

Intestinal parasitic infestation and anaemic status among the adolescent boys in Bangladesh

Md. Hafiz Uddin¹ and Hamida Khanum

Department of Zoology, University of Dhaka, Dhaka-1000, Bangladesh

¹Laboratory Sciences Division, ICDDR, B, Mohakhali, Dhaka-1212, Bangladesh

Abstract: The prevalence of intestinal parasitic infestation and anaemic status of adolescent boys (age 10-19 years) of two selected villages, Kutumbopur, Comilla and Gazirchat, Dhaka districts was investigated. Anaemic status was determined by measuring hemoglobin percentage and parasitic infestation was detected and identified under microscope with wet mount and stained preparations. Out of 106 adolescent boys, only two (1.9%) showed severe anaemia. Among the other anaemic status, 50.9% was moderately anaemic, 39.6% mildly anaemic and 7.5% non anaemic. Adolescent boys were infected (49.01%) with one or more type of protozoan and helminth parasites. Both anaemia and parasitic infestation were more prevalent in Gazirchat while compared to Kutumbopur. Parasitic infestation and anaemia was not correlated.

Key words: Anaemia, adolescent boys, *Ascaris*, *Trichuris*, *Entamoeba*, *Giardia*

Introduction

Anaemia is a common health problem with public health importance, affecting millions of people throughout the world. It is one of the most common problem in the developing countries like Bangladesh. Anaemia can be defined as a reduction of hemoglobin concentration per unit volume of peripheral blood below the normal (WHO, 1992). Hemoglobin concentration which is below 95% confidence interval for healthy, well nourished individuals of same age, sex and stage of pregnancy recognized as anaemic (Gilgen, 1998). The most common cause of anaemia are deficiency of iron, mal-nutrition and parasitic infestation. On the other hand, intestinal parasites in Bangladesh producing detrimental effects to health of million of people mainly children and adolescents (Karim *et al.*, 1998).

Adolescent boys are at high risk to gain parasitic infection because of their behavioural aspects, general hygiene knowledge, socio-economic status, etc. The present study aimed to determine the prevalence of intestinal infection among the adolescent boys and its effect on the anaemic status.

Materials and Methods

The present study was conducted on 106 adolescent boys, between 10 to the age of 19 years of age of two selected areas, Kutumbopur of Comilla district, a rural village whereas Gazirchat of Dhaka district, a peri urban village. The study was carried out from January to June 2002. Blood and stool samples were collected from the boys to determine the hemoglobin level and parasitic infestation respectively.

Blood sample was taken from the finger tip with pricking needle and hemoglobin concentration was measured instantly in the field with sahli hemoglobinometer according to WHO (1992, 1994).

An empty dry plastic container was provided to each of the boys to collect stool in the next morning. If any one failed to collect stool, these were collected through repeated visits. The stool samples were carried to the Parasitology Laboratory, Department of Zoology, University of Dhaka for microscopic examination.

Result and Discussion

In Kutumbopur 33.82% individuals were infected with one or more type of parasites. Among them 86.96% showed single infection and 13.04% showed infection with two different parasites (Table-1). No triple infection was observed in Kutumbopur. In case of helminth, prevalence of *Ascaris lumbricoides*, *Trichuris trichiura* were 29.41% and 5.9% respectively. The only protozoan parasite *Entamoeba histolytica* found in 2.94% adolescents.

Parasitic infestation was observed much higher in Gazirchat compared to Kutumbopur. Infestation rate was 84.21%, in which single infection observed in 43.75% cases, double infection observed in 37.25% cases and triple infection in 18.75% cases (Table-1). Both *A. lumbricoides*, *T. trichiura* showed a prevalence rate of 37.5%. The prevalence of hookworm was 43.75%, *Enterobius vermicularis* was 18.75%, *Diphybothrium latum* was 6.25% and *Giardia lamblia* was 31.25%.

Table 1. Prevalence of parasitic infestation among the adolescent boys of Kutumbopur and Gazirchat villages.

