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An Epidemiological Study of *Ascaris* Infestation in Meerut, Utter Pradesh (India)

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ABSTRACT

The present study was carried out from 2006 to 2009 for human intestinal diseases and a survey was carried out from urban and rural population of Meerut. This study was conducted on 451, persons.For the present study the sample of stool was collected from both areas of population. The collected stool specimens were examined microscopically for the presence of eggs, cysts and trophozoits of intestinal parasites, using direct saline smear method for the confirmation of parasitic positive patients. The persons having any cysts/ova/trophozoits/whole parasite were treated as parasitic positive and those have not treated as negative persons for intestinal parasites. Parasitic positive patients were subjected for hematological and biochemical examination. t – Square test was applied for analyzing the data. Present observations point out that ascariasis is the most common intestinal parasitic disease, Overall prevalence was found to be 37.5% in urban population as compared to (34.4%) the rural population of Meerut. This study will be helpful to tackled at the present day conditions. This study provides the influence of unhygienic condition of the continuity of human intestinal parasitic infection.

Key Words: -Ascariasis, Epidemiology, Poverty, Parasitic Infection

Introduction

Intestinal parasitic infection is a serious public health problem throughout the world particularly in developing countries. Like other countries in sub saran region epidemiological data regarding prevalence of intestinal parasites and their associated factors. These infections are the most prevalent in tropical and sub – tropical regions of the developing world where adequate water, sanitation facilities and poor economic conditions are lacking. (Savioli 2004, Cappello, M. 2004, Sah and Bhattarai S 2013 and Nxasana et al, 2013). Health component depends upon socio – economic status, housing, hygiene ie. Water supply, food hygiene, environmental hygiene and personal hygiene sanitation and education. Parasitic infection is a major cause of morbidity and mortality worldwide increased international travel means that take care for patients with parasitic diseases (Noyer and Brandt, 1999). Human intestinal parasites are highly specialized, possessing numerous adaptations, many of which are associated with their host and its mode of life. A parasite is an organism, which feeds off and usually within a host body, such as our body or other living organism like plant and animals. They feed on the nutrient cells, blood and organs of the host. They reproduce by depositing thousands of eggs or simply by cells division within the host tissues and cells. The usual symptoms of intestinal worms are diarrhea, foul breath, dark circles under the eyes, constant desire for food and restlessness at night with bad dreams, anemia

and headaches. For some species of intestinal parasites, infection occurs orally, i. e. by ingestion of *Ascarislumbricoides* of *Trichuristirachiura* eggs or *Giardia lamblia* cysts from contaminated food, water hands or utensil. Ascariasis is a round worm infection of human intestines. It's common throughout the world in those places where sanitation is poor. In these areas people may be carrying the parasite that causes the infection. Ascaris, hookworm and whipworm are parasitic worms. They are known as soil – transmitted helminthes (STH)because the infection spreads through contaminated soil. Ascaris sometimes abbreviated as A., is the group of worms that cause ascariasis. The worm looks like the common earthworm. It's about 6 – 13 inches long and about as thick as pencil. Up to 100 worms could potentially intact a parson. The usual symptoms of intestinal worms are diarrhea, foul breath, dark circles under the eyes, constant desire for food and restlessness at night with bad dreams, anemia and headaches. Round worms may give rise to inflammation of the intestine and lungs, nausea, vomiting, loss of weight, fever, nervousness and irritability. Ascariasis is common throughout world and caused by *Ascarislumbricoides*. It is most common helminthic infection. It is estimated that about 1.3 billion people were infected worldwide and the prevalence of the infestation was about 250 million during 1997 (WHO, 1998). It is clinically manifested by vague symptoms of nausea, abdominal pain and cough. Live worms are passed in the stool or vomited. Occasionally, they may produce intestinal obstruction and may migrate into the peritoneal cavity. (Holland, 2009) reported that *Ascarislumbricoides*the human roundworm is a remarkable infectious and parasite. (Cook, et. al., 2009) reported that average overall prevalence of infection for specific parasite was *Ascarislumbricoides* 17.7%. (Ulukanligil, et, al. 2006) observed that *Ascarislumbricoides* was the most frequently detected helminth (45%) followed by *Trichuristrichiura* (25.30%), *Hymenolepis nana* (10.15%) and *Teania species* (5%). (Chhakda, et. al. 2006) Helminth infection such as *Ascarislumbrcoides* (27.7%) and Hookworms (29.7%) were common. (Alvardo, et. al. 2006) observed that in a community of the 136 children, 36.6% were infected, 26.2% had helminth infections (*Ascarislumbricoides, Trichuristrichiura, S. sterocorlis*) and 11.8% has mixed infections. (Rai, et. al. 2004) reported that *Ascarislumbricoides* was the most common parasite detected. (Jung, et. al. 2004) studied a case of intestinal nephritis in a case of *Ascarislumbricoides* infection. Laboratory investigation revealed elevated count of leucocytes. (Mahata and Laskar, 1983) reported that the highest incidence was that of *Ascarislumbricoides* (10.1%) followed by *Giardia lamblia* 6.7%, *Entamoeba histolytica* 6.2%, *Entamoeba coli* 4.6% and *Ancylostoma*species 2.3%.(CIOMS, 1976) also reported that *Ascarislumbricoides* lives in the limen of small intestine where it moves freely.It was believed that 60 – 80 percent of population of Eastern Coast of Tamil Nadu and Andhra Pradesh were infected with hookworms. Different species of parasites have been found in preserved human faecal material from historic and prehistoric times throughout the World. Many findings of nematodes, Trematodes, cestodes, and acanthocephalan eggs in archaeological material are available in literature (Rainhard, et. al. 1986, Rainhard, at. al. 1990 and Golcaves et. al. 2003).

