

Prevalence of Anaemia in Hookworm Infestation in Children of Slum Areas in and around Dhanbad

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ABSTRACT

Introduction: Hook worm infection is the most common intestinal parasitic infection of Nematodes. The hook worm two major species that affected humans, *Necator americanus* and *Ancylostoma duodenale*, *Necator americanus* is generally its genus to infected human. The purpose of this study was to evaluate the prevalence of hook worm associated anaemia in slum area children in and around Dhanbad districts.

Material and Methods: A Total of 480 both (stool and blood) samples were collected from the suspected child of having anaemia. Blood samples of 3-5ml were collected in the anti-coagulant vial from different age groups of children and stool samples collected in two sterilised screw tight small Containers. One container was provided with 10% normal saline for its use in Formalin ether sedimentation method. Direct stool smear examination in normal saline as well as in Gram's iodine method to identify trophozoites, cyst, eggs and larva. Anaemia was defined as a haemoglobin concentration <11gm/dl with the help of Sahli's Method.

Result: A total number of 480 blood and stool samples were received during this period. Out of which 123 samples were positive. Both types of hook worm were found in our studied *Necator americanus* species found in (94.4%) and *Ancylostoma duodenale* are found in (5.6%). The children's who were suffering from Hookworm infection are found to be anaemic of minor to major in nature. This study shows that percentage of hook worm associated anaemia (23.57%) is higher than non-hook worm infected children (14.28%). the age group of 05 to 10 years of children is found to be more anaemic in our study.

Conclusion: Hook worm interferes with the normal nourishment of child and affect lungs, skin and small intestine. Children infected with Hook worm infection may lead to deficiency of red blood cells and lead to anaemia, Major Hook worm infection is the main reason for iron deficiency anaemia in children's.

Keyword: Anaemia, Parasitic, Worm, Sterilized

INTRODUCTION

Hook worm infection is the main reason for iron deficiency anaemia in children. This may lead to retarded development of infant, birth of underweight baby.^{1,2} Children who have frequent hookworm infections can experience slow growth and mental development from losing iron and protein.³ Hook worm transmission is a complex repetitive cycle, hook worm larva are found in human faces and transmitted to humans from contaminated soil through the skin, usually due to walking barefoot or by accidentally ingesting contaminated soil.^{4,5} once inside the body, larva are carried through the blood stream to the lungs and mouth where they are digested

and passed to the small intestine, Hook worms resides in the small intestine of infected children, where they attach to the villi and feed on host blood, Having children with inadequate iron intake and high physiological demands, this blood loss can result in anaemia.⁶ Hookworm are generally contracted by walking barefoot on soil contaminated by faeces from infected animals or person, or by swimming in infected water or wading in contaminated water.^{7,8} In Dhanbad large percentage of population lived in rural and slum areas, they have very poor knowledge of personal hygiene. Hence they are potentially exposed to hook worm infection. Prevalence of Hookworm is low as children uses sanitary toilet in the slums areas.^{9,10} The purpose of this study was to evaluate the prevalence of hook worm associated anaemia in slum area children in and around Dhanbad districts.

MATERIAL AND METHODS

This study was carried out in the department of Microbiology, P.M.C.H Dhanbad. All Samples of blood and stool were collected from 480 children of different age group of rural and slum area of dhanbad in clinical laboratory of Patliputra Medical College and Hospital, Dhanbad for detection of eggs of hook worm in stool and Hb% in blood respectively.

Sample Collection- 1ml of blood was collected in anticoagulant vial and stool was collected in a wide mouth sterilised cork – screw container.

Microscopical examination of stool has been performed by direct smear as well as by concentration method in 10% Normal saline. Negative for eggs of hook worm in stool samples has been declared after examination of 100 microscopic fields in concentrated samples of stool obtained

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Total Number of Stool Samples	Age Group of children			Hook Worm detected in Stool Samples				Hook Worm Not detected in Stool samples			
	5 to 10 years.	11 to 16 years.	17 & Above	5 to 10 years.	11 to 16 years	17 & Above.	Total	5 to 10 years	11 to 16 years	>17 & above	Total
480	248	197	35	79	42	2	123	221	103	33	357

Table-1: Total Hook Worm identified and Not-identified samples. (N=480).

Hook worm Not identified in stool samples				Total No. of Anaemic Children (HB% <11mg/dl)				Total Hb%
Age group of children's				Age group of children's				
05 to 10 years	11 to 16 years	17 & Above	Total.	05 to 10 years	11 to 16 years	17 & Above	Total.	14.28%
221	103	33	357.	32	15	04	51	

Table-2: Haemoglobin count in Hooks Worm Not-identified samples & percentage (N=357).

Hook Worm identified in stool samples				Total No. of Anaemic Children (HB% <11mg/dl)				Total Hb%
Age Groups of children				Age Groups of children				
5 to 10 years	11 to 16 years.	17 & Above	Total.	5 to 10 years.	11 to 16 years	17 & above	Total.	23.57%
79	42	2	123	21	07	01	29	

Table-3: Haemoglobin count in Hooks Worm identified samples & percentage (N=123).

from either by sedimentation or floatation method. Hb% estimation was done from anticoagulant blood samples by Sahli's Method.

