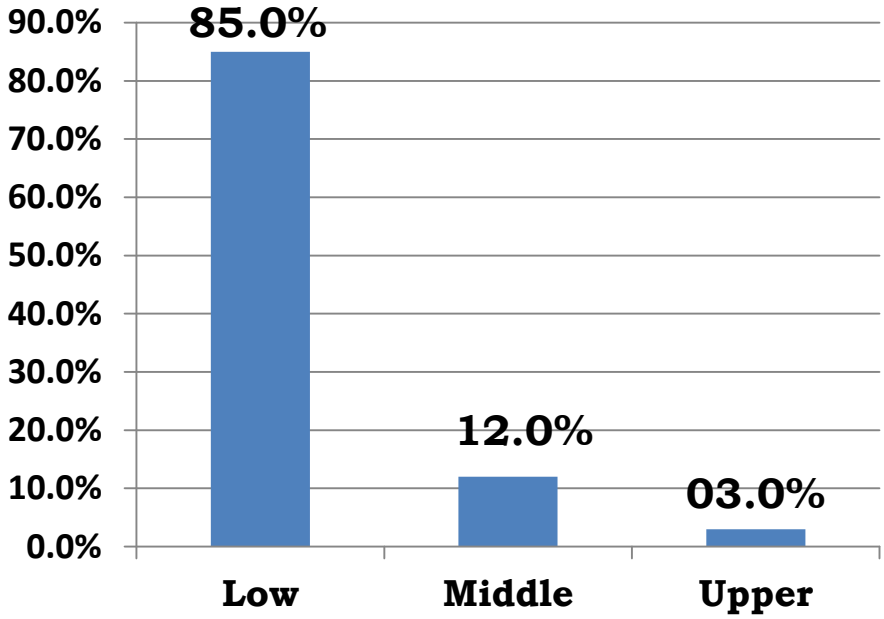

Fig:2. Socioeconomic distribution n=100

TABLE:1. Clinical presentation n=100

Clinical features	Number/ (%)
Paleness of conjunctiva	80(80%)
Fatigue	70(70%)
Hepatomegaly	10(10%)
Poor concentration	15(15%)

TABLE 2.RISK FACTORS OF IRON DEFICIENCY ANEMIA

n=100

Risk factors	Number (%)
Prematurity	17(17.0%)
Low socioeconomic class	60(60.0%)
Low birth weight	17(17.0%)
Excessive milk intke	30(30.0%)
Prolong bottle feed	30(30.0%)
Over weight	10(10.0%)
others	05(5.0%)

DISCUSSION:

In this study, anemia was seen mostly in males i.e. 70(70%) children as compare to females i.e. 30(30%). In comparison to this, Domellöf M et al [13] also found that iron deficiency anemia in babies was further predominant in males as compare to females (M:F=2.14:1), and further stated that at the age of 9 months, male babies have significantly lesser Hb level as well as showed a 10-times greater risk of being detected with iron deficiency anemia as compare to female babies. They moreover proposed that the factors for raised risk of IDA among male babies were a greater post- & pre- natal growth rate, a raised fetal erythropoietic activity leading to low iron accumulation state [14], loss of intestinal iron, lesser iron absorption, higher & further recurrent infections among males as compare to females. Wieringa FT et al also found in their study that these gender-centered variances vanish if iron-fortified diets are controlled, and quantity of oral iron requirement is maintained from 6 to 10 mg/day [15]. Regarding risk factors, in our study majority of cases i.e. 85% children had low socioeconomic class, 30% had excessive milk intake, 30% had prolong bottle feeding, 17% had prematurity, 10% were overweight and 5% had other reasons. The overall body iron deficiency among preterm babies rises with declining gestational age. It worsens by quick postnatal development that several babies undergo as well as through recurrent phlebotomies with inadequate blood substitution. Though, following the age of 6 months, acquiring sufficient iron via breastfeeding unaccompanied turns out to be challenging. In breast milk the mean iron concentration is about 0.4 mg/L, and even though 50% iron within breast milk absorbs because of its

