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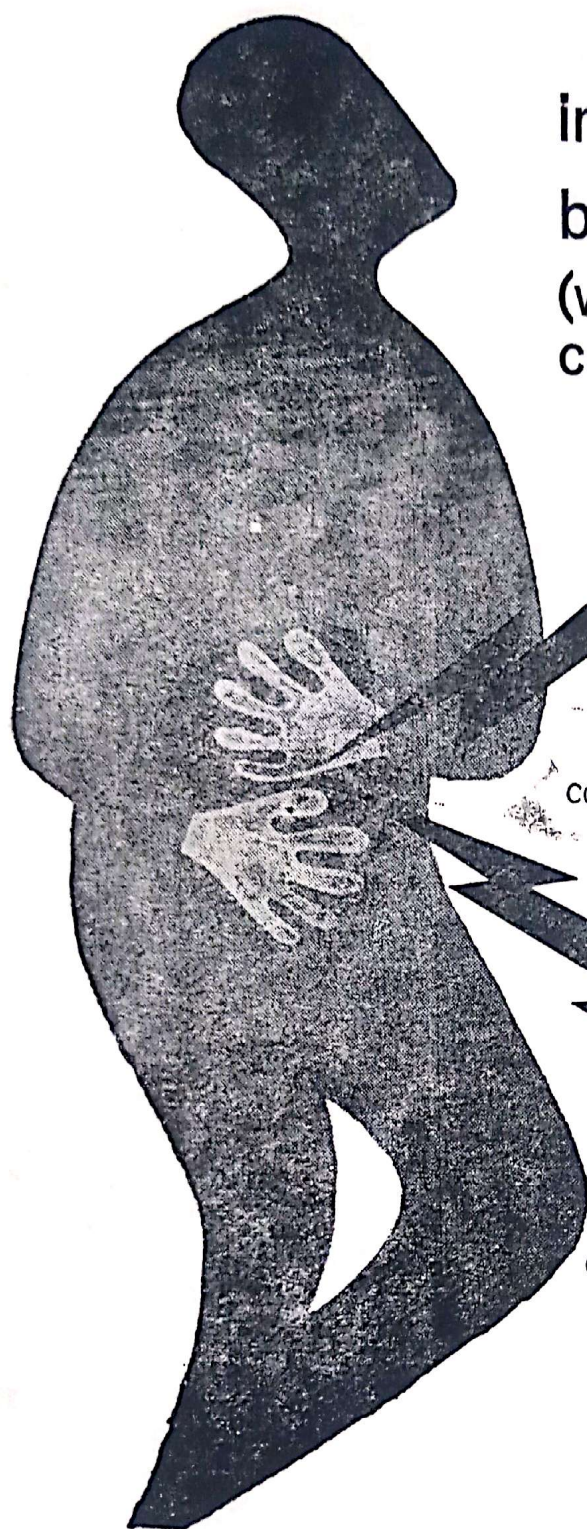
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in
bacillary dysentery
(whatever it's
called)

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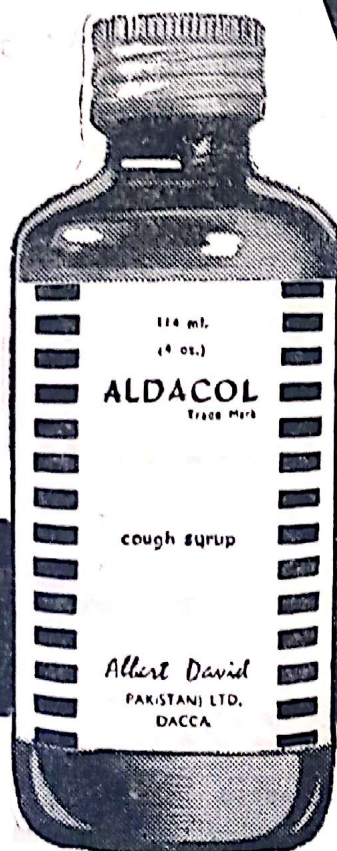


