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A Study on Dietary Habits of Aneamic Children Coming To the Department of Pediatric Medicine Skims Soura Srinagar (3-11 Years)

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Abstract:
Background: *Bioavailability of iron, vit.B_{12} and presence of vit.C in our diets are poorly understood. These micronutrients are crucial for the production of haemoglobin. The present study was carried out to find out the dietary habits of school going children (3-11yrs) suffering from nutritional anaemia.*
Objectives: *To assess the dietary habits of children suffering from nutritional anaemia, to explore the signs and symptoms of nutritional anaemia among the children.*
Design: *The study was done on 78 children coming to the department of Paediatric Medicine SKIMS Soura Srinagar. Here, the sample was assessed clinically and interviewed to obtain the required data. The nutritional status of each child was assessed using Gomez classification of weight for age.*
Results: *Grading of anaemia among these children was done as mild anaemic (16.6%), moderate anaemic (46.6%) and severe anaemic (36.6%) on the basis of WHO recommended cut-off values of Hb levels according to age and sex among these children. The nutritional status of these children was not adequate as their dietary intake was not enough to support their growth.24hr dietary recall of the sample also reveals that their iron and vit.B_{12} intake was less than RDI for these nutritients.*
Conclusion: *Childhood anaemia continues to be a significant public health problem in school children and iron deficiency either alone or mixed with other micronutrient deficiencies was commonest cause of anaemia. Children from rural and poor families were found more susceptible to nutritional anaemia. Those whose weaning was not started at proper age and mostly fed with cow's milk were found moderate to severe anaemic. They had poor immunity and were suffering from one or other health problems and infections.*

I. Introduction

Anemia is condition in which haemoglobin levels are lower than normal (for particular age and sex) due to rapid loss or slow production of RBC's. It occurs in a child (6-12) when haemoglobin production is considerably reduced leading to a fall in its level > 12gm/dl in the blood (10).

Globally the most common cause of anemia is believed to be iron deficiency due to inadequate dietary iron intake, physiological demands of rapid growth and iron losses due to parasitic infections, excessive bleeding, diminished absorption and/or utilization of iron or a combination of these factors. Other prevalent causes of anemia include chronic infections and nutritional deficiency of vit. A, folate and vit.B_{12}. Iron deficiency is responsible for 25% cases of anemia during childhood. Impact of intestinal helminthes infections on anaemia are aggravated by low nutritional status of subjects whose staple foods such as rice and maize are poor sources of folic acid and iron (3, 4, 5).

For children health consequences of anemia include premature birth, low birth weight, infections and elevated risk of death. Later physical and cognitive development is impaired, resulting in lowered school performance (10).

II. Definition

Anemia is defined as a condition in which Hb level is below than normal range appropriate for particular age and sex, in blood either due to slow production and rapid loss of RBC's or due to deficiency of elements essential for blood formation like iron, vit.B_{12} and folic acid. Hem (iron) + globin (protein) =Haemoglobin is important for carrying oxygen to different body tissues. In anemia Hb available is not enough to carry sufficient oxygen from the lungs to supply the needs of tissues (7).

Nutritional anemia results due to inadequate supply of one or more essential nutritients. Many nutritients are involved in hemopoiesis but from the public health point of view iron, folic acid and vit. B_{12} are the ones of major importance (14).

Anemia can be classified based on morphological characteristics of the RBC (mean corpuscular volume MCV and the amount of Hb in the RBCs). Table 1 presents the morphological classification, also called the Wintrobes Classification (22).

Table 1: Wintrobes Classification of anemia

	Norm chromic	**Hypo chromic**
Normocytic	Acute Haemorrhage	Chronic haemorrhage
Macrocytic	All megaloblastic anaemia's i.e. vit.B_{12}, folic acid deficiency	Liver disease
Microcytic	Chronic infections	Iron deficiency, Thalassmia.

III. Iron Tests

Haemoglobin; levels help to determine if anemia is present and if a blood donation can be done.
Serum ferritin; measures the amount of iron in containment. One ferritin can hold as many as 4500 iron atoms.
Serum Iron; is free or unbound iron in serum. Ideal range is 40-180µg/dl. Measurement is best done fasting because serum iron is sensitive to foods or supplements recently consumed and time of day.
Transferrin;is an iron-binding and transport protein that can bind to and transport 2 molecules of iron. Transferrin carries iron through the bloodstream to the bone marrow and the liver.
TIBC; demonstrates the iron-binding ability of transferrin. It gives iron saturation which is normally 25-35%. Lower than 25% is suggestive of iron deficiency and >355 is suggestive of iron loading (24).

