

Association of Anemia with Intestinal Parasites in Children age (5-12) Years in District Bannu

Association of Anemia with Intestinal Parasites in Children age (5-12)

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ABSTRACT

Objective: To determine the association of anemia with intestinal parasites and identify the risk factors in school children from different Schools of Bannu.

Study Design: Cross-sectional study

Place and Duration of Study: The study was conducted at Bannu Medical College with the collaboration of Jinnah medical college Peshawar from March 2018 to October 2018.

Materials and Methods: 360 school children from ages 5 to 12 were selected for the study. The presence of intestinal parasites was tested from a direct stool examination, and risk factors were evaluated through a structured survey which included general, housing, socio-economic, biological, behavioral and environmental aspects. The processing and statistical analysis was carried out with the program SPSS 19 version.

Results: Out of 360 children studied prevalence of anaemia was found to be 60 %. Frequency of anaemia in lower age group (6-9 years) was 70 % as compared to 30% in upper age group (10-12years). 56 % boys and 69 % girls were affected. Of 360 stool samples examined, 233 were tested positive for various intestinal parasites. The frequency of helminthic infestation was found to be 65%. There were 5 different types of helminths found in the specimens. By far the highest frequency of 101 cases was noted for *Ascaris Lumbricoides* and 86 cases for hookworm forming the bulk of these infestations. Other helminthes found were *Trichurius Trichiura* (9 cases), *Hemonolepsis Nana* (32 cases) and *Taenia Sagiinita* (5 cases). Interestingly *Enterobious Vermicularis* was not detected in any sample. Among the 233 infected cases major worm burden was by *Ascaris Lumbricoides* (43%) and Hookworm (36%).

Conclusions: This study shows a high prevalence of intestinal parasites, especially of *Ascaris Lumbricoides*

Key Words: Anemia, Intestinal Parasites, risk factors.

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INTRODUCTION

Iron deficiency represents a public health problem. Worldwide, about 2,150 million people suffer from deficiency of this element and of these more than 50% have anemia. Child malnutrition in underdeveloped countries is one of the main causes of mortality¹. Intestinal worm infestations are widely prevalent in tropical and subtropical countries and occur where there is poverty and poor sanitation. Soil-transmitted helminth (STH) infections form the most important group of intestinal worms affecting 2 billion

people worldwide and the main species which infect are *Ascaris lumbricoides*, (roundworms), *Trichuris trichiura*, (whip worms) and *Necator americanus/ Ancylostoma duodenale* (hookworms)². To diagnose an intestinal parasites in human being it is important to consider three aspects, transmission mechanism, source of infection and the presence of a susceptible host. This transmission happens because of the water consumption or food contaminated with fecal matter, from an infected person or animal, by penetration of larvae, by skin or consumption of meat with parasitic stages³. The present stations where this study has been carried out is to be highly endemic for intestinal worm infestations. With this in the backdrop, the present study has been undertaken to assess the parasite load in the target population with primary focus on School going children (5-12years) from three Primary Schools in district Bannu.

MATERIALS AND METHODS

It was a Descriptive Cross sectional study conducted at Bannu Medical College with the collaboration of Jinnah medical college Peshawar from March 2018 to October 2018.

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Population: School going children (5-12years) from three Primary Schools in district Bannu. School included in the study were Primary School Zarger Mama Khel Bannu, Govt. Primary School for Boys Imaro Kala Mandan Bannu and Govt. Girls Primary School bada mir abbas khan mandan bannu

Sample Size: In this cross sectional study sample size was calculated for each variable. The reported prevalence for anaemia varied from 10.5% to 58% among children. For estimation of prevalence of anaemia in the children, following assumptions were made.

The prevalence to be estimated (P) =0.5 with a bound on error of estimation (β) =5%, hence the sample size calculated for the assumed prevalence at 5% significance level (α) and power of study at 80% was at least 360 subjects. All the children in specified age group and studying in the primary schools were included in the study.

Sampling Technique: It was Convenient Non Probability Sample

Inclusion criteria: All Children (5-12 years) present in the School while conducting the survey in that particular School.

Exclusion Criteria: All Children (5-12 years) not enrolled in the Schools. All children below 5 years and above 12 years in the Schools and all those children not present while conducting the study.

Data Collection Procedure: Executive District Officer, Education was contacted who granted proper approval to carry out the study, and then issued a letter to the in charges of concerned schools to help and facilitate the survey. Written consent forms in urdu distributed among the children before the study day to get consent of their parents. The parents who had reservations were negotiated and convinced to include their children in the study.

Schools visited on alternate days and 15 to 25 students surveyed during each visit. Responses to structured questionnaire collected from all the children in the sample. Questionnaires were filled from students as per their responses. Help was also sought from the school teachers in this regard when and where felt necessary.