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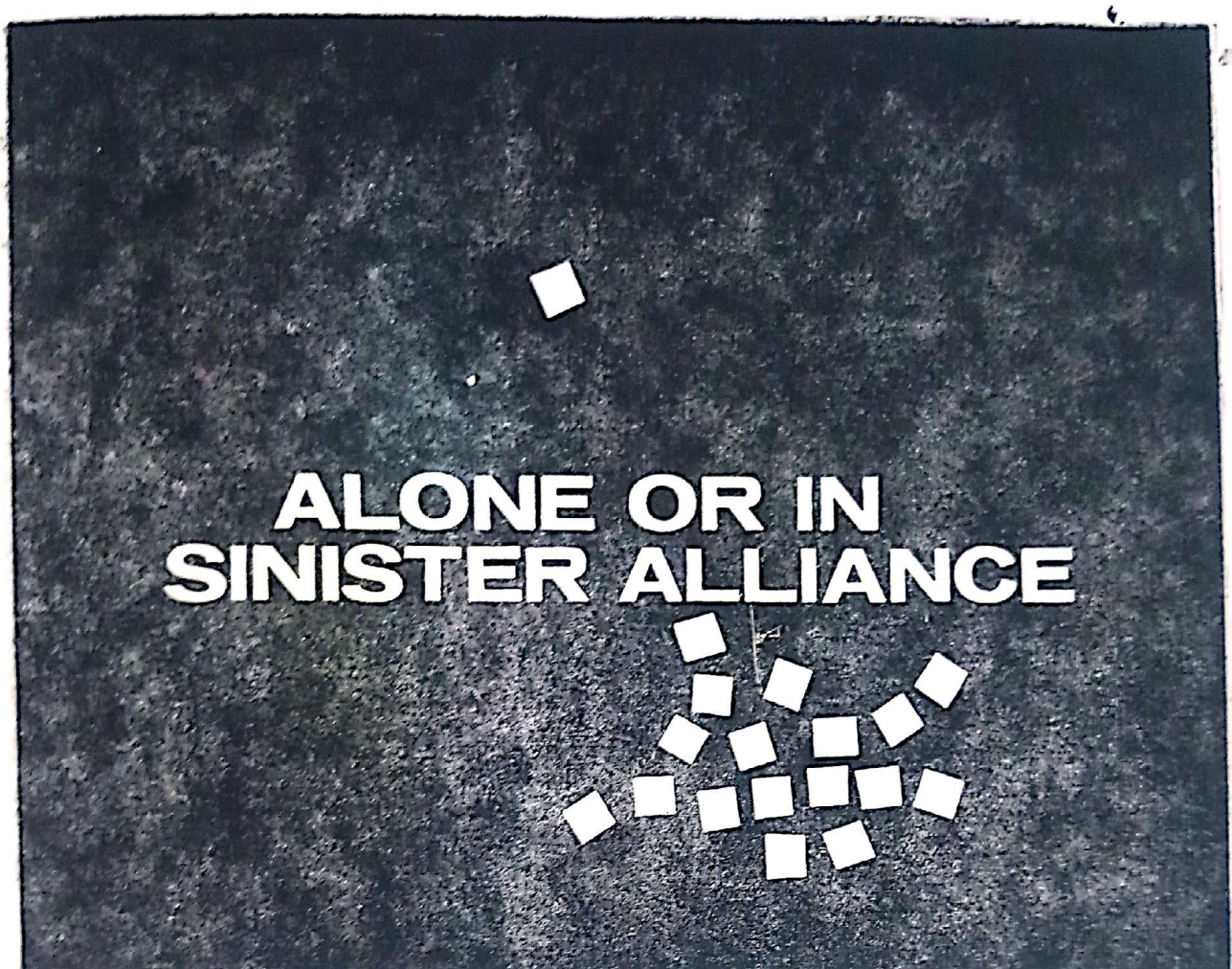
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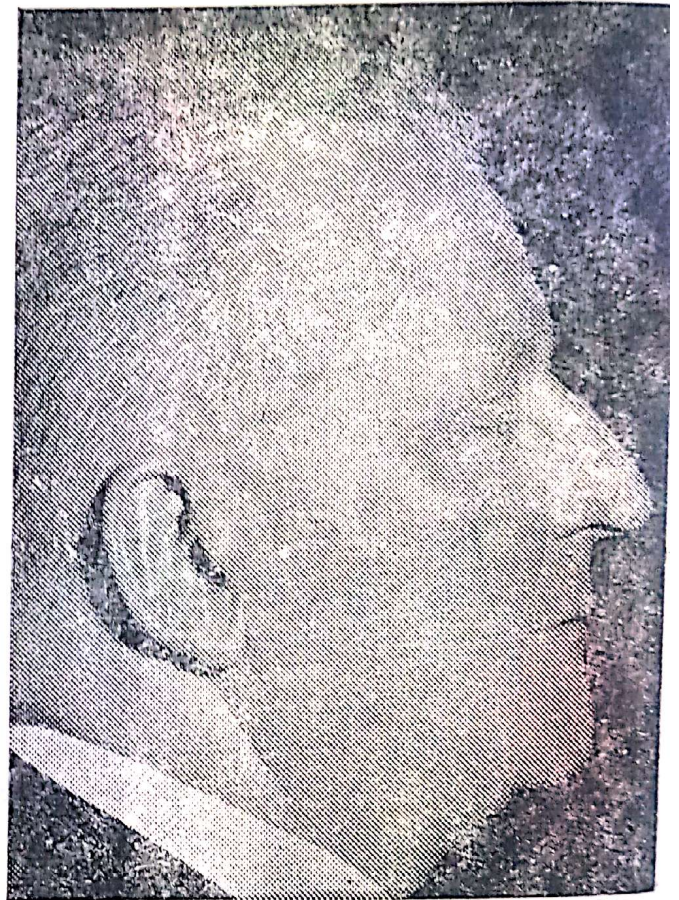
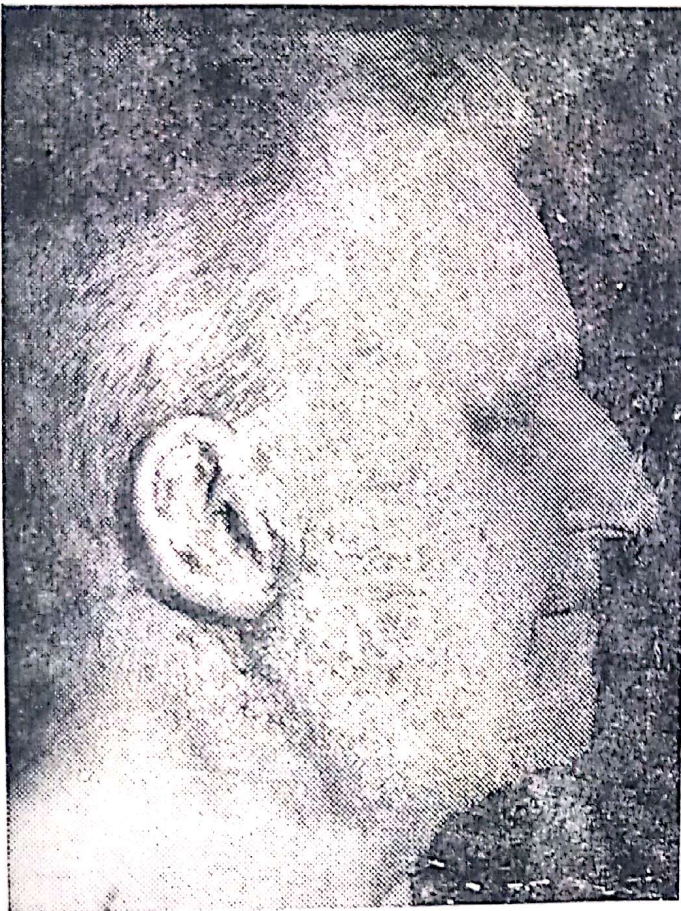
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INTESTINAL PARASITIC INFECTIONS IN CASES WITH DEFINITE CLINICAL EVIDENCE

By

Professor M. ATIQR-RAHMAN ANSARI¹

Ph. D. (Pb), Sc. D (Paris), D.Sc. (Pb), F.P.A.S., F.E.S.I., F.R.E.S.

