Difference of academic achievement between anemic and non anemic student of primary grade school going.

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Abstract

The present study was planned to find out the difference of academic achievement between anemic and non-anemic student of primary grade school going children. Eighty subject aged 8 to 10 years of primary grade from different school of Lahore were taken and divided into two groups (40 anemic and 40 non anemic children) purposively selected. Cyamet heamoglobin method was performed to assess their anemic state. The children with Heamoglobin (Hb) level equal or less than 10gm% was included in the non-anemic group. A teacher made test was given to both the group and the result thus obtained were compared to find out any difference of academic achievement between anemic and non-anemic subjects by using test. When academic achievements were compared between anemic and non-anemic children the later performed better then the former group and the difference was very highly significant statistically (t=5012 and p<0.001) which indicates that anemia does affect academic achievement.

Keywords: Cyamet heamoglobin method, Anemia, Iron, Vitamin B12, Folic acid, Zinc, Iodine.

Introduction

It has been the notion of the time that a sound body has a sound mind. Body health status has definite role in determining academic performance. Different studies emphasize directly or indirectly that our body needs micronutrients for growth in general and brain and blood formation in particular to fulfill the physical and mental capabilities WHO 1992, 1993 [1,2]. Such nutrients include iron, vitamin B12, Folic acid, Zinc, Iodine etc. In light of the studies undertaken by different worker as referred above deficiencies of such micronutrients express in form of firstly pre-clinical and then clinical expressions of deficiency diseases like anemias.

There has been a clinical expression that anemias especially iron deficiency causes changes like apathy, irritability, inability to concentrate, shorter attention span, hyperactivity, inattentiveness, perversion of appetite, anorexia, poor memory, decreased endurance, lack of interest in surroundings and learning problems due to impaired intellectual functions. The effects of deficiency anemias on the nervous system, intelligence and the intellectual performance and in turn academic achievement are the most important non-hematological effects especially in iron deficiency anemia. An extensive review of literature shows that anemia interferes with brain function in children [3,4]. This interference is especially localized to the individuals' ability to concentrate and process the available information in rational way. They are unable to discriminate between critical and non-critical information. This comprises the child's ability to solve various problems [5].

These defects in attention span, cognitive development, analytic and learning abilities can have far reaching consequences in areas of the world where anemia remains a commoner problem, as it is in Pakistan. A lesion in almost any of the iron dependant metabolic pathways can provide the basis of reduced learning and mental performance in children attributed to iron deficiency [6].

The hypothesis that intelligence and academic achievement are affected by iron status has been addressed by many studies and reviews. This hypothesis if proved, it will have grave and far reaching consequences on the intelligence and educational achievement especially in children [7]. This problem will be particularly acute in those parts of the world where deficiency anemias particularly iron deficiency anemia is common.

Anemia in school going children is mostly due to decreased supply of essential nutrients in the diet, which are required for blood formation like iron, vitamin B12, folic acid, etc. This problem, as mentioned in preceding paragraphs, is much more frequent in developing countries like Pakistan, where poverty and ignorance due to illiteracy go side by side. It achieves grave proportion when such kids perform poorly in their academic achievement which is directly related to healthy body status[8]. As anemia develops slowly over the years it is usually without any significant symptoms. The child apparently looks alright. The poor parents deadly busy in trying to make both ends meet rarely note any micro developments like pale complexion, fatigability and disinterest in their offspring [9].

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***Received:** 05-Jul-2023, Manuscript No. AABPS-23-104913; **Editor assigned**: 07-Jul-2023, PreQC No. AABPS-23-104913(PQ); **Reviewed**: 21-Jul-2023, QC No. AABPS-23-104913; **Revised:** 24-Jul-2023, Manuscript No. AABPS-23-104913(R); **Published:** 31-Jul -2023, DOI: 10.35841/ aabps-13.185.*

***Citation:** Tayyab H, Hashmi S, B Ismail et al. Difference of academic achievement between anemic and non anemic student of primary gradeschool going. Asian J Biomed Pharmaceut Sci. 2023;13(100):185*

Anemia develops over along span of time rarely gives alarming clinical features. These children show poor results in their examinations and other class tests. The teachers in school especially in government schools rarely bother to give detailed information about the academic achievement of the child to his parents, neither parents have time or sense to go for such consideration[10]. The result is that these children become a total failure later in their life as a result of this non-academic achievement.

Taking in view the suspected problems of academic achievement in anemic children a study is planned to assess scientifically this expected non-anemic children based upon teachers made assessment test [11].