Pathology Department (Laboratory) of Bannu medical college was used for Laboratory Investigations after proper permission from the Pathologist of the College.

Sample Collection: Each student of the sample population was provided with a clean, broad mouthed plastic container to collect the stool specimen. The students were instructed how to collect the sample and avoid contamination. These containers were provided to the students one day before the study to bring stool from home which were later examined for ova detection.

Blood Samples collected from the same specified group of children at the school for assessment of Haemoglobin Level.

Laboratory Investigations: Laboratory Investigations performed at Pathology Department (Laboratory) of Bannu medical college Bannu.

Blood and Stool Samples collected from the children and brought to the laboratory for examination. Stool examined directly by saline and iodine wet preparation microscopy. The blood hemoglobin (Hb) was estimated by Sahli's method.

Data Analysis Procedure: Questionnaire developed in epi info 6.4 software. Data entered in the rec files and analysis performed in the same soft ware and SPSS. By giving different commands analyzed data retrieved in the form of Numbers, means and percentages. Then results framed in the form of statements, tables, bar charts and pie charts. Bar charts and Pie charts developed in Excel software while tables in MS Word Software.

RESULTS

Study was conducted in all of the three Primary Schools in district Bannu. School included in the study were Primary School Zarger Mama Khel Bannu ,Govt Primary School for Boys Imaro Kala Mandan Bannu and Govt girls primary school bada mir abbas khan mandan bannu. Total of 300 children aged 6 to 12 years studied and they included 210 (70 %) boys and 90 (30%) girls (Fig 1).

Table 1. shows age and sex wise distribution of all anaemic children. Data shows that out of 220 anaemic children 140 boys and 80 girls were affected. Among 246 boys included in the study 140 were found anaemic (56 %) and likewise among girls 80 out of 114 were affected (69 %). And in terms of age the frequency of anaemia in lower age group (5-8 years) was 70 % as compared to 30% in upper age group (9-12 years). Out of 360 stool samples examined, 233 were tested positive for various intestinal parasites. The frequency of helminthic infestation was found to be 65% (Fig 3).

Figure 4 shows five different types of helminths found in the specimens . By far the highest frequency of 101 cases was witnessed for *Ascaris Lumbricoides* and 86 cases for hookworm Other helminthes found were *Trichurius Trichiura* (9 cases), *Hemonolepsis Nana* (32 cases) and *Taenia Sagiinita* (5 cases). Interestingly *Enterobious Vermicularis* was not detected in any sample.

Table No.1: Age and Sex wise distribution of Anaemic Children

Age Range	Boys	Girls	Total
5 to 8years	98	58	156
9 to 12 years	42	22	64
Total	140 (64%)	80 (36%)	320

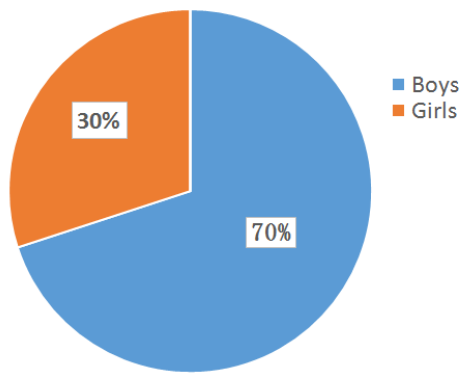


Figure No.1: Sex wise distribution of the study Population

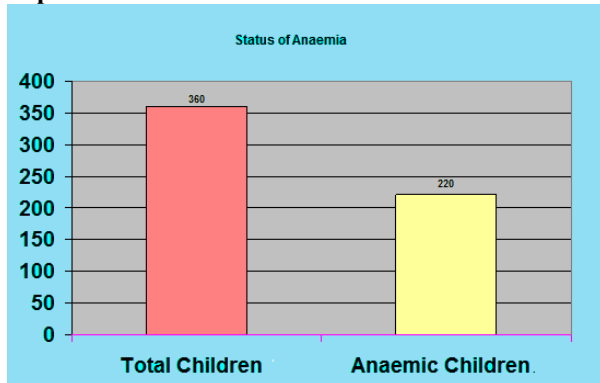


Figure No.2: Overall prevalence of anemia in children

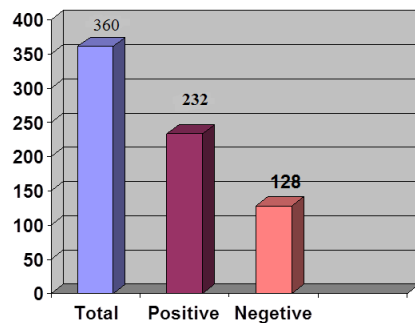


Figure No.3: Frequency of Worms.