1. INTRODUCTION

(١) لَقَدْ خَلَقْنَا الْإِنْسَانَ فِي كَبَدٍ ۝
(٢) أَأَجْسَدُ أَنْ تَنِيَّ يَقْدِرَ عَلَيْهِ أَحَدٌ ۝
(٣) وَارْسِلْ عَلَيْهِم طَيْرًا أَبْصِلَ ۝

*The web of life is a mingled yarn,
Good and ill together*

(SHAKSPEAR)

Our digestive tract harbours more or less sixty-six per cent of the parasites invading human body. Possession is attended with fear and pursuit with hope. The parasite acts passionately to subdue the host. The host functions according to the time honoured axiom *for each action there is equal and opposite reaction*. The body of the host makes concerted efforts and adopts ways and means at its command to evade the harmful effects of the intruder. A series of protective reactions against the mechanical annoyances, toxic irritations and the bye-product hazards are stimulated. There is a chain of attacks and counter attacks. The sum total manifestation of deranged functions and protective reactions of the host appear as general signs and symptoms. Some of the victims feel the presence of teeming millions of unwanted living things within their body and show *apparent absence* of "complete physical, mental and social well being." In others there is absence of symptoms and it is the inquiring eye of the microscopist which may definitely reveal the presence of microscopic organisms within the microcosm. The latter state of infection usually occurs in adult age groups. Poorly nourished communities are poorly supplied with resistance mechanism to infection and therefore, may show high rate of parasitism and

-
1. Professor of Medical Entomology and Parasitology, Institute of Hygiene and Preventive Medicine, 6-Birdwood Road, Lahore-3 (West Pakistan).
 2. (i) Certainly we have created man to be in distress.
(ii) Does he think that no one has power over him (Al-Balad, 90 : 4)
(iii) And sent down to prey upon them birds in flocks (Al-Fil, 105 : 3)

"Pak. Jour. Hlth., 14(3)"

well defined symptoms. Clinical significance of infection, is directly proportionate to the number of parasites present in the bowels of the host. If the intake of the pathogenic strain of the parasite is negligible, the symptom manifestation is also negligible to be perceived, felt or noted.

1.1. Signs and Symptoms :

*Endless is the list of human ills,
And signs might sooner fail than cause to sigh.*

(Dr. YOUNG)

Some of the subjective and objective symptoms, evoked by the intestinal parasites, are important bedside means available to the physician to identify tentatively the cause of certain complaints. The history given by the patient, together with physical examination, give him a chance to step a pace forward in determining the probable culprit.

Although every tree is known by its fruit, from thorn men do not gather figs nor from bramble bush one ever gathers grapes (Luke VI : 44), yet dysentery does not always mean *E. histolytica*. Usually several intestinal parasites give rise to similar symptoms (Ansari, & Sapru, 1963-64). The symptoms are not at all pathognomic and one is, therefore, not so easily guided to the specific diagnosis. The scientific knowledge, the physician's experience and his clinical sense just lead him to probabilities.

According to the intensity of symptoms, the intestinal troubles caused by the various intestinal parasites may be few, mild, moderate or acute. A definite clinical evidence to the presence of a parasite may be totally wanting. The symptoms in others may be less marked, slight or atypical. This state of gradation of symptoms warrants to divide infections into several categories. These categories are well pronounced in protozoal than helminthic infections.

In *acute (severe) cases* of infections, the symptoms are extensive and well marked. Entire abdomen may be involved and become tender. Diarrhoea may be severe and dysentery fulminating. The patient may be seriously incapacitated and show rapid loss of weight. Except during epidemics, acute cases occur in relatively very small number.

In *subacute (moderate) cases* the manifestations are less frequent and of more moderate nature. Except during epidemics, the subacute cases are also small in number.

In *chronic (mild) cases*, the manifestations are mild in nature and occur after long intervals. There is periodic reactivation of the acute state. Except during epidemics, the incidence of chronic cases is high but is much less than in asyndromic cases. In Lahore, we come across numerous persons, who complain of vague abdominal pain and discomfort time and again and therefore, they usually keep a

vial of Enterovioform which gives them immediate relief of the periodic trouble supposed to be due to *E. histolytica*. Supposed, because the laboratory confirmation is invariably wanting and sigmoidoscopy is never attempted.

In *asymptomatic* cases of infection, there are no distinctive manifestation. There is, however, a generalised indisposition with the presence of the parasites. An antiparasite therapy gives a definitive relief. When the host and parasite are in a state of complete compromise, a sort of equilibrium is established and the parasite is in commensal phase. Such cases show slight or no clinical evidence of infection and the host is usually a symptomless carrier.

Table I. SHOWING GRADES OF SYMPTOMS

Parasitic manifestations distinct.			Parasitic manifestation vague and indistinct	
Peridromal episode of the manifestations.	Manifestations moderate and less frequent		No distinctive manifestations. Generalised indisposition, symptoms relieved with anti-parasitic therapy.	No subjective or objective evidence of illness.
	Symptoms more moderate.	Symptoms more mild.		
Infection extensive	Periodic reactivation.	Occur periodically in acute form.	ASYNDROMIC (VAGUE)	Commensal Stage.
Patient feels incapacitated.				
Classical picture of infection.				
ACUTE (SEVERE)	SUBACUTE (MODERATE)	CHRONIC (MILD)		SYMPTOMLESS (INDISTINCT)

1.2. The Damage

*The noblest reward of virtue is virtue itself ;
And the extremest punishment of vice is vice itself.*
(LORD BACON)

The clinical effects due to the parasites are not explosive in nature. The classical picture usually develops slowly and steadily. The parasites exert influence and damage the host in a variety of ways.

The hook-worm larvae, during the process of entering the skin, cause physical damage. The migrating larvae of round-worms and hook-worms rupture the pulmonary capillaries and cause appreciable extravasation and effusion of blood.

The adult hook-worms are responsible for much traumatic destruction of the villi. The round-worms do not cause intestinal obstruction alone but may also perforate intestinal wall, penetrate liver and lungs. The intestinal obstruction may also occur due to beef-tape-worms.

The enzymes, secreted by the trophozoites of *E. histolytica*, do not only lyse tissue to meet the nutritional needs but also are means of penetration available to the parasite into the tissue of colon etc.

Activities of almost all the animal parasites provoke host tissue reaction. The host continuously attempts to get rid of the parasite. It may destroy it right away or restrict it by fibrous encapsulation. There may also occur systematic increase in certain types of cells. The constant irritation may result in neoplastic growth. The amoebic granuloma may in rare instances give rise to carcinoma of colon.