IV. Symptoms

Because of the gradual progression of iron deficiency anemia, many patients are initially asymptomatic except in symptoms of any underlying condition. They tend not to seek medical treatments until anemia is severe. At advanced stages, decreased Hb levels and the consequent decrease in the blood's oxygen carrying capacity causes the patient to develop dyspnea on exertion among children, fatigue, pallor, inability to concentrate, irritability, headache, and susceptibility to infections (10).

V. Causes

Iron is the main component of haemoglobin. Lack of dietary iron is the world leading nutritional deficiency and the most common cause of anemia. Following are the reasons leading to iron deficiency.

a) Inadequate Dietary Intake

The commonest cause of anemia is dietary inadequacy of iron. The dietary intakes are usually half of the recommended dietary allowances in every age and physiological group. Poor bioavailability of iron from the habitual diets is an important cause of iron deficiency. The chemically determined iron content of the Indian diets is apparently high (15mg/1000kcal), but 30% of it is unabsorable contaminate iron. The true dietary iron content is, therefore, only 10mg/1000 kcal (10).

b) Poor Availability Of Iron

The basic etiology of iron deficiency is an imbalance between the amounts of iron lost; the supply of iron to the bone marrow for normal erythpoiesis is thereby impaired. A reduced absorption of iron in to the body can be the result either of levels of dietary iron or a poor biological availability of dietary iron, or both (4).

Iron is present in foods of animal and vegetable origin largely in organic forms. Generally the bioavailability of iron in various types of foods, decreases as the proportion of food of vegetable origin in the diet increases. The studies in which isotopically - labelled iron was incorporated biologically into foods, the average absorption of iron from individual vegetable foods ranged from 1% to 6%, whereas from meats under comparable conditions the average of iron ranged from 7% to 22%(11, 12, 13). When different foods were mixed in the same meal, vegetable foods tended to decrease slightly the absorption of iron from meat, while, the addition of meat almost doubled the absorption of iron from vegetable foods (14, 15). Iron absorption is affected by various constituents like phytates, oxalates, phosphates etc. present in the diet. Egg iron is also poorly absorbed because the iron is strongly bound to the phosphate of the yolk, phosphoprotein. The amino acid composition of the diet and particularly the levels of cystien may be important (9).

c) Physiological Iron Requirement

Physiological iron requirement is the amount of iron that must be absorbed to compensate for iron losses and allow for the formation of new tissues (1). Most of the iron content inside the body, about 65-67%, is in the form of haemoglobin 3-5% is in the myoglobin of muscles, a small amount is in hem enzymes, about 30% is in the non-hem compounds ferritin and hemosiderin and a very small amount about 0.07% is bound to transferrin. Iron stores reach their lowest levels between 12 and 20 months of age, during childhood and adolescence they increase slowly and reach adult levels in males around 20years of age. Because of the additional iron requirements imposed by growth and development most children have considerably lower iron stores than adults living on a similar diet (19).

D)Helminthes Infection

Iron loss is increased in individuals harbouring parasites such as hook worm and tricheeres. Intestinal helminthes are among the most common and wide spread of human infections. They contribute to poor nutritional status, anemia and impaired growth in children. Heavy infestations are seen particularly in rural areas (16). Indiscriminate defecation, geophagy (soil eating) and contamination of water bodies are the important predisposing factors to intestinal worm infestation (20). Hook worm infection is associated with severe but not moderate anemia among children (21). A single Necator American (helminthes) sucks about 0.03ml of blood per day. Ancylostoma duodenal represented by 1000 eggs/gm of faeces cause daily faecal blood losses of about 2ml and 4ml respectively. An infestation represented by more than 5000 eggs/gm of faeces is required to produce anemia in adult men, while in children and menstruating women, whose iron requirements are higher a degree of infestation represented by around 2000 eggs/gm of faeces produce anemia. However these figures will probably vary according to the area and dietary iron intake (22).

a) Poverty And Ignorance

Low purchasing power of the communities and their consequent inability to meet the nutrient requirements even after spending 80-90% of their income on food is an important factor contributing to deficiencies. Animal foods help in increasing the bioavailability of iron. But their consumption is low due to traditional beliefs and ignorance, locally available inexpensive source like green leafy vegetables are not fully utilized. Similarly, the utilization of medical and health services is also poor(10).