Areas	No. of boys	Infection		Single infection		Double infection		Triple infection	
		No	%	No	%	No	%	No	%
Kutumbopur	68	23	33.82	20	86.96	3	13.04	0	0
Gazirchat	38	32	84.21	14	43.75	12	37.50	6	18.75
Total	106	55	51.90	34	61.81	15	27.30	6	10.90

In Kutumbopur, few double infections were observed such as, *A. lumbricoides* and *T. trichiura* (8.69%) and *A. lumbricoides* and *E. histolytica* (4.35%). In Gazirchat, double infection was most prevalent such as, *A. lumbricoides* and *T. trichiura*; *A. lumbricoides* and hookworm; hookworm and *E. vermicularis*; *E. vermicularis* and *G. lamblia* etc. The infestation rate of *T. trichiura* with hookworm was 6.25% in the adolescent boys (Table 2).

Table 2. Double infections among the adolescent boys of Kutumbopur and Gazirchat villages.

Parasites	Kutumbopur		Gazirchat	
	No	%	No	%
<i>A. lumbricoides</i> & <i>T. trichiura</i>	2	8.69	4	12.5
<i>A. lumbricoides</i> & <i>E. histolytica</i>	1	4.35	0	0
<i>A. lumbricoides</i> & Hookworm	0	0	2	6.25
<i>E. vermicularis</i> & Hookworm	0	0	1	3.12
<i>E. vermicularis</i> & <i>G. lamblia</i>	0	0	3	9.37
<i>T. trichiura</i> & Hookworm	0	0	2	6.25

Triple infections were only prevalent in Gazirchat such as, *A. lumbricoides* with *T. trichiura* and hookworm; *A. lumbricoides* with *D. latum* and *G. lamblia*; and *T. trichiura* with hookworm and *G. lamblia*. Each of the triple infection was found in 2 individuals (6.25%) of the Gazirchat area.

In Kutumbopur, 91.2% adolescent boys showed different degree of anaemia, among them 41.2% was moderately anaemic, 50% was mildly anaemic and

8.82% was non anaemic. No severe case was found in Kutumbopur. On the other hand, in Gazirchat, out of 38 adolescents, 5.26% was severely anaemic, 68.42% was moderately anaemic, 21.05% was mildly anaemic and 5.26% was non anaemic (Table 3).

Table 3. Different anaemic conditions of the adolescent boys of Kutumbopur and Gazirchat villages.

Status of	Kutumbopur		Gazirchat		Kutumbopur+ Gazirchat	
	No	%	No	%	No	%
Severe	0	0	2	5.26	2	1.90
Moderate	28	41.2	26	68.42	54	50.9
Mild	34	50.0	8	21.05	42	39.6
Non anaemic	6	8.82	2	5.26	8	7.50
Total	68		38		106	

Parasitic infection and anaemic prevalence both were higher in Gazirchat than in Kutumbopur (Table 4). Highest parasitic infestation (90.9%) observed in Gazirchat in the age group 10-12. The anaemic conditions were also prevalent in both the areas in the age groups 10-12 and 12-14 (Table 5). The correlation between anaemia and parasitic infestation was statistically insignificant ($\chi^2=0.716$, $p>0.05$)

Table 4. Relationship between parasitic infestation and anaemia among the adolescent boys of Kutumbopur and Gazirchat.

Areas	No. of Infected boys	Prevalence of infestation (%)	Prevalence of anaemia (%)
Kutumbopur	68	23	33.82
Gazirchat	38	32	84.21
Total	106	55	51.88

Table 5. Parasitic infestation and anaemic status according to the age group of the adolescent boys of Kutumbopur and Gazirchat areas.