In *ascariasis* and *strongyloidiasis* there is moderate or notable eosinophilia. Increased erythropoiesis may occur in extensive amoebic invasion of colon. Hook-worm attachment to intestinal wall is also known to cause increased erythropoiesis. The mechanical loss of blood and destruction of erythrocytes ultimately result in anaemia.

Supersensitiveness is a state of exaggerated response to an antigen. It may lead to severe reactions. Allergy, anaphylaxis, serum sickness, atopy and etc, are some of the known manifestations of supersensitiveness. Active and most familiar sensitization to foreign substances is known to occur when the helminth larvae penetrate the skin of the host. The migrants also stimulate the production of anti bodies when contacting intimately with the viscera of the host. Relatively prolonged host-parasite association increases probability of specific antibody response to the introduction of foreign antigen. The chances of hyper-sensitization increase when the superinfection with the same agent occur repeatedly in quick succession. The toxic and allergic phenomenon are of more frequent occurrence in *ascariasis*.

1 3. Causes and Effects

*Still as they run they look behind,
They hear a voice in every wind,
And catch a fearful glance.*

(GRAY)

The symptoms attributed to different parasitic infections depend upon various conditions. Endemicity usually promotes certain degree of tolerance in a community towards an animal parasite. A new parasite or a new strain of a parasite, when introduced for the first time into a community, on the other hand may exert a severe devastating effect.

The total clinical picture presented in most helminthic infections is due to intoxication and sensitization. Mechanical loss of blood in *ancylostomiasis* constitutes an important disease syndrome.

Pneumonitis due to migrating helminthic larvae may develop a few days after ingestion of the eggs. The amoebic colitis may become acute within a few days if numerous cysts, of high pathogenic index are swallowed by most susceptible hosts with low threshold of resistance.

1.4. Means of Spread

*Habits are soon assumed ; but when we strive
To ship them off, 'tis being flayed alive.*
(COWPER)

Although foods and drinks are conservative means of spread of animal parasites viz. *Entamoeba histolytica*, *Giardia intestinalis*, *Trichomonas hominis*, *Ascaris lumbricoides*, etc, yet an intimate contact of infected individuals with uninfected individuals and susceptible hosts is also an important alternative means of dispersal of *G. intestinalis*, *Enterobius vermicularis*, etc. Children, labourers and farm workers pick up and inadvertently ingest fully embryonated eggs of *A. lumbricoides*, *T. trichiurus* from soil polluted by human excreta. Eating of raw vegetables, produced on contaminated soil and seeded fields or washed in water obtained from unprotected source, is also common means of spread of *A. lumbricoides* and *T. trichiurus*.

Auto-infection is of common occurrence in *E. vermicularis* and *S. stercoralis*. Direct contact with infected soil is responsible for human infections in *S. stercoralis* and hook-worm. Filth flies seem to be heroes in the spread of several intestinal parasites. The success of transmission through the mechanical vectors largely depends upon the speed with which an organism is taken from the filth to the food and the suitability of temperature and moisture of the new environment on which it is deposited. However, the fact remains that she has pledged and signed a pact to transport protozoal cysts and helminthic eggs from manure to man, from faeces to food, from filth to face and she is doing it to her best advantage since time immemorial.

Direct anus to mouth infection by the contaminated fingers is commonest means of infection in *E. vermicularis*. Auto-infection also occurs in *H. nana* and *S. stercoralis*.

Retrofection has been reported in moist environments, when eggs of *E. vermicularis* hatch on the anal mucosa and the larvae migrate up to the bowel to develop into adults. Internal auto-infection has also been suspected of occurring in *E. vermicularis*. Filiform larvae of *S. stercoralis* sometimes develop before leaving the host. These may pass in the fresh stools and on contact enter exposed perianal and perineal skin of the host. In other cases, however, the larvae either enter perineal skin, or enter intestinal mucosa, migrate to lungs and initiate auto-infection.

1.5. Factors of Transmission

Age influences the incidence of an infection considerably. *G. intestinalis*, *T. trichiurus*, *A. lumbricoides*, etc. are much more prevalent in children than in adults. The rate of infection is comparatively high in children of large families, asylums, juvenile jails, *darul shafqats*, *darul-niswan*, industrial homes and primary schools. Higher incidence in one age group than the other may be directly proportionate to the rate of exposure. In some communities however, in addition to reduced rate of exposure, immunity which due to constant exposure develops in advanced age groups, plays significant role in this regard.

High incidence in adults may usually be due to greater chances of re-exposure. The infection rates also fluctuate from males to females and vice versa. Comparatively high rates in either sex are for reasons of occupation. Some parasites (*ascariasis*) are highest in those who live in-doors while others (hook-worms) only infect out door-workers. One may acquire considerable tolerance to an infection if subjected to repeated and long continued exposures to a particular strain of parasite. Severe infection may be established within a few days if numerous eggs or cysts, of high pathogenic index are swallowed by most susceptible host and with low threshold of resistance.

Over and above other factors, poor social conditions increase incidence of parasites. People with low income index are usually more exposed to the onslaught of the parasites. Poverty lowers ability to resist the invasion. Poor quarters have deplorable sewage disposal facilities and are exposed to contamination with faecal matter. Insanitary and unhygienic living conditions, congestion and filth flies further increase chances of infection.

Cardinal manifestations are comparatively better understood by those who work in an endemic area. The relatively accurate presumptive diagnosis is again made, if the symptoms evoked are typical and the patient involved is from an endemic area. A patient showing classical symptoms of *ancylostomiasis* and coming from Shakargarh Tehsil (Sialkot) may be safely presumed harbouring hook-worms. In 99 per cent cases the laboratory diagnoses may probably confirm the clinical diagnosis.

In asyndromic intestinal diseases however, the clinical sense does not help much. It is not uncommon to have uncomplicated amoebic colitis without dysentery and diarrhoea but with multiple undermining intestinal ulcers. In a seatworm case, on the other hand neurological manifestations may not commensurate with the degree of tissue damage. Lethargy and lassitude may also be due to the invasion of intestinal parasites. Even though the parasite may not produce clinically demonstratable symptoms but may interfere with the metabolic balance of host. It reminds us of a valuable saying: "*What are usually termed trifles are no longer so, when there is possibility of their taking a serious turn.*" In parasitosis, *parva scintilla excitavit magnum incendium*, works more appropriately than elsewhere.