Review of Literature

Anemia literally means without blood and is one of the commonest disorders afflicting mankind. It is one of those disorders which results in physical as well as socio-economical damage to both the individual and the society [12]. The detection and diagnosis of anemia are frequently the focus of attention in the acre of patients because accurate quantization is not difficult to achieve and rational analysis of the problem is possible.

Anemia is not a diagnosis in itself, but merely an objective sign of the presence of disease. To understand anemia, it is useful to think of the circulating red cells which make up most part of the formed elements of blood [13]. The rest of the blood consists of the liquid part or plasma Anemia results from a qualitative defect of red blood cells. Red blood cells or erythrocytes were first described in human blood as globules of no significance by blood are a highly specialized connective tissue. This view was held for the next one hundred years when Hewson not only recognized them as flat disc like structures but also suggested that they were very important to the body [14]. Since thena large and coherent body of information on the birth, life, death, shape, structure, composition and functions of red cellshas accumulated. The entire process by which red cells are produced is called erythropoiesis. It is a dynamic process by which approximately 2 million new red cells are produced every second in an adult .Ninety percent of the dry weight of the red cells is made up ofhaemoglobin which is an iron protein complex and some 640million molecules of haemoglobin are packed into each red cell [15].

Definition of anemia

The term anemia as is generally used to refer to a reduction below normal in the concentration of haemoglobin or red blood cells in the blood. It must be remembered that the mean normal value and the lower limits of the "normal" range depend upon the age (childhood or adult life) and gender (male or female) of the subjects, as well as the altitude of residence. So, by definition anemia is said to be present when the haemoglobin level in the blood is below the lower extreme of the normal range for the age and sex of the individual. The lower limit of normality is reduced during pregnancy [16].

Clinical presentation of anemia

The most important function of haemoglobin is the transport of gasses to every part of the body, which is of course, a vital function essential for life.Clinical manifestation in patients with anemia depend upon:

- The reduction in the oxygen carrying capacity of the blood.
- The degree of change in the total blood volume (when it due to loss of blood from the body).
- The associated features of the underlying disorder that resulted in the development of anemia, and
- The capacity of the different system in the body, especially the heart and the lungs, to compensate for the anemia [17].

If the development of anemia has been slow in onset, as occurs in most nutritional deficiencies present sometime for years, the patients' adjustment may be so good that he rarely experiences any problem until the haemoglobin level drops below 8 gm/dl or lower. In the children particularly, restriction of capacity for physical exertion may barely be apparent, despite the presence of severe anemia [18]. The patient feels breathlessness and awareness of vigorous and rapid heart action (Palpitation) may be noted even at rest.The rapidity of the onset of anemia, its severity, and the age ofthe patient and the capacity of the heart and the blood vessels to adjust to at govern the clinical presentation. When anemia develops rapidly, shortness of breath, palpitation, dizziness and extreme fatigue are prominent [19].

When a patient of anemia is examined, pallor is the most evident sign of anemia. In the hands, the skin of the patient becomes pale, which can also be seen on the lips and nail beds. A heavy deed whiteness of the skin suggests acute blood loss and 'sallow' colour suggests chronic anemia. Other sign include a burning sensation in the tongue, difficulty in the swallowing, other thing and loss of luster in the skin, etc [20].

Type of Anemia and their occurrence. Anemia can be classified depending upon the cause of haemoglobin or red cell deficiency as

- Loss of blood from the body either acute or chronic
- Excessive destruction of mature red cells as due to various infectious, drug intake congenital causes etc. and [21]
- Impaired red cells production, as may be due to deficiencies of particular nutrients required for haemoglobin formation like iron, vitamin B12, folic acid, zinc etc.
- Depending upon the particular appearance of red blood cells seen under the microscope (morphological classification), the anemia may be [22].
- Hypo chromic, microcytic type, where is the size and the colour of red cells (due to haemoglobin) may be reduced_ iron deficiency is the most common cause of such a picture. According to WHO report Two billion individuals amongst which up to five billion were found to be iron deficiency anemia cases [23].High risk

of iron deficiency anemia is found during the time period of rapid growth especially in age groups 6-24 months, adolescence and pregnancy and 50% is iron deficiency type remaining may be of inherited diserythropoietic type of iron deficiency anaemia [24].