VI. Treatment

The chief treatment for iron deficiency is oral iron therapy. This treatment involves oral administration of inorganic iron in the ferrous form. At a dose of 30mg absorption of ferrous iron is three times greater than if the same amount were given in the ferric form (17).

Iron is best absorbed when the stomach is empty; however, under this condition it tends to cause gastric irritation. Gastrointestinal side effects can include nausea, epigastric discomfort and distension, heartburn, diarrhoea, or constipation. To reduce these side effects patients are told to take iron with meals instead of an empty stomach. However, this therapy reduces the absorption of iron. Gastric irritation is a direct result of the quantity of free ferrous iron in the stomach that irritates the gastric mucosa. Health professionals generally prescribe oral iron for three months (3 times daily). If it has to be given with meals, treatment should be for 4 to 5 months. Iron therapy should be continued for several months, even after restoration of normal Hb levels, to allow for repletion of body iron reserves (17).

VII. Prevention

Correction and prevention of iron inadequacy are important sustainable methods of prevention of iron deficiency anemia. However this is a long term strategy requiring not only improvement in increasing availability of iron in the diets but also changing behaviours of community. In view of the widespread extent of iron deficiency anemia alternate methods are required to control anemia and a mix of approach is necessary.
The available methods of prevention and control of anemia are:

- Supplementation
- Fortification
- Behaviour changing communication
- Strengthening the public health measures.

VIII. Methodology

This study was undertaken to assess dietary habits of anaemic children of age group 3-10years coming to the department of paediatric medicine SKIMS Soura Srinagar.

1) Data Collection

The data was collected from both the primary as well as secondary sources. Primary data was collected through questionnaire cum interview schedule. Collection of secondary data was carried out by gathering information from various books, journals, websites and newspapers.

2) Selection Of Sample

A sample of 78 children of age group 3-10years were selected randomly for study. Subjects were selected from the department of paediatric medicine SKIMS Srinagar. The study was done from 06-04-2015 to 04-07-2015.

3) Tools Used

Observations, Interviews, Reports, and Records were used to obtain the relevant data. The tool used for data collection was structured questionnaire keeping in view the objectives of the study. Questions were asked regarding dietary habits and personal information of the subjects.

4) Analysis Of Data

The data collected was analysed through percentage & frequency tables.

IX. Results & Discussion

In the studied sample 56.7% subjects were females and 43.3% were males. Most of the subjects about 86.67% were belonging to rural areas while as only 13.23% subjects were from urban areas. 16.66% of sample was mild anaemic, 46.67% was moderately anaemic and 36.67% sample was severe anaemic as shown in fig 1.

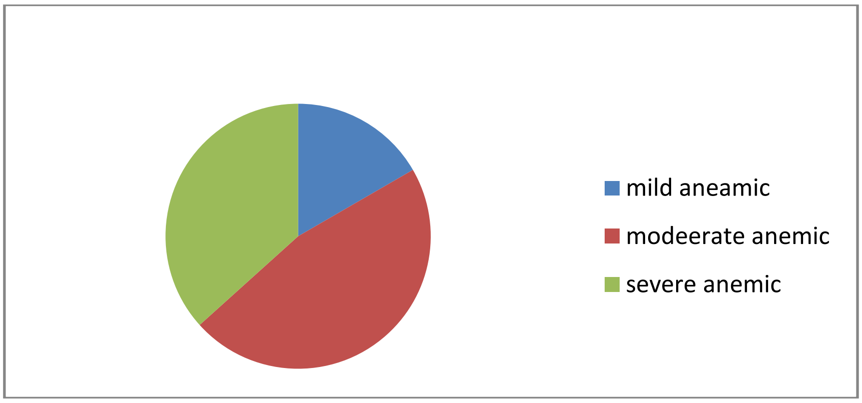

Fig 1. Distribution of sample according to grade of anemia

According to WHO recommended cut-off values of Hb among anaemic children, mild anemia; Hb=10.9gm/dl for 5-5.9 years old, Hb=9-11.9gm/dl for > 6years old, moderate anaemia Hb=6-8.9gm/dl and severe anaemia Hb=<6gm/dl.

