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ORIGINAL ARTICLE

Prevalence of Iron Deficiency Anemia in School Going Children at District Bannu Khyber Pakhtunkhwa, Pakistan

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ABSTRACT

Purpose: The purpose of the current research was to determine how common iron deficiency anaemia was among school-age children.

Methodology: A total 200 blood sample in EDTA tube from school going children (6-12 year old) was collected at district Bannu KPK and then transported to Pathology Lab for Complete blood count using hematology analyzer and also transported for microscopy to evaluate the morphology of Red blood cells.

Result: Total 200 blood samples were subject to Pathology Lab. Male was 110 (55%) and female were 90(45%). Total IDA positive cases were 120/200 (60%). IDA can be divided into three types of anemia due to Hemoglobin. The following types can occur First Mild Anemia: 10-10.9gm/dl (41.66%), second Moderate Anemia: 7-9.9gm/dl (37.5%), third extreme Anemia :< 7gm/dl (20.83%).

Practical Implications: In district Bannu, a large number of children at school age had anemia despite the fact that its symptoms were challenging to identify and diagnose, but pale skin was the most prevalent sign of anemia.

Conclusion: From this study we concluded that in district Bannu school going children have 60% anemia. The pale color of the children decreases physiological growth, and physical and mental activity. The female had 42.5% anemia as compare to male i.e. 17.5%. Between age of 10 and 12 the anemia cases was found.

Keywords: IDA, MCV, MCH, MCHC, Serum ferritin prevalence, Bannu, Khyber Pakhtunkhwa.
Keywords: anaemia, iron, children, Hemoglobin, human health

INTRODUCTION

The most common hematologic disorder in children is iron deficiency. When growth is accelerated, the bone marrow's iron reserves are reduced, infants between the ages of 9 and 24 months may experience dietary deficiency of iron. Recently, the iron prevalence deficiency was reviewed[(1)]. Anemia affects around half of school-age children in poor countries. However, school-age children are also frequently affected by iron deficiency anaemia. Anemia affects 24.8% of people worldwide[(2)]. Additionally, it is thought that iron deficiency accounts for 50% of the 600 million anaemia cases in preschoolers and school-age children worldwide, with the highest rates occurring in South Asia (50%), Africa (49%)—which includes Indonesia (37-73%), Bangladesh (74–80%), India (34–69%) and North America (12%)[(3)]. According to Kazakhstan's Demographic and Health Surveys, 69% of children older than three were underweight. The school years are a good time to take action, but any action taken must be supported by a solid epidemiologic understanding of the issue affecting this age group. More people than any other form of malnutrition are affected by iron deficiency, so controlling it is a top priority for public health worldwide[(4)]. Childhood anaemia is a condition where a child's haemoglobin (Hb) level is insufficient to provide enough oxygen to the body's tissues. The initial Hb level for children between the ages of 6 and 59 months is 11.0 g/L deciliter (g/dL). Iron deficiency anaemia is caused by a number of reasons, including inadequate iron consumption, increased physiologic demands during early infancy and pregnancy, and iron losses from parasite infections[(5)]. Due to poor dietary intake, high iron needs associated with menstrual blood loss and rapid growth, adolescent girls are also vulnerable to dietary iron deficiency. Different populations and age groups place different weights on these causes, making different prevention methods for iron deficiency anaemia necessary. IDA affects both young children and women who are fertile most often and severely. These populations have therefore been the subject of the majority of epidemiologic studies into the issue and its causes[(6)].For a number of reasons, the school years are a good time to address this issue. Children's physical and mental development is hampered, which reduces their capacity for work and harms the nation's progress. Children's cognitive abilities are hampered by iron deficiency, so interventions to prevent and treat it may improve kids' academic potential[(7)]. Children with better iron status will be more physically fit and have greater work capacity. The anaemia prevention in girls throughout their reproductive years may be aided by their greater iron status during the school years. Finally, the school environ-ment provides a perfect distribution system for a variety of public health interventions, such as iron supplementation, parasite treatment, and education about health[(8)]. The majority of studies examining the relationship between iron deficiency and cognitive function have concentrated on people with iron deficiency anaemia. There is not enough data to say that iron deficiency without anaemia contributes to developmental issues. The cognitive consequences of iron deficiency, however, may manifest before hematologic signs of anaemia because iron in the central nervous system diminishes before red blood cell synthesis is reduced[(9)]. Additionally, iron deficiency without anaemia is much more common than iron deficiency with anaemia, which raises the possibility of a greater impact on public health. Clarification is needed regarding how iron deficiency affects older children's cognitive functioning, especially adolescent girls who are most at risk for iron deficiency[(10)]. For the creating purpose and directing efficient treatments to prevent iron deficiency anaemia in school-aged children, a thorough epidemiologic understanding of the problem is necessary. An evaluation of the prevalence of iron deficiency anaemia in a sample of district Bannu kids aged six to twelve was the objective of this study[(11)].