- Macrocytic type where the size of the red cells is larger than normal-vitamin B12 and folic acid deficiency give rise to such a phenomenon. Such anemias are important in our set up in all age groups because vitamin B12 and folate deficiencies are usual occurrence including other micronutrients dietary deficiencies. Worldwide prevalence of vitamin B12 deficiency including school age group is quit high in developing countries. Folate deficiency anemia up to 48% has been found in female adolescents and children [25].
- Normocytic and normochemic type where the red cells are normal looking and the basic defect lies with the failure of production of red cells from its site of synthesis i.e.,. Bone-marrow. This may be due to toxic action of certain drugs of chemical (as is occupational exposure to benzene in workers of paint industry) or exposure to radiation (as is x-ray technician) or certain disease destroying the bone marrow like cancer, etc [26].

Anaemia in children

Certain features of anemia are unique to infants and children. Nutritional may have a great effect upon the hematopoietic system. Growth imposes increased requirement from iron and other factors required from heamoglobin formation.

In addition, many congenital and hereditary disorders make their first appearance early in life. Red cell formation is accelerated in the new born as compared to adults. Similarly red cell life span is shortened (85 to 90 days) then in adults (120 to 125 days) [27]. As referred in preceding paragraphs, children of 6-24 months and later in school going age suffer from iron deficiency anemia in developing countries. in their studies found iron, vitamin B12 and folic acid (folate) deficiency anemias in children. Further comments regarding deficiency anemias in children are giving in proceeding paragraphs [28].

Nutritional deficiencies in children

Nutritional requirements of the child are especially important in the light of the rapid growth which must occur. The growing body needs micronutrients for the formation of blood to fulfill the physical and mental capabilities. Different micronutrients like iron, vitamin B12, folic acid, etc. are needed for blood formation. Micronutrients deficiencies often occur in the context of poverty and among families who are best by multiple stresses that may interfere with the healthy development of their children [29].

Iron deficiency anemia in children

Nutritional deficiencies play a major role in causing anemias in children starting right from the birth to late childhood. For example, iron reserves are influenced by the tying of the umbilical cord at the time of delivery. If the cord is tied too early, the infants will be deprived of additional red cells from the placenta which would provide not only additional iron reserves. If this mistake is not made, the haemoglobin concentration is higher at birth than will be found later [30]. After birth iron requirements are provided by the diet which, if confined to milk, will be insufficient. Since un-supplemented milk is a poor source of iron (about 0.075 mg Fe/100 gm milk) most infants receive little iron in their diet if solid foods are introduced relatively late. By far the most common cause of inadequate diet in infancy is excessive dependence on milk [31]. Iron deficiency may occur as a result of inadequate iron intake, Chronic blood lose, and inadequate iron absorption from the intestine or hookworm (Ankylostoma duodenale) infestation. Iron deficiency anemia is widely believed to be the commonest chronic illness affecting mankind across the globe. It afflicted person of all ages and economic groups. Some one thousand million people all over the world are affected by this condition. The increased demand for iron occurs in children during their period of rapid growth, when iron is not only required for the progressive increase in the number of red cell in the body but it is also needed for the synthesis of myoglobin which is required for the progressively increasing mass of muscle tissue [32].

Vitamin B12 and Folic Acid (Folate) deficiency Anemia: Vitamin b12 (Cobalamin) is synthesized solely by micro-organisms and is present only in food of animal origin including dairy products. Absorption requires intrinsic factor which is secreted by gastric parietal cells [33]. The intrinsic factor-B12 complex passes to terminal ileum, where intrinsic factor attaches to specific receptors site on the mucous membrane and B12 enters the ileal cells to be transported into the blood by the carrier protein (TranscobalaminII). B12 requirement are 1-3 μg daily and average diet contains about 5 μg per day. Body stores, half of which are in the liver are about 3 mg, which is sufficient for a few years without further supply [34].

Folic acid is present in most types of food; the highest concentrations are in liver and green vegetables. The daily adult's requirement is about 100 μg. An average diet provides about 200 μg per day. Body stores are normally sufficient for only about 4 months so severe deficiency can develop rapidly [35].

Vitamin B12 and folic acid are coenzymes required for DNA synthesis. Folic acid enters haomopoietic precussor cells from plasma as Methylene tetralydrofolate. B12 acts as a coenzyme in the conversion of Methylene tetralydrofolate which is converted 5-10 Methylene tetralydrofolate polyglutamate, a coenzyme for the conversion of deoxyuridine monophosphate to thymidine monophosphate. Thus deficiency of either B12 or folic acid can lead to reduced concentration of nuceleotide precursor (Thymine) required for DNA synthesis by haomopoietic precursor cells, resulting in defective haemopoiesis and a clinical picture of megaloblastic Macrocytic anemia [36].