Infection in a community depends upon several artificial and natural factors. If these factors, operating to perpetuate the infection, are modified, corrected or removed, the transmission may be restricted, the incidence may be brought down and the parasite may be eradicated from a country. *Oppose the first appearance of evil*, remains a guiding principle in parasitology. The community needs to be prepared to act upon it rigidly.

Adequate source of infection in the human population is a prerequisite. If the supply of the infective stages of the parasites to a community is large, high rate of incidence becomes imperative.

Extrinsic development of the parasites and their transmission occurs if the human stool is deposited in favourable locations. Promiscuous defaecation and free use of night soil for manurial purposes, contaminates agricultural and vegetable farms and increases chances of infection in field workers and children. The community habits are important contributory factors in building up parasitic infections.

Suitable moisture and warmth promote development of parasites. Shady places are most congenial, and do not only create but may also maintain optimum conditions of temperature and humidity for the extrinsic development of cysts and ova of human parasites.

If the human night soil is collected in suitable environments, the developing stages of the zooparasites contained in it, get more favourable conditions for further development and remain viable for long periods. Prolonged cold and dry weather is detrimental for the development of cysts and ova. Excessive rains are also most unsatisfactory for the delicate stages. Fairly well distributed and well spaced annual rains however, favour the development, distribution and spread of parasites.

The soil texture also plays an important role in the development and survival rate of cysts and ova. The sandy and humous soil is ideal for the viability of these stages. The parasites do not survive long in heavy soils, which have defective aeration and faulty percolation. Soil of Lahore area is most suitable for cultivation. Due to availability of manures, lands nearest to the city, are more productive. Intensive vegetable growing also promotes promiscuous use of night soil manure. This practice gives incentive to the spread of bowl-parasites also. Malnutrition is frequently associated with certain parasitic infections. Under nourished communities have lesser resistance and therefore, high level of parasite index. Defensive and offensive sides of poorly fed communities are poor. The parasites therefore, are in privileged position to establish if transmitted in those who have defective nutrition and lower vitality.

Primitive standards of sanitation and bad water supply promote parasitic infections in a community. Hence the parasitologists and the hygienists always

say, "let us find out what parasites a man has and we will tell you under what standard of sanitation he lives." Improvement of sanitation is a blow to the bowel parasites. It is cheaper, effective and the only tool to eradicate zoo-parasites from endemic areas. Motivation of the communities is an essential need. Self-help attitude of the communities has done good elsewhere and it is going to do wonders in this country also.

1 6. Material and Method

1.6.1. MATERIAL : During 1958-59, on our request the Medical Officer, Borstal Institute, Lahore, kindly provided us facilities of examining stools of all such cases who complained of dysentery, diarrhoea, abdominal discomfort and other symptoms suggestive of parasitic infections. It is our privilege to thank Dr. M. Riaz Mir, the then Medical Officer, for unstinted help and co-operation throughout these studies. We examined 701 stools, on an average 2.5 stools daily, during the period commencing from January 1958 and ending on November 22, 1959. 74.64 per cent stools were found harbouring zooparasites. The stools of 604 males and 97 females examined were adults, and the ages ranged from 19 to 57 years.

The symptoms reported by the stool donors ranged from slight dyspepsia to serious gastro-intestinal disturbances. In most instances, the infected persons manifested mild symptoms. Pronounced symptoms were, however, infrequent. Each person gave history of a variety of clinical symptoms. The most common symptoms reported, are tabulated below.

Table II.—GIVING SYMPTOMS REPORTED TOGETHER WITH THE PARASITES INCRIMINATED

Complaints reported (per cent)	Parasites usually involved.	Parasites found.
1. Anorexia (15-18 per cent)	<i>E. histolytica</i> , <i>G. intestinalis</i> , <i>T. trichiurus</i> , <i>E. vermicularis</i> , <i>A. lumbricoides</i> and Hook-worms.	<i>E. histolytica</i> , <i>G. intestinalis</i> , <i>A. lumbricoides</i> , Hook-worm and <i>H. nana</i> .
2. Capricious appetite. (18-20 per cent)	<i>A. lumbricoides</i> and <i>T. saginata</i> .	<i>A. lumbricoides</i> , <i>G. intestinalis</i> , <i>H. nana</i> and <i>T. saginata</i> .
3. Hunger pain (18-20 per cent)	<i>A. lumbricoides</i> , <i>T. trichiurus</i> , Hook-worm and <i>T. saginata</i> .	<i>G. intestinalis</i> , <i>A. lumbricoides</i> , Hook-worm, <i>H. nana</i> and <i>T. saginata</i> .

4. Gastro-intestinal disturbances. (80-85 per cent)	E. histolytica, I. butschlii, G. intestinalis, A. lumbricoides, T. trichiurus, Hook-worm, H. nana and T. saginata.	E. histolytica, G. intestinalis, A. lumbricoides, Hook-worm, T. saginata and H. nana.
5. Vague abdominal discomfort and desepsia (40-45 per cent)	E. histolytica, T. trichiurus, A. lumbricoides and T. saginata.	E. histolytica, G. intestinalis, A. lumbricoides, Hook-worm, H. nana and T. saginata.
6. Nausea, vomiting (5-8 per cent)	E. histolytica, A. lumbricoides, Hook-worm and T. saginata.	G. intestinalis, A. lumbricoides, Hook-worm and H. nana.
7. Abdominal eructation (5-7 per cent)	T. trichiurus and A. lumbricoides.	A. intestinalis and H. nana.
8. Flatulence (12-15 per cent)	G. intestinalis, T. trichiurus and Hook-worms.	G. intestinalis, A. lumbricoides and H. nana.
9. Indigestion (25-30 per cent)	T. trichiurus, A. lumbricoides and Hook-worms.	E. histolytica, G. intestinalis, A. lumbricoides, Hook-worms and H. nana.
10. Geophagia (2-3 per cent)	A. lumbricoides and Hook-worm.	A. lumbricoides and Hook-worm
11. Heart-burning (4-5 per cent)	A. lumbricoides and Hook-worm.	A. lumbricoides, Hook-worm and H. nana.
12. Abdominal pain (20-25 per cent)	E. histolytica, G. intestinalis, T. trichiurus, A. lumbricoides, Hook-worm and H. nana.	E. histolytica, G. intestinalis, T. trichiurus, A. lumbricoides, Hook-worm and T. saginata and H. nana.
13. Occasional abdominal pain (25-30 per cent)	E. histolytica, G. intestinalis, A. lumbricoides, Hook-worm and H. nana.	E. histolytica, G. intestinalis, A. lumbricoides, Hook-worm, H. nana and T. saginata.