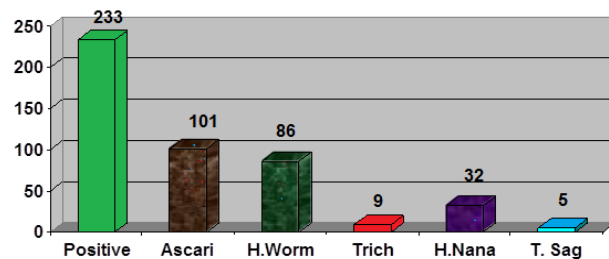


Figure No.4: Distribution of different worms

DISCUSSION

Iron deficiency anemia in young children is recognized as a major public health issue and the most prevalent form of micronutrient deficiency worldwide⁴⁻⁵

The prevalence of IDA in our study is lower than in previous studies in other low resource countries such as Palestine and Kenya⁶⁻⁷ and substantially below the estimate from a previous study in Pakistan⁸. These differences could be attributed to variations in the study settings or factors such as the rate of parasitic infections and dietary habits. “Studies conducted in other parts of the world shows almost the same results. A study conducted among school going children (6-14 years) of Baiga, Abuihmadia and Bharia tribes of Madhya Pradesh India to assess the prevalence of anaemia and intestinal parasitic infestation concluded that 50% children had intestinal parasites⁹. Most of the studies conducted in past indicate that among intestinal helmenths major worm burden is by Ascaris Lumbricoides and Hookworms and likewise current study also confirms the previous findings. Among positive cases contribution of Ascaris Lumbricoides and Hookworms was 43% and 36% respectively.

A higher level of the infection can be attributed to lack of personal hygiene and poor sanitation. Open defecation seems to be responsible for the higher prevalence of intestinal worms infestation in this particular study. Children are more prone to the infection partly due to poor living conditions, and partly to the lack of awareness of hygienic practices on the part of their parents.

Data in this study clearly revealed that there was strong association of Anaemia with Intestinal Worms especially Hook Worm. 78% of the anaemic children were found infected with one or other worm.

A comparative study was carried out to identify the prevalence of anemia, nutritional indices and intestinal parasitic infestation in primary school children. Among anaemic children who were infected by intestinal helmenths 85% were by Hook Worms and Ascaris Lumbricoides. Strong association of anaemia with Hookworm (45%) and Ascaris Lumbricoides (39%) was also found in this study. Hence findings of this study are consistent with the previous studies and worms like Hook Worms and Ascaris Lumbricoides are still major risks causing iron deficiency anemia and malnutrition.

In the current study, the income level and family size of the studied population have also been assessed. The monthly house hold income was mostly very low and that had a direct impact on their state of iron deficiency owing to the reduced purchasing power. Because of extended families and large number of dependants the nutritional requirements and caloric needs are difficult to be met. The income earnings are in fact below the internationally accepted levels and due to growing poverty, these poor people cannot afford to eat iron rich foods and consequently undergo malnutrition and nutritional deficiency anemia.

Age of the students was found to have epidemiologically significant affect on the causation of

the problem. Both anaemia & worms infestation are more prevalent in the younger age group. The reason is that this age group can care for themselves less as compared to the older age group and have poor personal hygiene.

Both anaemia & worms infestation were more prevalent in females as compared to males. Other studies^{10,11} found that the prevalence of anemia was higher in females, and is mainly due to gender bias and male dominant society where the females even if children, are neglected and suffer.

Low literacy of the fathers is another contributory factor in causing anaemia & worms infestation. Study showed that 61% fathers of students had no education. Children in these rural families are ignored and even deprived of their basic needs.

CONCLUSION

Anaemia and worms infestation both were significantly associated with the age and sex of the subjects, parent's education level, family size and income, personal and community hygiene,. The problem was more prevalent in those living in large, congested and poor families, low sanitation, and poor personal and environmental hygiene. Insensitivity of the parents to children's hygiene and the children's frequent exposure to ova-laden soil also emerged as important factors. So this study revealed the fact that anaemia and intestinal helminthiasis still continues to be major public health problems in this area.

Measures for the control and prevention of the problem are suggested. Also further and more detailed studies are needed to see the affects of this high load of anaemia and worms on the health status of the children.

Author's Contribution:

Concept & Design of Study:	Muhammad Fayaz Khan Barki
Drafting:	Firdos Jabeen
Data Analysis:	Shehnaz Dilawar
Revisiting Critically:	Muhammad Fayaz Khan Barki, Firdos Jabeen
Final Approval of version:	Muhammad Fayaz Khan Barki

Conflict of Interest: The study has no conflict of interest to declare by any author.

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