Diagnosis of anemia

The diagnosis of anemia is often suggested by the clinical features particularly the history and is established with

certainty by various laboratory tests. As regards history, the duration of the symptoms and then onset, weather acute or slow should be established. One should enquire about the family history with special reference to anemia or any bleeding disorder. Recent intake or exposure to any drug or chemical should also be inquired. The dietary history is quite important. The patient must be questioned regarding the diet and cooking habits, especially with reference to folic acid intake [37].

Clinical examination

In the laboratory examination is mandatory which includes patient complexion, especially pallor of the skin and mucous membrane of lips and eyes and abdominal examination for any abnormality of body organs like liver, spleen, etc [38].

Laboratory investigation

In the laboratory examination of a stained blood smear of the patient is very important, along with haemoglobin estimation. The shape of the red cells under the microscope can give useful cues to the cause of anemia. eg. Red cells with smaller size (microcytic) and showing reduced staining (hypochromia) are characteristically seen in iron deficiency anemia. Macrocytic (red cells with larger size) are a feature of anemia due to vitamin B12 or folic acid deficiency [39].

Haemoglobin estimation: Haemoglobin estimation is of utmost significance as anemia can only be said to be present when haemoglobin level is below normal for the age and sex of the patient. However, it should be interpreted in relation with the state of hydration. In over hydrated patient e.g., in kidney failure, it may be falsely low and in dehydrated subjects due to diarrhea or vomiting) it may give falsely high results [40].

Factors affecting academic achievement

Various factors influence academic achievement. They include genetic, environmental, socio-economic, and educational and health backgrounds including nutritional status. Genetic factors combined with environmental factors influence intelligence and in turn academic achievement. Differences have been noted, in measured Intelligence Quotient (IQ), and academic achievement between different self-identified racial and ethnic groups. Asian cultural values and family practices play central importance on academic achievement and link success in school with later occupational success. Environmental factors comprise all the stimuli a person encounters from conception to death including food, cultural information, education and social influences [41].

Socio-economic factors also play their part. Children from smaller families (with better socio-economic status), and earlier offspring tend to show better academic achievement. Similarly children who do not attend school or who attend intermittently perform poorly than those who attend regularly. Children who move from low quality to high quality school show better results [42].

Nutritional iron deficiency affecting academic Achievement

There has been a clinical impression that nutritional iron deficiency in children cause changes like apathy, irritability, inability to concentrate, shorter attention span inattentiveness, loss of appetite, poor memory, lack of interest in surroundings and learning problems due to impaired intellectual functions. The effects of iron deficiency anemia on the nervous system and academic achievements have been intensively studied. However, the exact neurophysiological mechanisms involved in the production of these effects are largely speculative. were the first to show that academic achievement of school children was affected by iron deficiency anemia [43].

The school performance (as jugged by a battery of intellectual performance tests) of anemic children was significantly below than that of the non-anemic children. They are, hence, considered to be pioneers in this field. They studied 191 school pupils living in an economically deprived, predominantly black community in Philadelphia. Ninety of the students were classified as anemic (Hb between 10.1 and 11.4gm/dl). The remaining 101 students served as a normal control group on achievement tests. In addition the anemic children took significantly longer than control to respond to a visual after image task. Finally, teacher evaluation indicated that anemic boys displayed significantly more conduct problems then non-anemic children. [44].

A number of observational studies have found that children who experienced anemia early in life continued to demonstrate lower academic performance during their school-age years, even after the anemia had been treated. For example, examined the record of children who were enrolled in the special supplemental nutrition program for women, Infants and children before five years of age. Those who were anemic were more likely to experience academic problem at 10 years of age, compared to children who were not anemic on enrollment [45]. Concurrent iron status is also related to academic performance, as demonstrated in a recent investigation using data from 5398 children aged 6-16 years from the NHANES III survey in the United States. When standardized mathematic tests scores were examined controlling for background variables, children were iron deficiency, with and without anemia, had lower scores than children with normal iron status. These findings suggest that iron deficiency, even without anemia, may place children at risk for cognitive and achievement delays [46].

Nutrition vitamin B12 and folic acid deficiency affecting academic achievement

Nutrition vitamin B12 and folic acid deficiencies also play important roles in the determination of intelligence and academic achievement. Children with vitamin B12 deficiency are at risk for delayed development of milestones. It is also associated with reduced memory and neurobehavioral deficits. They show slow reaction on neuropsychological test and perception, memory and reasoning along with academic problems including lower academic achievement, lower teacher ratings and more delinquent behavior. The metabolism of vitamin b12 and folic acid are interdependent and so deficiency and so deficiency of one of them would disturb the other one as well. Both of them are essential micro-nutrients for blood formation as they take part in DNA synthesis [47].