14. Colic (2-3 per cent)	A. lumbricoides, E. vermicularis and T. trichiurus.	E. histolytica, G. intestinalis, A. lumbricoides and H. nana.
15. Constipation (12-15 per cent)	T. trichiurus and Hook-worm.	E. histolytica, G. intestinalis, A. lumbricoides, Hook-worm and H. nana.
16. Constipation alternating with diarrhoea/loose stools (15-20 per cent)	E. histolytica, G. intestinalis, T. trichiurus, A. lumbricoides and T. saginata	E. histolytica, G. intestinalis, A. lumbricoides, Hook-worm and H. nana.
17. Diarrhoea (23-26 per cent)	E. histolytica, G. intestinalis, T. trichiurus, A. lumbricoides, Hook-worm and T. saginata.	E. histolytica, G. intestinalis, A. lumbricoides, Hook-worm and T. saginata.
18. Dysentery (3-4 per cent)	E. histolytica, G. intestinalis and Hook-worm.	E. histolytica, G. intestinalis and Hook-worm.
19. Recurrent attacks of dysentery (4-7 per cent)	—	E. histolytica, G. intestinalis and H. nana.
20. Palpitation (6-7 per cent)	—	A. lumbricoides, Hook-worm and H. nana.
21. Oedema	T. trichiurus S. stercoralis and Hook-worm.	Hook-worm and H. nana.
22. Pruritis (5-7 per cent)	T. trichiurus, S. stercoralis, E. vermicularis, A. lumbricoides and Hook-worms.	E. vermicularis, A. lumbricoides, Hook-worm and H. nana.
23. Pallor of the skin and perspiration (2-3 per cent)	Hook-worm.	G. intestinalis, Hook-worm, T. saginata and H. nana.
24. Allergy : asthma, urticaria, dermatitis. (3-4 per cent)	A. lumbricoides, T. trichiurus and S. stercoralis.	G. intestinalis, A. lumbricoides, Hook-worm and H. nana.

25. Nocturea (2-3 per cent)	<i>S. stercoralis</i> , <i>E. vermicularis</i> and <i>T. trichiurus</i> .	<i>G. intestinalis</i> , <i>A. lumbricoides</i> , <i>E. vermicularis</i> and <i>H. nana</i> .
26. Headache (5-7 per cent)	<i>T. trichiurus</i> , <i>S. stercoralis</i> , <i>A. lumbricoides</i> , Hook-worm and <i>H. nana</i> .	<i>G. intestinalis</i> , <i>A. lumbricoides</i> , Hook-worm, <i>H. nana</i> and <i>T. saginata</i> .
27. Lassitude and general malaise (7-8 per cent)	<i>E. histolytica</i> , <i>T. trichiurus</i> , <i>A. lumbricoides</i> and Hook-worms.	<i>E. histolytica</i> , <i>G. intestinalis</i> , <i>A. lumbricoides</i> , Hook-worm and <i>H. nana</i> .
28. Insomnia	<i>E. vermicularis</i> , <i>T. trichiurus</i> , <i>S. stercoralis</i> , <i>A. lumbricoides</i> and <i>H. nana</i> .	<i>E. vermicularis</i> <i>A. lumbricoides</i> , Hook-worm and <i>H. nana</i> .
29. Low grade fever (3-5 per cent)	<i>E. histolytica</i> , <i>T. trichiurus</i> , <i>A. lumbricoides</i> and Hook-worm	<i>E. histolytica</i> , <i>G. intestinalis</i> , Hook-worm, <i>H. nana</i> and <i>T. saginata</i> .
30. Muscular pain and weakness. (9-10 per cent)	<i>A. lumbricoides</i> .	<i>G. intestinalis</i> <i>A. lumbricoides</i> , Hook-worm, <i>H. nana</i> and <i>T. saginata</i> .
31. Exhaustion and tiredness (15-17 per cent)	<i>E. histolytica</i> , <i>G. intestinalis</i> , <i>T. trichiurus</i> , Hook-worm, <i>E. vermicularis</i> , <i>T. saginata</i> and <i>H. nana</i> .	<i>E. histolytica</i> <i>G. intestinalis</i> , <i>A. lumbricoides</i> , Hook-worm, <i>E. vermicularis</i> , <i>T. saginata</i> and <i>H. nana</i> .

According to the consensus of opinion the signs and symptoms are frequently misleading. Other diseases, when present along with the parasitic infection, may exaggerate a clinical picture. Such conditions warrant careful laboratory examinations. In this connection we may point out that a laboratory technician needs to be checked and counter checked throughout investigations. In our experience with slight relaxation on the part of seniors, the microscopist usually becomes zealous. Both with negative and uncertain cases he becomes most uncomfortable. Occasionally the vegetable cells and *Blastocystis hominis* become helminthic eggs while small oval and rounded artefacts appear protozoan cysts to him. Ordinarily *C. mesnili*, *E. hominis*, *D. fragilis*, *E. nana* and *R. intestinalis* are invariably missed.

In our opinion some people, who are victims of *parasite-phobia* also give the history of ghost-symptoms and mislead the microscopist. We would, therefore recommend that the microscopist should never be told of the symptoms present in a patient. This knowledge usually makes him to work from hypothesis backwards and get the supposed answer. Most of the patients are in this country confused mass of protoplasm. It holds good in all children who may admit the presence of a syndrome only when interrogated. The negative and positive replies depend mostly upon the style of question posed to the patient. "Do you have headache" and "you must be having headache" usually bring forth two different types of replies which may both be unreal. These factors detract the utility of history sheets. Traditions say that one may judge of the size of Hercules' structure by merely seeing the foot. In parasitology *ex pede Herculem* does not work. Parasitologists believe in Watts, who states "*Method implies the placing of several things, or performing several operations, in such order, as is most convenient to attain some end.*" There is greater need to arrange ideas systematically. Promiscuous defaecation spreads intestinal parasites and throwing facts promiscuously is also cause of confusion in parasitology. Mind exerts itself with more cheerfulness, alacrity and profit if the bits are collected with a purpose and aim.