The aim of the study is to find the Prevalence of iron deficiency Anemia in preschool children (6 to 12) years of age.

Children frequently struggle with an iron shortage. It can take several forms, ranging from a minor shortage to iron deficiency anaemia, which is a disorder in which the blood lacks enough healthy red blood cells. A child's growth and development might be impacted by untreated iron deficiency. The consequences of iron deficiency on the immune system are a significant yet contentious clinical impact.

METHODOLOGY

Study Processing: First Ethics Committee Approval was obtained then cross sectional Descriptive examination was done on people going to the Samad clinical research facility, District Bannu, Khyber Pakhtunkhwa, Pakistan for the reason to gauge the predominance of Iron insufficiency paleness in the period of Six month from Feb 2020 to July 2020. A total of 200 instances of frailty were examined. Our cases comprise of in-Patient of the age bunch 6 to multiyear [Preschool children] in Samad clinical Laboratory and Research Center.

Sources of Data: Between the ages of 6 and 12, a minimum of 125 pupils from both public and private schools were selected. Students from each school were chosen from the first through seventh grades. Twenty or so students were randomly selected from each class using the class roll numbers. The schools were casually visited, and the head teachers instructed the children on how to obtain their parents' consent. Only children whose parents granted their consent were included in the study.

Inclusion and Exclusion Criteria: Children were chosen based on WHO standards for children aged 6 to 12 years if their haemoglobin level was less than 11 gm%.

- 10 - 10.9 g/dl-Mild Anemia
- 7 - 9.9 g/dl-Moderate Anemia
- < 7 g/dl-Severe Anemia

Children older than 6 and younger than 12 were not included in this research.

Sample collection: Sample collection is carried out from person attending the Samad clinical Laboratory district Bannu, name, age, sex, home address and medical record include pallor, weakness, atrophic glossitis, and angular stomatitis and mainly anemia were recorded. A sum of 200 blood tests was gathered.

Laboratory work: The blood tests were quickly delivered to the Samad clinical laboratory in Bannu. A haematology analyzer may be used to measure the following: platelet, mean corpuscular volume, mean corpuscular haemoglobin, mean corpuscular haemoglobin concentration, hematocrite, and haemoglobin (HB, MCH, and HCT). The MCV can be low in microcyt-ic hypochromic anemia.

Statistical Analysis: All the information obtained were entered in Microsoft excel 2007, percentages were drawn manually. Figures and tables were drawn using Ms excel and Word.

RESULTS

Gender wise IDA distribution: An aggregate of 200 young youngsters (6 - 12 years) with both genders (young men and young ladies) were met and clinically inspected for the nearness of iron deficiency at region Bannu. After clinical assessment blood tests were gathered for additional investigation. In district Bannu 200 blood sample were collected and processed for IDA males were 110 (55%) and females were 90 (45%). In which females were 85/120 (70.8%) and males were 35/120 (29.1%) have low Hb value than normal and were anemic. Anemia was more common in girls than in boys (table 1).

Table 1: Gender wise distribution of IDA

S. No	Gender	Positive cases
1	Male	110
2	Female	90
3	Total case	200

Hemoglobin wise distribution of IDA: IDA was divided into three types of anemia due to Hemoglobin. The people whose hemoglobin was 10-10.9 gm/dl were considered First Mild Anemia while 7-9.9gm/dl were considered Second Moderate Anemia and <7gm/dl were Third extreme Anemia. The children with First Mild Anemic had significant anaemia prevalence (41%) rate. 37% anemic children belong to Second Moderate Anemia and 20% belong to Third extreme Anemia. Because of their unbalanced daily nutritional intake, children from lower-class families had a higher prevalence of anaemia (figure 1).