Vitamin B12 deficiency has profound effect on the children's cognitive development and academic achievement. We are not sure for the exact incidence of vitamin B12 deficiency in developing counties and for that matter in Pakistan. Because animal products are the only source of vitamin B-12, rates of vitamin B-12 deficiency are likely to be high among children who consume little or no meat or milk [48].

Folate is important micronutrients whose deficiency is also a significant cause of anemia in our country. Up to 48% of female adolescent may be folate deficient folate deficiency anemias can also impair cognitive development and academic achievement in children [49].

Miscellaneous micronutrients and academic achievement

Deficiency of vitamin B6 is also involved in the causation of anemia. Dietary deficiency is less common apparently because of ubiquitous distribution of this vitamin. Vitamin B6 deficiency anemia could impair cognitive development in children especially those belonging to rural areas and poor families [50].

Zinc is another micronutrient whose deficiency although not important causes of anemia yet can never the less affects mental development in early childhood. A study from Egypt demonstrated a link between maternal zinc intake and infants' development skills [51].

Iodine deficiency, though not important for including anemia, can be very important for mental functions especially in early years of life. The link between parental iodine deficiency and cognitive development is direct, but can be prevented through public health methods, making iodine deficiency the most preventable cause of mental retardation in the world. Iodine deficiency is a major problem that affects children in areas where iodine is depleted from the soil, primarily mountainous regions, such as the Himalayas and the Andes, and the flood plains [48]. A WHO report estimates that 1.6 billion people or 30% of the world's population live in iodine-deficient areas and are therefore at risk for iodine deficiency. Public health methods, such as iodized salt, injections of iodinated oil or oral iodine, have been effective in preventing congenital hypothyroidism and the associated mental retardation [52].

Construction of the academic achievement test

A teacher made academic achievement test was used in the present thesis research work. The choice of this test was guided by its simplicity, easy understandability and comprehension. It also had the ability to pick up small changes in academic achievement. The subject chosen were Urdu, English and Mathematics. So the knowledge of school children as regards national language international language and ability to solve figure was tested [53].

Data collection was done through teacher made achievement tests (including Urdu, English and Mathematics).

These tests included objective and subjective type questions (e.g MCQs, fill in the blanks and short questions items etc.) according to the syllabus of the class. Tests were prepared from textbooks (recommended by Punjab text books Board of Lahore) of 4 class [54].

Items for the test were selected from the syllabus already taught during the session by the teachers and then forwarded to their experience teacher from other schools for approval of test items. Commonly agreed items were returned and disapproved items were rejected .

This process was done for the following reasons

- To select the valid items for the test.
- To exclude the irrelevant items.
- To know about this limit.
- To restructure pre-existing questions if necessary.
- To make test applicable in all respects[55].

In the final selection test had 155 items (54 items in Urdu and 39 Mathematics and 62 items in English) and 50 marks for each test and time limit allowed for each test was 45 minutes.

Logic of the teacher made test and to avoid standardize test: Different studies show that standardized tests cause boredom in students [56]. found various small fraction of a sixth-grade Irish sample disaffected by standardized tests, even though they are uncommon in Ireland. When asked about their experience in standardized tests, 29% reported feeling nervous, 19% unconfident, 16% bored and 15% uninterested. Twenty nine percent reported that they did not care whether they took the tests and 16% said they did not enjoy the experience .

speculated that standardized tests may lead both bright and dull to do poorly. Bright students may feel heightened parental, peer or self imposed expectations to do well on tests, which make them anxious. Slower, disadvantaged students may do poorly, then rationalize that school and tests are unimportant and consequently, expend less efforts preparing for and completing test. Either case might lead to a self-reinforcing spiral of decelerating achievement [56].

Procedure

The procedure for the teacher made test given to both the groups was adopted as fallows. The variable to be tested was the effects of anemia on academic achievement of the two "anemic and non-anemic groups". Other variable were common in both the groups.

A week prior to apply the test procedure, due permission and information was collected from the concerned authorities and parents/guardians. Three days prior to conduct the teacher made test, blood sample were taken to group the subject of anemic and non-anemic. However the result of this blood test was not communicated with the mind not to bring another variable of stress for the anemic groups [57].