Material and Methods

This study was conducted on human intestinal parasitic patients and few healthy subjects as control. In this study, a survey was carried out for human parasitic diseases, from rural and urban populations of Meerut District from 2006 to 2009. For the present study, a total of 451, samples of stool for both rural and urban populations were collected for microscopic investigations in

laboratory. The Simple Smear in Saline method was used to determine the stool samples. The persons having any cyst /ova / trophozoit / whole parasite were treated as parasitic positive patients. Blood samples were collected from intestinal parasitic positive patients and few healthy subjects as control for hematological (Hb, RBC, TLC, DLC, ESR, PCV, MCV, MCH and MCHC) and biochemical (Serum Total Protein, Serum Total Albumin, Serum Total Globulin. Serum Iron, Serum Binding Capacity, Serum Glucose and Serum Lipids) studies.The t –Square tests were performed.

Results and Discussion

1. Hematological findings:-

The mean level of Hemoglobin (Hb) in the patients of ascariasis was observed as 9.6 ± 0.122gm/dl, Red Blood Cells (RBCs)3.18 ± 0.372 million/cumm, Total Leucocytes Count (TLC)8610 ± 64.04mm^3. It was higher than control. The mean level of erythrocyte sedimentation rate (ESR) was observed as 10 ± 0.709 mm in 1st hr. It was significantly higher as compared to control group. Packed cell volume (PCV) was28.8 ± 0.375 percent, mean corpuscular volume (MCV) was observed as 90.54 ± 0.112 cubic micron and it was significantly higher as compared to control. The mean level corpuscular hemoglobin (MCH) were observed as 30.18 ± 0.365 picograms. Mean corpuscular concentration (MCHC) was 33.3 ± 0.352 percent. The mean level of differential counts (DLC) were observed in Polymorphs (P) 58.6 ± 0.677 percent, in Lymphocytes (L)32.2 ± 0.862 percent, in Eosinophils (E)6.8 ± 0.375 percent, in Monocytes (M)2.2 ± 0.375 percent and in Basophils (B) was observed as 0.4 ± 0.245 percent.

2. Biochemical Findings:-

The mean level of Serum total protein (STP) was observed in the patients of ascariasis as 6.6 ± 0.130 gm/dl, Serum albumin (S. A) was 3.96 ± 0.143 gm/dl, Serum globulin (S. G) was observed as 2.64 ± 0.125 gm/dl, Serum Iron (S I) mean level was 83.2 ± 0.862 µg/dl, Serum iron binding capacity (SIBC) mean level was observed as 321.4 ± 2.29 µg/dl, the mean level of serum of glucose (S G) was observed as 100.4 ± 4.68 mg/dl and the mean level of serum lipids was observed in the patients as 585.4 ± 12.29 mg/dl. It was decreased as compared to control group. However, it was statistically insignificant value.

In the continuation of this study, another study also revealed that the high prevalence of intestinal helminthes shown in the low socio – economic group. (Bhandari, et. al. 1985, Kumar et. al. 2013, Kumar et. al. 2015, Kumar, et. al. 2017, Kumar, P., 2018, Kumar, P., 2018, Kumar, P. 2018, and Kumar, P. 2021). The relationship between socio - economic status and child mortality has been well documented (Faarah, et. al. 1982, D'souza, et. al. 1982, Da Vanza, 1983, Majumdar, et. al. 1993 and Spencer, at. al. 1996).