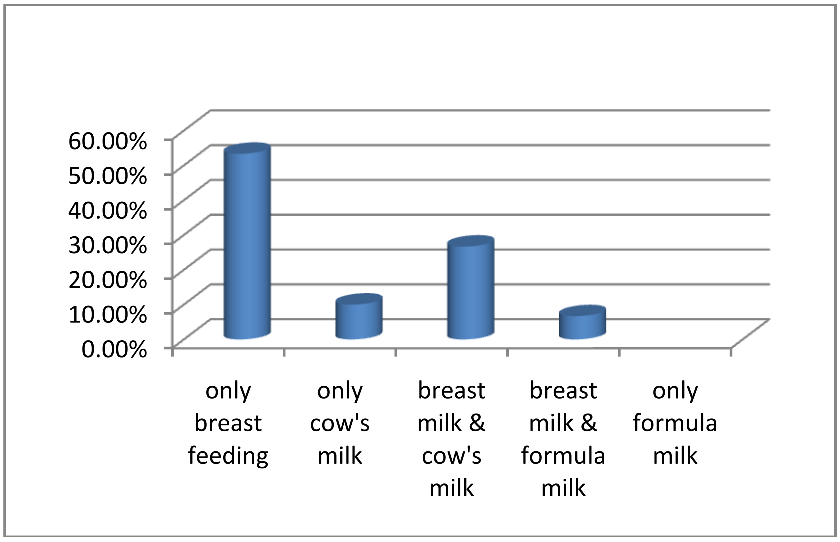

Fig 2. Distribution of sample according their feeding pattern

Fig2. Depicts that 53.33% of subjects were breast fed during their first 2 years of life, 10% of subjects were given only cow’s milk, 26.67% were given both breast milk and cow’s milk, and 6.67% were given formula milk and breast milk whereas 3.33% of subjects were given only formula milk.

According to Sunil Gombar, Bhawna et al 2003: During the first 6 months of life, babies are usually protected against developing iron deficiency by the iron stores built up in their bodies before birth. But after month 6, they often don't get enough iron through breast milk alone or regular cow's milk. Regular cow's milk can cause some infants to lose iron from their intestines, and drinking lots of it can make a baby less interested in eating other foods that are better sources of iron. For these reasons, regular cow's milk is not recommended for children until they're 1 year old and eating an iron rich diet. In addition they should not drink more than 24 ounces (709-946ml) of milk each day.

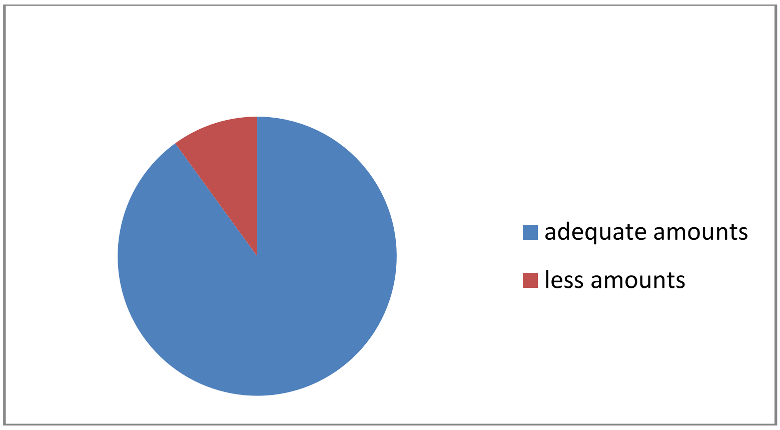

Fig 3. Consumption of cereals

Fig3 shows that90% of sample3 was taking cereals in adequate amounts while, 10% of sample was taking same in less amounts.