The teacher made test was conducted under similar atmosphere for both the groups on the already specified date and time.

Assessment process of the answer books in different subject for scoring purpose was equally applied. Standard of scoring

was the same by the experienced teacher which was rechecked by another experienced teacher to avoid the bias regarding assessment in both the groups. In whole of this assessment procedure the variable of anemia was not communicated to the assessors. The result were compiled for both the groups and compared statistically by applying student's t-test.

The problem of anemia given immense importance in our country for the above given reason and its detection gains it most importance in our set up. If proper treatment is given to these sick children, they can improve the academic achievement.

The healthy children will not only be able to fight with the disease, but also achieve better in their academic carrier. They can be a great future asset for our country where poverty is increasing day by day and people are being deprived of their basic needs. Intelligent children would handle the country development in future in a better way.

In the light of studies cited above it was hypo-theorized that non-anemic children will perform better on achievement test than anemic children [58].

Problem statement

Anemia has effect on the academic achievement of the students of primary class.

Hypothesis: Academic achievement of non-anemic students will be better than that of anemic students [59].

Discussion

The present study has found significant concurrent association between anemias and school achievement as a measure of cognitive development in school going children aged from 8 to 10 years. These results were in agreement to previous studies who find similar positive association between anemia and academic achievement. Although most studies found association between anemia and academic achievement, a puzzling minority of the studies failed to find significant associations. Small sample sizes in these studies may explain some failures to find associations.

The subject in the present study were selected from areas were poor socioeconomic status prevails as assessed from the monthly income of their parents. also considered low socioeconomic status as a contributory cause to mental development. They concluded that poverty is often associated with lack of stimulation in the home and maternal warmth, poor maternal education, and maternal depression and more absent fathers. found that anemic children tended to be more fearful, withdrawn, tense, and uncreative to usual stimuli, more solemn, less involved and unhappy. Thus social behavior of anemic children is also lined with poor academic achievement.also observed that anemic children showed less pleasure and were more wary, hesitant, and easily tired. The above account proves our hypothesis that academic achievements of non anemic primary grade student are better than anemic primary grade students group [60].

Limitations

- Sample was selected purposively for three areas of Lahore. It should be selected from greater number areas increase validity of the test.
- The number the subject included in the present study was also small whereas if larger number was included it could have given more appropriate results.
- Further if the study was expended over larger areas of the community it could have provided the results to declare with some epidemiological impacts.
- The blood sampling of the students was done purposively i.e., anemic and non-anemic children were selected for the present study on the basis of their haemoglobin level. A random sampling may have been more elaborative.
- Further the effect of parent education on the subject studied (anemic and non-anemic both) was also not considered in the present research work. The impact of parental education on academic achievement should have been taken into account as well.

Suggestions

- Iron, Vitamin B12 and folic acid take a major part in the synthesis of haemoglobin in the body, so a causal relationship should be established between their blood levels and haemoglobin, so that the exact nature of deficiency could be defined and treated.
- The academic performance may be checked again after fulfilling the missing micro nutrients deficiency and improvement in haemoglobin levels.
- Social factors should be taken into consideration as they also play important role in child's mental and physical development.

Appendix

Haemoglobin estimation

The basic of this method is dilution of blood in a solution containing potassium cyanide and potassium ferricyanide. Ferricyanide converts the Hb iron from ferrous state to ferric state and from methaemoglobin. The methaemoglobin then combines with potassium cyanide to form a stable pigment cyanmethaemoglobin. The absorbance of this compound is measured in a spectrophotometer at wave length of 540 nm which is proportional to the concentration of Hb (Table 1 and Table 2).

Two test tubes labeled as T (test) and a B (Blank) were taken. Five ml of Drabkin's solution was added to the tube t. 0.02 ml of well mixed heparinized blood was taken into Shali's pipette and added to 5ml of Drabkin's solution in tube T. the pipette was rinsed thoroughly with the diluents. The contents of the tube T were Stoppard and mixed by inverting it several times (Table 3 and Table 4).