CONCLUSION

The aim this study was to find out association, if any, between social factors like as age, sex, rural or urban area, marital status, income, education and parasitic diseases these factors and prevalence of diseases might prove helpful in planning and execution of an effective strategy directed to eliminate the diseases in highly endemic areas. This study provides the influence of unhygienic condition of the continuity of human intestinal parasitic infections in rural and urban population.This study will be helpful to tackled at the present day conditions. Initiatives aimed at improving the nutritional status of school children are also needed.

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Table: - 1. Hematological findings in the patients of Ascariasis:-

Parameter (Unit)		Control	Aacariasis
Hb (gm/dl)		14.42 ± 0.185	9.6 ± 0.122*
RBC (million/cumm)		4.78 ± 0.058	3.18 ± 0.0372*
TLC (mm3)		8570 ± 48.29	8610 ± 64.04
ESR (mm in 1sthr)		3.2 ± 0.375	10 ± 0.709*
PCV (%)		42.8 ± 0.58	28.8 ± 0.375*
MCV (cubic micron)		89.4 ± 0.134	90.54 ± 0.112*
MCH (picograms)		30.2 ± 0.0776	30.18 ± 0.365
MCHC (%)		33.7 ± 0.086	33.3 ± 0.352
DLC (%)	P (%)	61 ± 1.0	58.4 ± 0.677*
	L (%)	32.2 ± 1.34	32.2 ± 0.862
	E (%)	2.6 ± 0.40	6.8 ± 0.375
	M (%)	03 ± 0.44	2.2 ± 0.375
	B (%)	0.2 ± 0.20	0.4 ± 0.245

Values express as mean ± SE (n=5)
* Value significantly different from control.

Table: - 2. Biochemical findings in the patients of Ascariasis:-

Parameter (Unit)	Control	Aacariasis
Serum Total Protein (gm/dl)	7.06 ± 0.075	6.6 ± 0.130
S. Albumin (gm/dl)	4.08 ± 0.058	3.96 ± 0.143
S. Globulin (gm/dl)	2.98 ± 0.116	2.64 ± 0.125
S. Iron (µg/dl)	85.6 ± 1.54	83.2 ± 0.862
S. Iron binding capacity (µg/dl)	326.4 ± 4.65	321.4 ± 2.29*
S. Glucose (mg/dl)	102 ± 1.27	102.4 ± 4.68
S. Lipids (mg/dl)	630 ± 6.34	385.4 ± 14.29*

Values express as mean ± SE (n=5)
* Value significantly different from control.

Fig:- 1. Hematological studies showing the status ofTLC in the patients of Ascariasis.

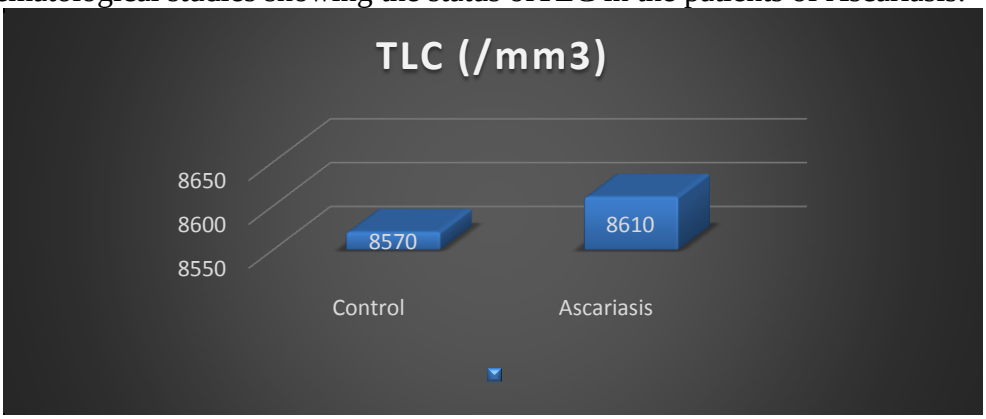

Fig:- 2. Hematological studies showing the status of DLC in the patients of Ascariasis.