Areas	Age gr.	No. of boys examined	Infection (%)	Boys with moderate anaemia	Prevalence of anaemia (%)
Kutumbopur	10-12	40	35.00	30	75.00
	12-14	8	25.00	6	75.00
	14-16	14	28.57	6	42.86
	16-18	4	0	2	50.00
	18-<20	2	0	2	100.00
	10-<20	68		46	
Gazirchat	10-12	22	90.90	20	90.90
	12-14	12	83.33	10	83.33
	14-16	4	50.00	4	100.00
	16-18	0	0	0	0
	18-<20	0	0	0	0
	10-<20	38		34	
Kutumbopur + Gazirchat	10-12	62	54.84	50	80.64
	12-14	20	60.00	16	80.00
	14-16	18	33.33	10	55.55
	16-18	4	0	2	50.00
	18-<20	2	0	2	100.00
	10-<20	106		80	

Hyder *et al.* (1998) found 69% of male as anaemic in Fullbaria thana of Mymensingh district. Linpisarn (1996) reported that, in Thailand anaemia was common in all age groups with a prevalence of about 25% in male and 45% in women and children. Uddin *et al.* (2005) showed 10.14% severe anaemia, 69.56% moderate anaemia and 17.39% mild anaemia among the adolescent girls of two selected areas of Bangladesh. Uddin, *et al.* (2005) showed 71.01% parasitic infection in the adolescent girls of two rural areas and infestation rate was significantly correlated with anaemia. In another study, Huq & Sheikh (1976) showed the prevalence of parasites as 65.8%. Muttalib (1976) reported the gross prevalence of parasites were *A. lumbricoides* 92.9%, *T. trichiura* 52.46%, hookworm 9.91%, *G. lamblia* and *E. histolytica* 40.88%. Chowdhury & Brig (1979) investigated intestinal parasitic infections from Dhaka and found *A. lumbricoides* (23.18%), *T. trichiura* (10%), hookworm (6.2%), *E. vermicularis* (0.28%) and multiple infections (10.5%).

Acknowledgement

The authors acknowledge the Ministry of Science and Information and Communication Technology under R&D proposal for financial support under special allocation for Science and Information and Communication Technology for financial year 2002-2003.

References

- Chowdhury, M. & Brig, M.R. 1979. Intestinal parasitic infection in privileged class of Dhaka population. *Ban. Arm. Med. Jour.* **4**(1): 5-12.
- Gilgen, D. 1998. *The effect of iron deficiency anaemia and intestinal helminth infections on labour productivity of adult female tea pluckers*. PhD Dissertation, Cambridge, London. pp. 292.
- Huq, N. & Sheikh, A. 1976. Incidence of intestinal parasite in children of different socio-economic population of Dhaka city. *B.M.R.C. Bull.* **11**(1): 20-26.
- Hyder, S.M.Z., Chowdhury, S.A. & Chowdhury, A.M.R. 1998. Prevalence of anaemia and intestinal parasites in a rural community of Bangladesh. BRAC: 43-48.
- Karim, M.R., Rahman, M.A. & Rahman, M.M. 1998. *Reflex: A guide to physiology and biochemistry*. 8th ed. Shadow printing, Dhaka. pp. 62-108.
- Linpisarn, S. 1996. Iron deficiency and anaemia in children with a high prevalence of hemoglobinopathies: implications for screening. *Intl. J. Epidemiol.* **25**(6): 1262-1266.
- Muttalib, M.A. 1976. Prevalence of intestinal parasite in rural children in Bangladesh. *Bang. Med. J.* **4**(1): 15-21.
- Uddin, M.H., Rahman, M.M. & Khanum, H. 2005. Hemoglobin level among adolescent girls and its relation to intestinal parasites. *Bangladesh J. Zool.* **33**(2): 183-187.
- World Health Organization. 1992. The prevalence of anaemia in women: a tabulation of available information. 2nd Ed. Geneva, WHO: 5-12.
- World Health Organization. 1994. Report of the WHO informal consultation on hookworm infection and anaemia in girls and women. WHO/CTD/SIP/96. **1**: 1-46.

Manuscript received on 25.05.-2008, accepted on 06.09.2008