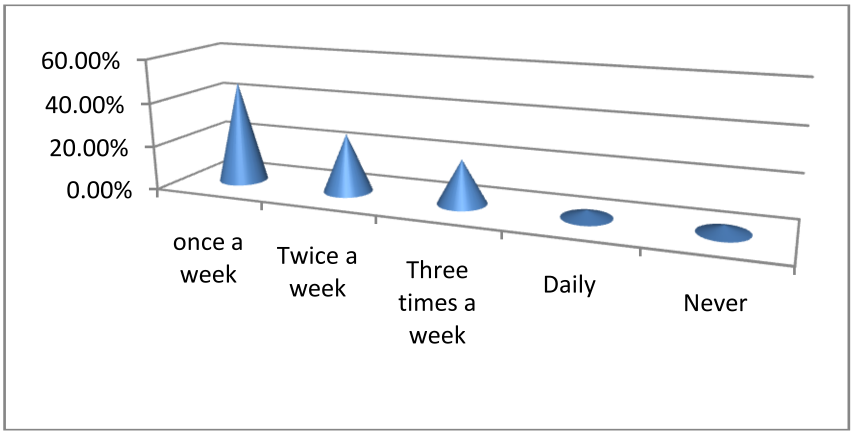

Fig 4. Consumption of pulses

Fig4. Shows that the 46.67% of subjects were taking pulses twice a week 26.67% were taking pulses three times a week, 20% were taking once a week and 3.33% were taking pulses daily whereas, 3.33% were never taking pulses in their diets.

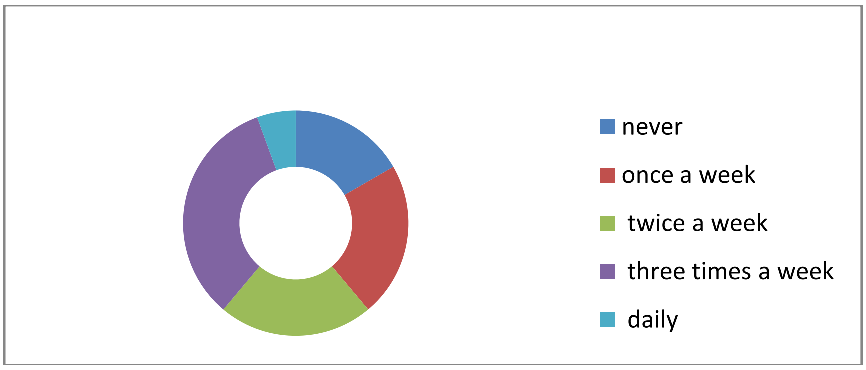

Fig 5. Consumption of flesh and poultry item

Fig5. Shows that the 10% of sample was refusing flesh and poultry items, 13.33% was taking once a week, 20% was taking three times a week while as 3.34% of sample was taking flesh and poultry items daily.

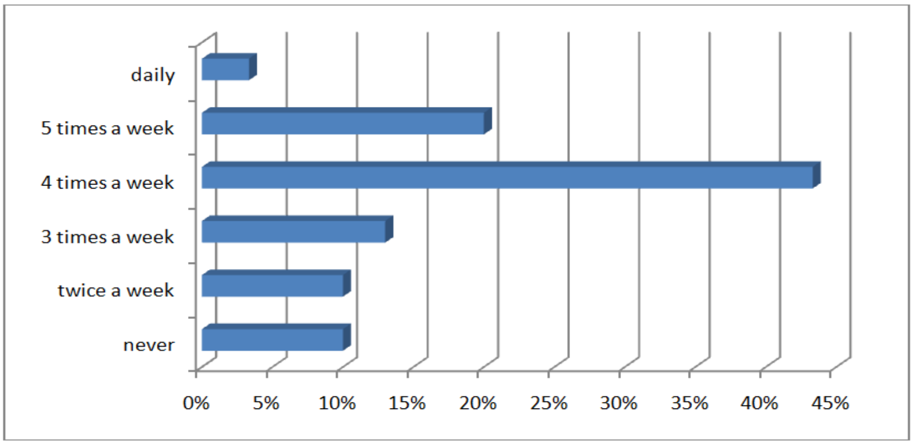

Fig 6. Distribution of sample according to their pattern of consumption of vegetables

Fig6. Shows that the 43.33% of sample was consuming leafy vegetables 4 times a week, 20% was consuming 5 times a week 13% was consuming 3 times a week, 10% was consuming twice a week, only 3.33% was consuming daily and 10% of sample was not consuming vegetables at all.