Laboratory identification of hook worm infection and its associated Anaemia.

All 480 stool and blood samples were collected from suspected patients in hook worm infection both of different age groups children. Direct Microscopical examination of fresh stool samples was done for detection of hook worm eggs,¹⁶ for this we made a slide from the stool samples either by direct wet – mount method or by concentration method. Stool should be evaluated promptly because eggs hatch in to infective larva within 24 hours.¹⁶ Anaemia was defined as a haemoglobin concentration below 11gm/dl. sEstimation of Hb% was performed by shalis method. 0.02 ml of blood was mixed with 0.2ml of N/10 Hydrochloride solution so that haemoglobin was converted to brown –coloured Acid Haematin. This was then further diluted with distilled water till the brown colour matches with the colour of glass standard comparator. The haemoglobin value was read directly from the scale of the comparator.¹⁷

Age group prediction in Hook – Worm Infection: In this study, all 480 children who had suspected for hook –worm infection of up to 18 years of were examine for hook worm as well as anaemia. All 480 children who were investigated for hook worm infection as well as anaemia were divided in to three age group for better study. The groups were 05 to 10 years, 11 to16 years and 17 years above.

STATISTICAL ANALYSIS

ata were analysed using Categorical variables were summarized by percentage. χ^2 tests were performed for trend of ordinal variable.

RESULT

According to table -1, out of 480 samples, 123 stool samples

were hook- worm positive and 357 samples were Hook-worm negative. Hook worm positive and hook-worm negative children were further categorised in to different age group. Out of 123 positive stool samples, 79 were 05-10 years of age group; 42 were 11-16 age group; 02 children were in 17 years and above age group.

According to table -2, out of 357 non- hook worm infected children of the different age group; 51 were anaemic in different age group. Out of 51, 32 from 05-10 years group, 15 from to 11 to 16 years age group and 04 above 16 years and above age group.

According to table -3, out of 29 hook worm associated anaemia; 21 from 05-10 years age group, 07 from 11-16 years of age group and 01 form 17 years and above age group.

DISCUSSION

This study was carried out during the period from Feb -2017 to Feb 2018 in the department of Microbiology, Patliputra Medical College and Hospital dhanbad, Jharkhand. We found that the total number of Hook worm associated anaemia in children were higher (23.57%) than non-Hook-worm infected anaemia (14.28%). we also observed that Hook-worm associated anaemia were 21 in 05-10 years of age group Out of 29 of all age groups of hook worm associated anaemia. we also found that Hook-worm associated anaemia were found more in 05-10 years age group in slum and rural area.

In this study found that 123 children were affected by the Hook worm infection out of 480 children. Those who were affected by Hook Worm infection were further categorised in to different age group. We observed that out of 123 affected children; 79 children were among the age group of 05 to 10 years, 42 children were among in 11 to 16 years and 02 among the 17 years and above age group (table-1).

Rest 357 children those who were not affected by Hook

Worm infection were also categorized in to the different age group, we found that 221 children were 05 to 10 years age group 103 children were among 11 to 16 years of the age group and 33 children were among the 17 years. and above age group.

In the observation in Table-02 reflected that of 51 children were suffered from anaemia among 357 children those who are not infected by Hook worm .357 children who were not infected by hook worm infection were categorised in to three different age group. Out of 357; 221 children were among the 05 t 10 years of age group, 103 children were 11 to 16 years age group and 33 children were among the 17 years and above age group (table-2).

We also observed that the 51 children were anaemic among 357 children those who were not infected by Hook worm. 51 anaemic children were further categorised in to three different age group. 32 were among 05 to 10 years of age group, 15 children among the 11 to 16 years of the age group and 04 children among the 17 years and above age group

In Our study we were observed that number of Hook worm associated anaemic children were 29 out of 123 Hook worm infected children. We were categorised in to three difference age groups (table-3).

We found that out of 123 Hook worm infected children; 79 Hook worm infected children in 05 to 10 years of age group 42 children among 11 to 16 years of the age group and 02 children among 17 years and above age group. In our current study we observed that Hook worm infection was the most common cause of anaemia in children of ruler and slum areas of dhanbad district. It was may be due to poor educational back ground, poor sanitation, unsafe drinking water, use of contaminated food and lack of health awareness.^{18,19} Now we are going to advice and suggestion to the local Health authority to organised Health awareness programme in the ruler and slum area of dhanbad to minimised Hook worm infection.

We observed that out of 123 hook worm infected children; 29 children were anaemic. We also further categorised of 29 Hook worm associated anaemic children in to three different age group. We observed that out of 29 anaemic children; 21 were in 05 to 10 years age group, 07 were in 11 to 16 years of age group and 01 were in 17 years and above age group.

CONCLUSION

According to our observation we found that out of 480 children 248 children were 05 to 10 years of the age groups. It's seemed that society is more sensible against the health of 05 to 10 years age group particularly. We also observed that 05 to 10 years of age group of children were more infected with Hook worm infection and more anaemic than other age group.

So, we get conclusion that incidence and prevalence of hook-worm associated anaemia is most common in 05 to 10 years of the age group of children in rural and slum area of dhanbad.

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