Table 1. *Anaemic group: Showing clinical information.*

No.	S. No	Pulse rate/min	Respiration rate/min	Temperature Fo	Pallor (Anemia)
1	1	70	20	98.5	+
2	2	76	17	98.4	+
3	3	78	15	97.4	++
4	6	76	20	97.7	+
5	7	77	22	97.6	+
6	8	80	21	97.8	++
7	10	80	18	97.8	+
8	12	70	21	97.8	+
9	13	70	19	97.9	+
10	14	76	20	97.9	+
11	15	71	20	98.4	+
12	17	75	22	98.4	+
13	19	71	16	97.6	+
14	20	71	20	97.5	+
15	21	72	17	98.3	+
16	22	72	17	98.3	+
17	23	72	21	98	++
18	24	71	21	98	+
19	25	79	20	98.1	+++
20	26	81	20	97.7	+
21	27	81	16	98.2	+
22	28	82	20	98.2	+
23	29	82	18	97.9	+
24	30	84	18	98	+
25	31	84	18	97.8	+
26	32	70	18	97.8	+
27	37	77	19	97.8	++
28	38	85	19	97.8	+
29	40	85	22	98.5	+
30	41	85	22	98.4	++
31	44	70	21	98.4	+
32	46	70	21	97.9	+
33	48	70	17	97.9	+
34	49	78	17	98.5	++
35	51	85	17	97.9	+
36	53	80	22	97.9	+
37	57	80	18	97.9	+
38	59	79	20	97.7	+
39	64	79	20	93.3	+
40	70	80	20	97.8	++

Table 2. *Non-anaemic group: Showing clinical information.*

No.	S. No.	Pulse rate/min	Respiration ret/min	Temperature Fo
1	4	81	21	97.5
2	5	81	22	97.7
3	9	81	20	98
4	11	84	20	98
5	16	84	20	98.4
6	18	78	21	98.4
7	33	75	21	97.9
8	34	75	18	97.9
9	35	75	18	97.8
10	36	80	19	97.9
11	39	80	21	97.8
12	42	80	21	98
13	43	80	21	97.9
14	45	80	20	97.9
15	47	84	20	98.3
16	50	84	17	97.9

Citation: *Tayyab H, Hashmi S, B Ismail et al. Difference of academic achievement between anemic and non anemic student of primary gradeschool going. Asian J Biomed Pharmaceut Sci. 2023;13(100):185*

17	52	84	20	97.9
18	54	84	21	97.8
19	55	78	21	97.8
20	56	70	20	98.5
21	58	75	18	98.5
22	60	80	18	98.5
23	61	82	19	98.6
24	62	82	19	98.4
25	63	82	21	98.3
26	65	82	21	98.3
27	66	82	19	98.3
28	67	81	19	98.3
29	68	81	18	98.5
30	69	81	18	97.5
31	71	81	20	97.5
32	72	84	20	97.9
33	73	84	16	97.9
34	75	84	16	98
35	76	84	20	97.9
36	78	84	20	97.9
37	79	79	18	98.4
38	83	79	20	98.4
39	84	79	19	98.5
40	85	79	22	98.5

Table 3. *Anaemic grouping showing Hb and percentage of achievements based upon teacher made test.*

No.	S. No.	Hb (gm/dl)	Teacher made achievement test							
			Math (Marks 50)		Urdu (Marks 50)		English (Marks 50)		Grand Total (150)	
			Marks obtained	Percentage %	Marks obtained	Percentage %	Marks obtained	Percentage %	Marks obtained	Percentage %
1	1	10	21	42	32	64	24	48	77	58.8
2	2	10	25	50	26	52	28	56	79	52.1
3	3	8.4	20	40	34	68	24	48	789	51.4
4	6	9.5	30	60	33	66	29	58	92	60.7
5	7	9.5	31	62	40	80	34	68	105	69.3
6	8	8.5	28	56	28	56	22	44	78	51.3
7	10	10	32	64	34	68	30	60	96	63.4
8	12	9.2	18	36	26	52	21	42	65	42.9
9	13	10	19	38	29	58	24	48	72	47.5
10	14	10	33	46	30	60	23	46	76	50.2
11	15	9.9	34	68	39	78	32	64	105	69.3
12	17	10	25	50	33	66	28	56	86	56.8
13	19	9.4	23	46	28	56	20	40	71	46.9
14	20	9	26	52	29	58	18	36	73	48.2
15	21	10	28	56	31	62	26	52	85	56.1
16	22	9.5	31	62	32	64	28	56	91	60.1
17	23	8.4	24	48	36	72	32	64	92	60.7
18	24	8.8	20	40	33	66	24	48	77	50.8
19	25	9.6	29	58	29	58	28	56	86	56.8
20	26	7	24	48	35	70	32	64	91	60.1
21	27	9.8	35	70	40	80	40	80	115	75.9
22	28	10	32	74	42	84	37	74	111	73.9
23	29	9.5	28	56	29	58	23	46	80	52.8
24	30	10.8	24	48	30	60	33	66	87	57.8
25	31	9	25	50	26	52	23	46	74	48.8
26	32	9.5	20	40	38	76	37	74	95	62.7
27	37	8.6	20	40	27	54	23	46	70	46.2
28	38	9.5	16	32	24	48	12	24	52	34.3
29	40	10	17	34	35	70	29	58	81	53.5
30	41	8.6	13	26	10	20	20	40	43	28.4
31	44	9	20	40	11	22	17	34	48	31.7
32	46	10	17	34	35	70	29	58	81	53.5