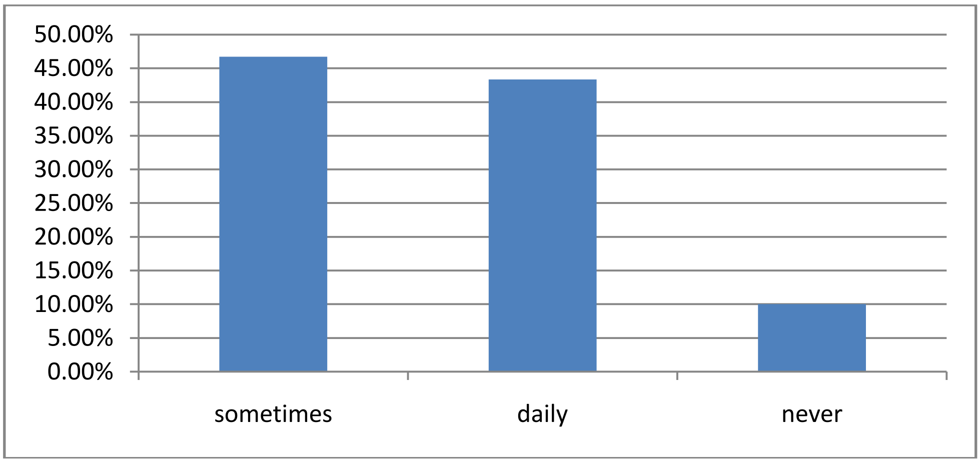

Fig 7.distribution of sample according to consumption of milk

According to fig7; 46% of sample was consuming milk sometimes, 43.33% was taking daily while 10% of sample was not like to take milk

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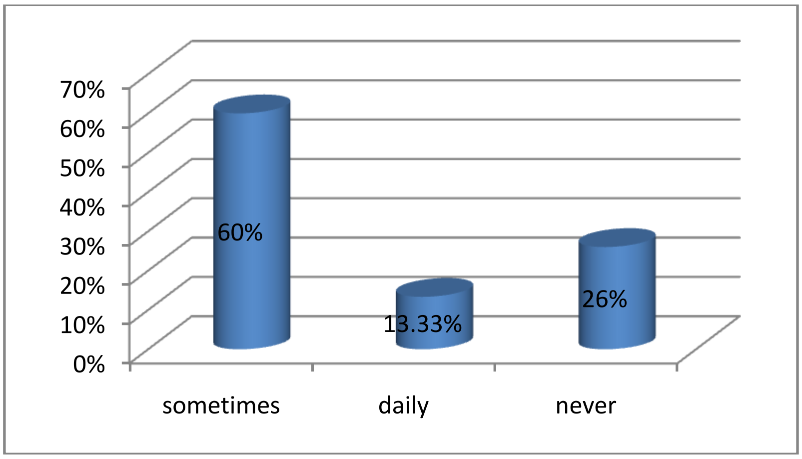

Fig 8.distribution of sample according to egg consumption

Fig8 shows that the 60% of sample was taking eggs sometimes, 13.33% was taking daily and 26.37% of sample was not taking eggs at all.

"Hallberg, Finch, et al (1990)" found in their study that the amount of iron absorbed from the diet depends on the form of iron in the food and presence of other foods and substances in the diet. Dietary iron is present in two forms "heme" and "non heme" iron. The amount of iron absorbed from non heme iron is 5-10 times less than the amount of iron absorbed from heme iron, and its absorbance is affected by the presence of other food items present in diet. Heme iron is present in fish, meat and poultry items. While, as non-heme iron is present in grains, cereals, eggs and dairy products.

According to "Moore C. V. et al (1971)"; in general bioavailability of iron is high in diets rich in animal foods and decreases as the proportion of vegetable origin foods in diet increases. The average absorption of iron from individual vegetable food ranged from 1% to 6%, whereas from meats under comparable conditions it ranged from 7% to 22%.