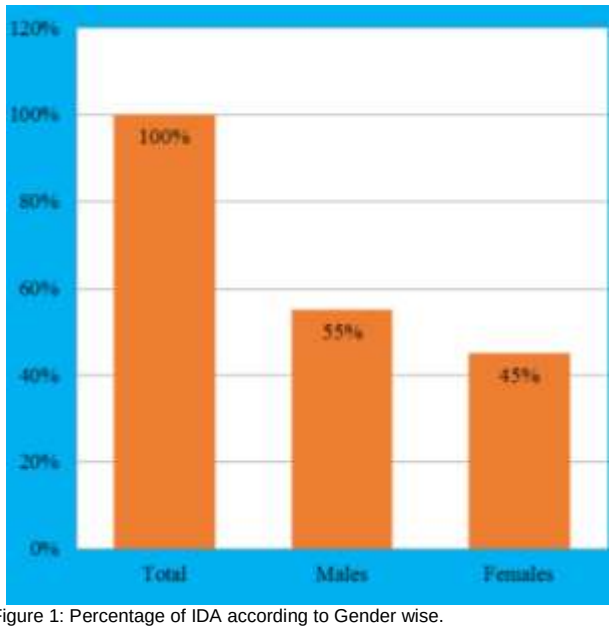

Figure 1: Percentage of IDA according to Gender wise.

Table 2: Hemoglobin wise distribution of IDA patient

S. No	Degree of anemia	Males	Females	Total
1	Mild (10-10.9gm/dl)	33	17	50
2	Moderate (7-9.9gm/dl)	35	10	45
3	Severe (<7gm/dl)	17	8	25
4	Total	85	35	120

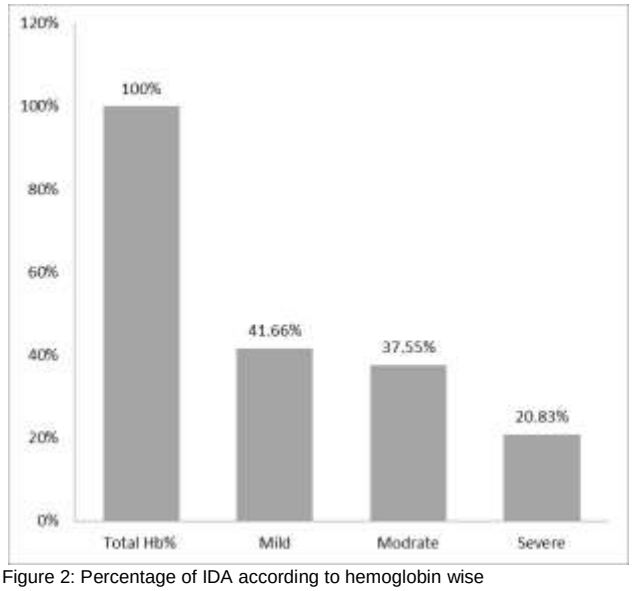

Figure 2: Percentage of IDA according to hemoglobin wise

Age wise distribution of IDA: The kids were split into three groups based on how old they were according to IDA distribution. Compared to other age groups, children under the age of six had a higher

Proportion of anaemia (41%). The incidence of anemia were 41%, 33.3% and 25% from age (**<6**), (6 - 12) and (>12) years respectively (table 3).

Table 3: Age wise distribution of IDA.

S. No	Age of children	IDA patient
1	<06 years	50/120
2	06-12 years	40/120
3	>12years	30/120

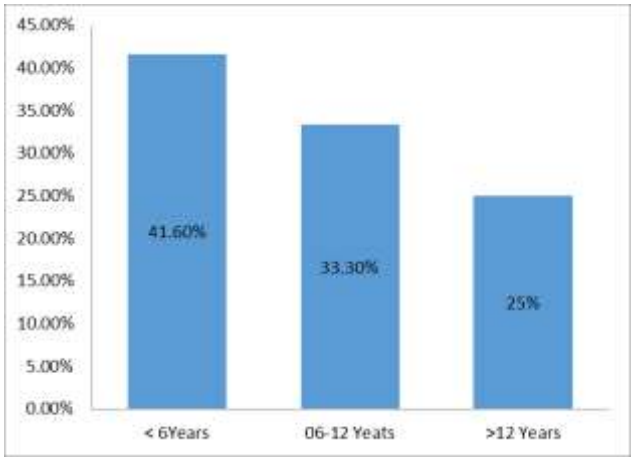

Figure 3: Percentage of age wise distribution of IDA.

Area wise IDA distributions: Rural and urban areas made up the two main groups that made up the whole Bannu district. 120 kids from each cluster took part in the research. Anemic and non-anemic children from the research sample were separated into two groups. 52.5% of students in rural areas who attended school were anaemic. Anemia affected 47.5% of school-age children in metropolitan areas. Rural and urban areas have higher prevalence rates, respectively. The total anemic children were 63/120 and non-anemic were 57 in rural area and 57/120 were anemic and 63 were non-anemic in urban area.