1.6.2. Collection of Fresh Specimens

Stool samples, from those complaining of enterogastric troubles, were collected a day after the subject had attended the hospital. Each patient was given labelled stool collecting bottles. These containers were collected early in the morning by our laboratory attendant and brought to the department within an hour for examination. Each specimen was given a code number corresponding to the history sheet. Each history sheet provided the following information :

PERSONAL DATA (Filled at the Hospital)

1. Name Age Sex
2. Date/Number of sample / from
3. Occupation
4. General Health.....
5. Diarrhoea Persistent/Recurrent/Absent.
6. Dysentery Chronic/Acute/Recurrent/Absent.
7. Remarks.....
8. Treatment..... ..Previous :
Present :

LABORATORY REPORT (Filled in at the Parasitology Department)

9. Protozoal $\frac{\text{Cysts}}{\text{Troph.}}$: Eh/Ec/Ep/En/Ib/Df : Ri/Ei/Cm/Gi/Th.

10. Nematodes $\frac{\text{Adults}}{\text{Ova}}$: Tt Ss/Hw/Ev/Al.
11. Cestodes $\frac{\text{Segments}}{\text{Ova}}$: Dc/Hn/Hd/Ts.
12. Trematodes. Flukes (*F. buski*, *S. haematobium*)
13. Miscellaneous. Mites/Maggots/Caterpillars/Grubs.
14. Physical exam. of stool samples :
 - (i) Colour: Creamy/yellow/brown/black.
 - (ii) Odour: Putrid/rancid/sour.
 - (iii) Consistency: fluid/semifluid/formed/hard.
 - (iv) Mucous: strings/balls/casts/ribbons.
 - (v) Blood: free/streak/tinged/changed.

15. Remarks :

Each stool specimen was examined both by direct and concentration methods. For direct examination, the specimen was emulsified in concentrated solution of sodium chloride (sp. gr. 1200). The slide was examined both before and after staining with Lugol's iodine.

For concentration method of examination, the specimen was macerated in tap water/physiological solution and spinned at a moderate speed (1500-2000 r. p. m.) for 1-2 minutes, stained with Lugol's iodine and examined.

We examined 2-5 specimens daily. Depending upon heavy and light infections, each slide was examined for 15-20 minutes. A specimen showing the presence of *E. histolytica* however, was given more time, and was labelled positive after proper scrutiny based on third/fourth opinion.

*In our own filth drop our clear judgements, make us
Adore our errors ; laugh at us, while we strut,
To our confusion. (SHAKESPEARE)*

2. PRESENTATION AND ANALYSIS OF DATA

*Vice is a creature of such a hideous mien
That to be hated, needs to be seen,
Yet once beheld, familiar with her face,
We first endure, then pity, then embrace. (POPE)*

Out of 701 males and females examined, 519 (74.04 per cent) were found positive for one or the other kind of intestinal parasite. The infection rate in males was 73.18 per cent as against 79.38 per cent in the females. The number of males and females (in parenthesis) harbouring each zooparasite is presented in Table below.

TABLE III SHOWING NUMBER OF MALES AND FEMALES (GIVEN IN PARANTHESES) HARBOURING ZOOPARASITES INCRIMINATED IN THE SERIES.

Zooparasites	I N F E C T I O N S				
	Total	Pure	Double	Triple	Quadrupl
1. <i>E. histolytica</i>	92(10)	55(5)	28(2)	9(3)	0(0)
2. <i>E. coli</i>	100(20)	49(8)	34(8)	16(4)	1(0)
3. <i>I. butschlii</i>	33(8)	14(3)	16(3)	2(2)	1(0)
4. <i>E. nana</i>	17(7)	5(1)	6(3)	6(3)	0(0)
5. <i>G. intestinalis</i>	91(28)	62(20)	18(5)	11(3)	0(0)
6. Hook-worm	162(20)	117(13)	31(7)	13(0)	1(0)
7. <i>A. lumbricoides</i>	34(6)	18(4)	16(2)	0(0)	0(0)
8. <i>E. vermicularis</i>	4(1)	2(1)	1(0)	1(0)	0(0)
9. <i>T. trichiurus</i>	6(0)	3(0)	3(0)	0(0)	0(0)
10. <i>T. saginata</i>	6(1)	3(1)	3(0)	0(0)	0(0)
11: <i>H. nana</i>	21(1)	12(1)	6(0)	2(0)	1(0)

The corresponding ratio of each zooparasite, in relation to other parasite-5 (incriminated in the series reported here) are presented in Table IV. In this table each line is to be read horizontally. For example, read the first line for every one case of *E. histolytica*, there were 1.18 cases of *G. intestinalis*, 1.78 of hook-worms 0.39 of *A. lumbricoides*, 0.22 of *H. nana* and so on.

TABLE IV SHOWING CORRESPONDING RATIOS OF DIFFERENT
ZOOPARASITES IN THE PRESENT SERIES GIVING HISTORY
OF CLINICAL GASTRO INTESTINAL TROUBLES.

	EH.	EC.	IB.	EN.	GI.	HW.	AL.	EV.	TT.	TS.	HN.
1. EH.	1.00	1.18	0.39	0.24	1.18	1.78	0.39	0.05	0.06	0.07	0.22
2. EC.	0.85	1.00	0.33	0.20	1.00	1.51	0.33	0.04	0.05	0.07	0.18
3. IB.	2.55	3.00	1.00	0.60	3.00	4.55	1.00	0.13	0.15	0.18	0.55
4. EN.	4.25	5.00	1.66	1.00	5.00	7.54	1.66	0.21	0.25	0.29	0.92
5. GI.	0.85	1.00	0.33	0.20	1.00	1.51	0.33	0.04	0.05	0.06	0.18
6. HW.	0.56	0.66	0.22	0.13	0.66	1.00	0.22	0.02	0.03	0.04	0.12
7. AL.	2.55	3.00	1.00	0.60	3.00	4.55	1.00	0.13	0.15	0.18	0.55
8. EV.	20.40	24.00	8.00	4.80	24.00	36.20	8.00	1.00	1.20	1.40	4.40
9. TT.	17.00	20.00	6.67	4.00	20.00	30.16	6.67	0.83	1.00	1.17	3.67
10. TS.	14.57	17.14	5.71	3.43	17.14	25.86	5.76	0.71	0.86	1.00	3.15
11. HN.	4.63	5.46	1.82	1.09	5.46	8.23	1.82	0.23	0.27	0.32	1.00

Abbreviations : EH, *E. histolytica*. EC, *E. coli*.