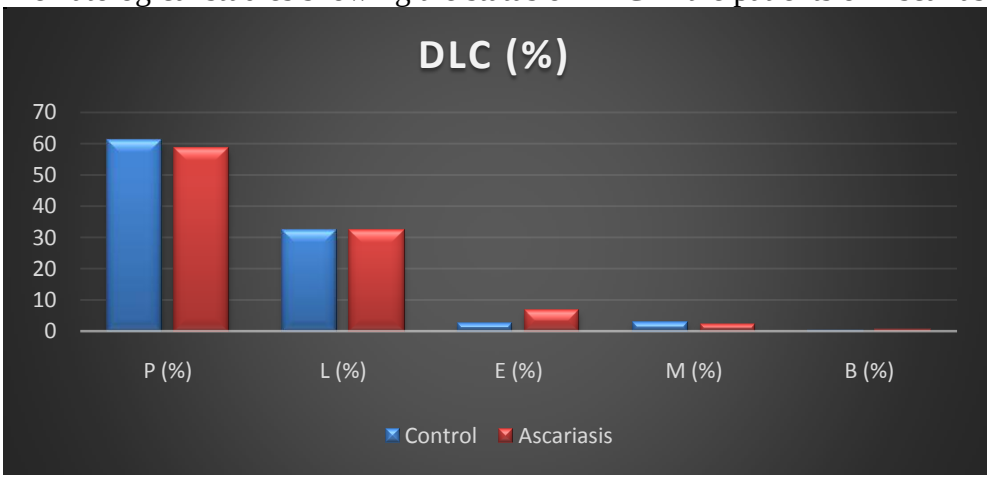

Fig:- 3. Hematological studies showing the status ofHb, RBC, ESR, PCV, MCV, MCH and

MCHC in the patients of Ascariasis

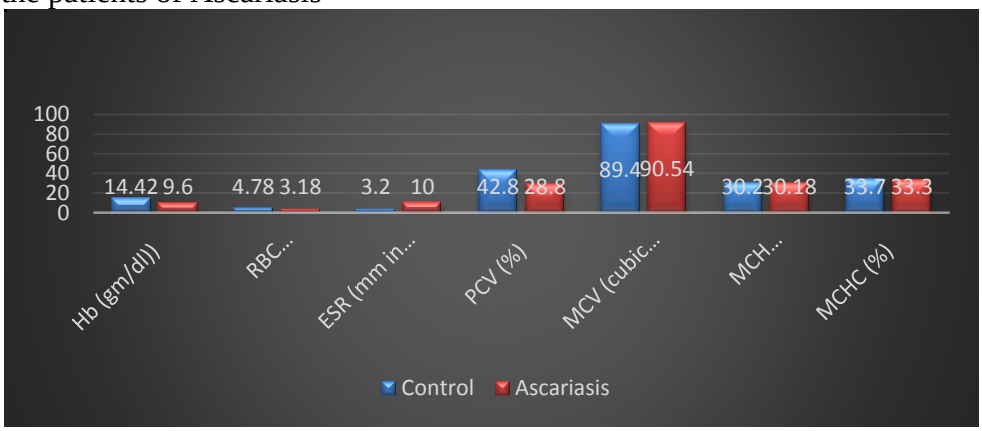

Fig:- 4. Biochemical studies showing the status of STP, S. Albumin, S. Globulin in the patients of Ascariasis.

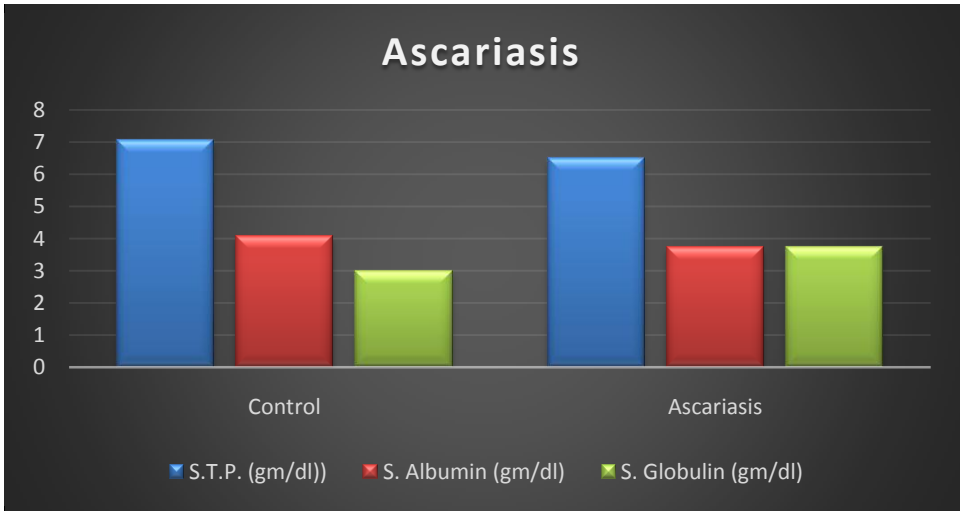

Fig:- 5. Biochemical studies showing the status of STP, S. Albumin, S. Globulin in the patients of Ascariasis.