Table 4: Area wise distribution of IDA patient

Area of Bannu	Positive cases
IDA in Rural area	63
IDA in Urban area	57
Total	120

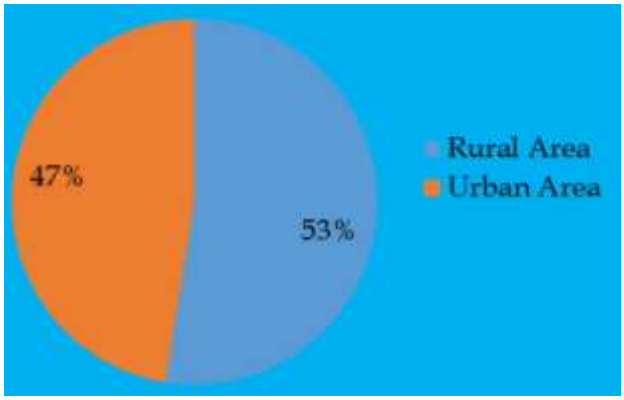

Figure 4: Percentage of area wise IDA distribution in district Bannu

DISCUSSION

Early-life iron deficiency fragility also has a significant impact on outcomes, preventing both physical and mental development as well as lowering physical well-being, productivity, and employee performance[12]. The WHO requirements for Hb esteem in accordance with age are used to define iron deficiency anaemia: Hb 11.5 g/dL in 6e–11 years old children, Hb 12 g/dL in 12e–15 years old children, or 15e–18 years old children with no pregnant females, and Hb 13 g/dL in 15e–18 years old men[13]. The present evaluation was based on 200 young children ages 5 to 12 who were both male and female and lived close to Bannu. One of the major clinical problems affecting young people and expectant mothers, especially in developing countries, is illness. The paleness of IDA occurs in Bannu in KPK, Pakistan. In bannu territories bannu, 60% of replacements of two sexual courses (age 05-12 years) had iron deficiency[14].

Given that youngsters need a revitalising eating routine for quick growth, the rate of whitening at this age was high. African children are more likely to be pale than those in Latin America (46%), the eastern Mediterranean (63%), South Asia (66%) and North America (7%)[15]. According to Pakistan's national prosperity audit, dietary paleness in children under the age of five was measured at 62.9% between 1990 and 1994 (NHSP). In Punjab, urban areas where paleness cannot be avoided account for 51.5%. In the Bannu area, IDA was higher in young women (42.5%) than in young males (17.5%), perhaps due to the fact that more parents favour male children than female children. According to the most recent study, iron deficiency was common in children (42.5%) among the provincial younger understudy of Bannu than young fellows. The prevalence of illness was higher in adolescents (51.1%) among the Punjabi urban more active learners than in children between the ages of 05 and 20[16]. Youth who are trusting (15.3%) are different from young workers (12.0%) in Banglore, Southern India. A result of the 2003 school-based mediation program's efforts was the low enormity in Bangalore[17].

When compared to age groups (> multiyear), children (10 to 10.9) and children (7-9 years) had higher levels of frailty at 41.6% and 37.5%, respectively. 25% children since their bodies at this age need balanced nutrition for quick growth[18]. In Pakistan, children are allowed to start school at age 5. Children at that age carry additional burdens and need more nutrition. According to age-appropriate statistics, the prevalence of pallor was highest in children between the ages of 5 and 8 in Rishikesh, Uttrakhand, India, where it was high (48%) and 15.5% elsewhere[19]. Young children had a high level of mild fragility (Hb 10 to 11 g/dL) (46.8%), moderate (Hb 7 to 10 g/dL) (45.5%), and severe iron shortage (Hb 7 g/dL) (12.6%). Young offspring of Bangalore showed levels of mild frail (11.2%), moderate pallid (2.1%), and severe sickly (0.3%), which was similar to the present experiment. Mild weakness is preferable than moderate frailty and severe illness[20].

CONCLUSION

The results of the most recent analysis show that young children have a significant incidence of iron insufficiency. In the Bannu region, the percentage of young children that were feeble was high (60%) It suggests that the weakening was more pronounced in rural than in urban areas. The proximity of pallor in children reduces resistance, physiological growth, and physical and mental activity. Young women (42.5%) had a larger percentage of frailty than young males (17.5%). Age-wise, children between the ages of 10 and 12 were becoming weaker. Most of the children had mild iron deficiency. The symptoms of pallor were difficult to identify and study, but the most well-known adverse effect was pale skin.

There is further research needed to be done on IDA deficiency identification, risk factor and its causes to overcome its deficiency in Pakistan moreover IDA Qualitative and quantitative method is a very good technique, and must be implemented in each and every public & private Medical and clinical laboratory throughout the KPK province as well in Pakistan.

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