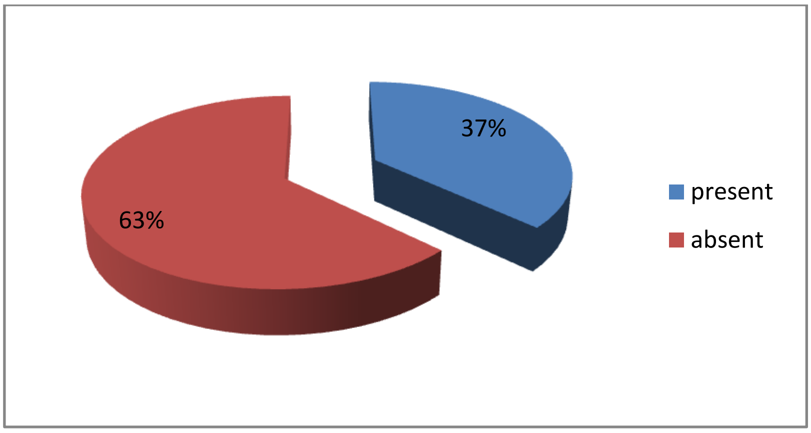

Fig 9.soil eating habit

According to fig 9, in 63% of sample soil eating habit was absent while as 37% of sample was having craving for soil.

According to "*Vincent Lanneli"* (paediatric expert) *2014:* that cravings for non-food items, or pica, such as soil, chalk, detergent etc is one of the symptoms of iron deficiency anemia.

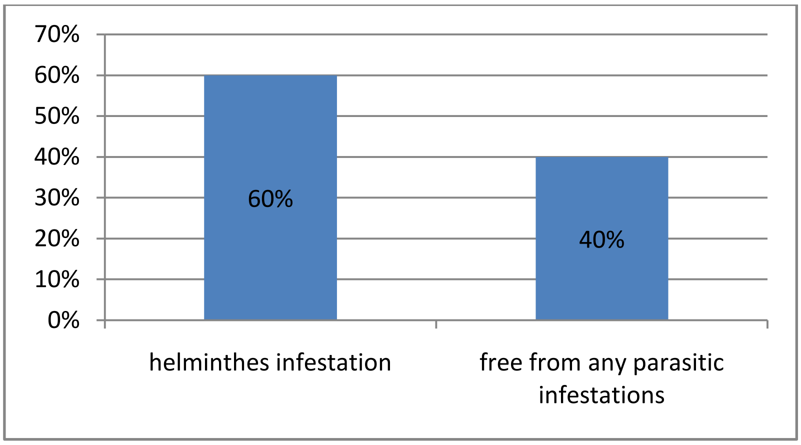

Fig 10.distributiion of sample according to parasitic infections

Fig 10 shows that 60% of sample was having helminthes infection and 40% of sample was free from any parasitic infections.

Larry and Janovy Jnr (1996): stated that the most important cause of pathological chronic loss of blood and iron in hetropics is hookworm and other soil transmitted helminthes whilst, the practice of soil eating (geophagy) during childhood.

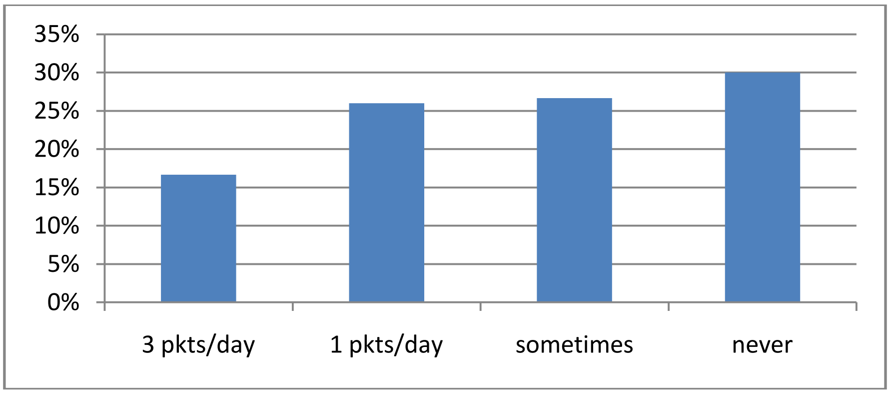

Fig 10. Distribution of sample according to their habit of consuming junk foods

Fig 10 shows that 16% of sample was taking 3 packets of junk food daily, 26% of sample was taking one packet daily, other 16% of the sample was taking junk foods sometimes only and 30% of sample was not taking any junk food.

Lee, Hurrell, et al (1989) stated that substances like tannin in tea and some vegetables, calcium and phosphorus in milk, casein, whey protein in dairy products, phytates and oxalates in vegetables and processed food items inhibit the absorption of non heme iron.

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