33	48	10	25	50	28	56	19	38	72	47.5
34	49	8.9	20	40	25	50	19	38	64	42.2
35	51	10	21	42	17	34	11	22	49	32.3
36	53	9.5	10	20	13	26	13	26	36	23.8
37	57	10	17	34	18	36	17	34	52	34.8
38	59	9.8	19	38	18	36	17	34	54	35.6
39	64	10	10	20	18	36	18	36	46	30.4
40	70	8.7	21	42	30	60	18	36	69	45.5

Table 4. *Non- Anaemic grouping show Hb and percentage of achievement based upon teacher made test.*

No.	S. No.	Hb (gm/dl)	Teacher made achievement test							
			Math (Marks 50)		Urdu (Marks 50)		English (Marks 50)		Grand Total (150)	
			Marks obtained	Percentage %	Marks obtained	Percentage %	Marks obtained	Percentage %	Marks obtained	Percentage %
1	4	14.3	32	64	40	80	33	66	105	69.3
2	5	14.8	30	60	35	70	40	80	105	69.3
3	9	14.6	32	64	35	70	40	80	107	70.6
4	11	14.7	38	76	41	82	42	84	121	79.9
5	16	14.5	35	70	38	76	40	80	113	74.6
6	18	14.8	40	80	42	84	45	70	117	77.2
7	33	14	29	58	30	60	24	48	83	54.8
8	34	14.1	30	60	28	56	31	62	89	58.7
9	35	14.7	28	56	33	66	28	56	89	58.7
10	36	14.3	32	64	42	84	37	74	111	73.3
11	39	14.8	17	34	21	42	18	36	56	37
12	42	14.9	34	68	39	78	35	70	108	71.3
13	43	14	38	76	33	66	33	66	104	68.6
14	45	14.3	40	8	30	60	28	56	98	64.7
15	47	14.1	41	82	27	54	24	48	92	60.7
16	50	14.6	38	76	21	42	26	52	85	56.1
17	52	14	36	72	25	50	37	74	98	647
18	54	14.8	37	74	44	88	35	70	116	76.6
19	55	14.3	28	56	38	76	39	78	105	69.3
20	56	14	37	74	24	48	40	80	101	66.7
21	58	15.2	17	34	45	90	31	62	93	61.4
22	60	14.4	29	58	22	44	32	64	83	54.8
23	61	14.4	29	58	32	64	40	80	101	66.7
24	62	14.3	25	50	40	80	30	60	95	62.7
25	63	14.9	27	54	30	60	20	40	77	50.8
26	65	14.6	33	66	37	74	41	82	111	73.8
27	66	14.9	32	64	42	84	37	74	111	73.8
28	67	14.8	23	46	30	60	24	48	77	50.8
29	68	14.6	27	54	37	74	44	68	98	64.7
30	69	14	32	64	39	78	41	82	112	73.9
31	71	14.3	11	22	24	48	30	60	65	42.9
32	72	14.9	30	60	17	34	17	34	64	42.2
33	73	14	31	62	39	78	30	60	100	66
34	75	14.9	17	34	29	58	27	54	73	48.2
35	76	14	21	42	25	50	29	58	75	49.5
36	78	14.8	27	54	37	74	30	60	94	62
37	79	14	38	765	35	70	40	80	113	74.6
38	83	14.9	22	44	40	80	30	60	92	60.7
39	84	14.7	27	54	38	76	37	74	102	67
40	85	15.4	39	61	39	78	40	80	110	72

Conclusion

We concluded that non-anemic group should better performance than the anemic group. The present study provides an awareness that anemia should be taken as an alarming problem of the society with reference to academic achievement in school going children. Children are a precious lot of society, further builders and policy makers. They are better brought up and academically well trained they will prove more use full to the society in different fields.

Citation: *Tayyab H, Hashmi S, B Ismail et al. Difference of academic achievement between anemic and non anemic student of primary gradeschool going. Asian J Biomed Pharmaceut Sci. 2023;13(100):185*

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