greater bioavailability, just 0.2 mg per day of overall iron absorption can take place through complete breastfeeding although the baby uses breast milk 1 L per day, which is yet significantly below the prerequisite iron volume[16]. Study was done in Korea whose results showed that the LBW prevalence has risen from 2.7% to 5.6% during 1993 to 2010. Moreover, among LBW infants, observance to iron supplementation is low[17]. Greer FR et al conducted study in which they found that LBW babies are usually believed a risk group for iron deficiency anemia because of low stores of iron at birth. Therefore, supplementation of iron is suggested for them; though, their observance to the supplementation of iron is low. Preterm babies, being a large percentage of LBW babies, present a lower store of iron because of briefer 3rd gestational trimesters when majority of iron is stored. These babies have greater iron prerequisites to catch-up growth, as well as preterm babies should therefore receive elemental iron supplementations (2 mg/kg per day) during the age of 1 to 12 months [18]. Though the reason of iron deficiency anemia in children at early age can depend on a number of factors, the diet consumption poor in bioavailable iron is expected the major causative factor. Prior to the age of 24 months, fast growth consistent with recurrently insufficient consumption of dietetic iron leads the children of any age group to be at a greatest risk for ID. In full-term babies, the iron accumulation can

fulfill the iron prerequisites up till the age of 4-6 months, as well as IDA usually never takes place until around the age of 9 months. Relatively, low-birth-weight & preterm babies are born with lower stores of iron as well as grow quicker in the course of infancy. Thus, their iron stores frequently deplete by the age of 2-3 months and babies are at higher risk of iron deficiency. Following the age of 24 months, children's growth rate decelerates and the diet turns out to be further diversified, the ID risk declines. Following the age of 36 months, iron status & dietetic iron are generally satisfactory; though, ID risks comprise inadequate access to food, a low-iron or further specified diet, and medical conditions which influence iron status (such as, parasitic or malarial infections). In our study regarding clinical features, majority i.e. 80% had paleness of conjunctiva, 70% had fatigue, 15% had poor concentration and 10% had hepatomegaly. Kalantri A et al also found in their results that the physical signs of anemia comprise an unhealthy pale appearance of conjunctivae, the nailbeds, palms and tongue.[19] During severe anemia, children can as well present signs of congestive cardiac dysfunction with edema, hepatomegaly, tachypnea, and fatigue. Majority of children in our study i.e. 85% were from low socioeconomic class while 12% were from middle class and 03% were from upper class. In comparison to our results, Wei QW et al[21] stated in their study that dietary iron deficiency escalates if physiological prerequisites remain unfulfilled by dietetic iron absorption. Poverty is associated with iron deficiency anemia.

.Zlotkin SH et al[22] conducted study in which they observed that IDA is further prevalent in South Asian nations including Pakistan, Bangladesh and India than elsewhere globally. In the course of early childhood & infancy, IDA is correlated with reduced psycho-motor growth & cognitive functions that can possibly be irretrievable. Consequently, there is an escalating consciousness that iron deficiency anemia is one of the several factors inhibiting socio-economic growth of under developed countries. The raised risk among younger children has been accredited to a comparatively large iron prerequisite, unfulfilled by adequate dietetic iron consumption. At this age, the variety of complementary diets can distinctly affect the anemia & ID risk. In children of school-age, iron status usually enhances as growth decelerates and foods further diversify.

Zimmermann MB, et al and others observed in their study that dietetic iron bioavailability is poor in populaces eating plant-based foods with minimal meat. Iron in meat, 30%-70% is heme-iron, out of that 15%-35% is absorbed, but in plant-centered foods, most dietetic iron is not heme-iron, as well as it is often absorbed <10%. The nonheme iron absorption is raised by ascorbic acid & meat, however impeded by calcium, polyphenols, and phytates [23,24]. Daniel CR et al found in their results that the inclination towards decreasing the consumption of red meat in the US and further Western nations, with a rise in poultry consumption is because of anxieties regarding red meat's adverse effects on health[25], can possibly indicate a high risk for ID among children in case this drift continues

CONCLUSION:

We concluded that majority of children with iron deficiency anemia had poor socioeconomic status and it was the commonest risk factor for iron deficiency anemia, because due to poor socioeconomic status nutritional status was very poor and parent cannot treat properly their children when they suffered from general disease and there was a history of self-medication on early stage of disease especially in rural areas. They go to good health facilities or consultant peadiatricians when their children become severely suffered. unfortunately they was also history of poor antenatal care of the mothers during pregnancy and babies delivered at poor and risky local health facilities without ultrasound and laboratory investigations due to poor socioeconomic status and low awareness and education. Most common clinical features were paleness conjunctiva and fatigue.

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