IB, *I. butschlii*. EN, *E. nana*. GI, *G. intestinalis*.

HW, *A. duodenale*. AL, *A. lumbricoides*.

EV, *E. vermicularis*. TT, *T. trichiurus*.

TS, *T. saginata*. HN, *H. nana*.

2. Observations :

2.1. ENTAMOEBIA HISTOLYTICA Schaudinn 1903.

E. histolytica is world-wide in distribution. Its depredations have been alarming in some countries while in others it has always played a systematic folk-game of *Hide-and-seek*. For most workers its specific forms pose a complex situation. Broadly speaking, if one strain is most pathogenic and responsible for much morbidity, there is another form which oscillates in its behaviour from pathogenic and virulent strain to nonpathogenic and avirulent strain. This form is most annoying and is responsible for periodical unwell phases in its host. There may occur an irregular rhythm of amoebic colitis in these patients. With a view to control cramps, these patients become forced VIOFORM addicts and may be witnessed carrying *carte* or a vial of a ten tablets in thier pockets. There is another strain which does not cause any symptoms and may be found in any community in which a search may be carried out. This strain is lumen commensal. It is nonpathogenic to its host as it is not suspected of invading the tissue. The opinions are divided and each opinion has several points in its favour. Prof. Brumpt (1925), Westhall (1937, 1938) and Hoare (1952) have ably discussed the tissue invading potentialities of different strains of this well-known and widely-distributed parasite of man.

In the series under review, the incidence of *E. histolytica* was found to be 14.55 per cent. In men and women separately, the infection rate was, however, 15.23 and 10.31 per cent respectively. Only 8 percent of these had classical clinical signs and symptoms of amoebic dysentery. About fifteen per cent gave a history of periodical, intermittent griping pain which occurred after every 20-30 days. Others, however, had not had any clinical clue of *amoebiasis*. Some were addicts of some amoebicide. Anterovioform was common drug of choice.

Pure infection cases in males were 16.18 per cent as against 8.77 per cent in females.

34.57 per cent males and 13.33 per cent females had *E. histolytica*, either with another protozoal or a helminthic parasite. The partners involved were *E. coli* (7 cases), *I. butschlii* (3 cases), *G. intestinalis* (4 cases), Hook-worms (9 cases), *A. lumbricoides* (2 cases), *T. trichiurus* (one case), *T. saginata* (one case) and *H. nana* (3 cases).

E. histolytica was also found involved in 12 three-parasite infections. The following protozoal or helminthic zooparasites were involved. *E. coli* + *I. butschlii* (one case), *E. coli* + *G. intestinalis* (one case), *E. coli* + *E. nana* (one case), *I. butschlii* + *G. intestinalis* (two cases), *E. coli* + hook-worm (5 cases), *G. intestinalis* + *H. nana* (one case).

We did not come across vegetative forms of the parasite in any of the positive cases. 8 per cent of the cases, having classical sign and symptoms of amoebic dysentery also did not help us in securing trophozoites.

The ratio of *E. histolytica* to other pathogenic and nonpathogenic intestinal zooparasites is given in Table IV. A perusal of this table will show, that when compared with other pathogenic parasites, its incidence in the series under review stood blew *G. intestinalis* and hook worms. It was about 17.0 times higher than *T. trichiurus*, 14.6 times higher than *T. saginata*, 4.6 times higher than *H. nana* and 2.5 times higher than *A. lumbricoides* in this series.

Even without making an allowance, to compensate for the smaller number of females examined, one may infer that the amoebic infections were much more prevalent in males than in females in this series. This fact needs further verification. We would suggest to the fellow-workers to collect some more data with a view to confirm/modify these conclusions.

In previous surveys, the incidence of *E. histolytica* was found in 5.13 per cent conservancy staff of the city Corporation of Lahore (Ansari and Saptu, 1963-64). In a primary school, it was found present in 4.6 per cent children (Ansari and Saptu, 1964). These figures were obtained from symptomless carriers and therefore not comparable with the present figures. Farooki (1964) has reported an incidence of 1.0 per cent from Bahawalpur, 3.5 per cent from Peshawar and 8.7 per cent from Multan. Mallick et al (1961) were able to recover *E. histolytica* from 21 per cent persons examined in a random sample from Lahore.

U. S. Naval team, reported an incidence of 43 per cent from a village in Dacca. In a hospital of Khulna (East Pakistan), the infection rate was found to be 10.1 per cent. In hospital patients of Calcutta however, Choudhri and Choudhri (1946) found an infection rate of 8.8 per cent. These figures do not refer to persons having active amoebic lesions and therefore may not be taken as alarming.

Some authors are more active than the parasite itself and do not mind giving exaggerated figures. Who is victim to such a parasite is difficult to ascertain as there is no yard stick to differentiate a fact from a fad. The present figures were obtained from persons complaining of entero-gastric troubles and therefore are not comparable with over all infection rate figures obtained from a general community.

From a critical examination of these figures, one may agree with Professor Farooki (1964). Without applying the critical diagnostic criteria of this protozoa, one cannot find out a conservative estimate of infection rate. There is every great need to dispell the fobia, we, in Pakistan, have. For all practical purposes the first choice of our colleagues is to label a symptomatic case as of *amoebiasis*. The fallacy has been acquired from foreign author, who invariably say that because of poor

sanitation, the tropical and subtropical countries have very high incidence of *amoebiasis*. The foreigners coming to Lahore are usually seriously afraid of amoebic colitis. Their fears are so great that they look at everything with a sceptic eye. To our mind the concept of untouchability in these people is of different pattern and will probably succeed in the creation of a creed exclusively based on socio-economic standards.

On some later date, this type of class segregation may probably lead to more dangerous repercussions than the history ever recorded before, even due to the religious aloofness (caste system) established by medieval Hindus. The eradication of parasites warrants good water supply, wholesome food and proper sanitation in all localities, irrespective of the status of those living there. Clean Ichhra will guarantee clean Gulberg. The classical case of Typhoid Mary Mallon is an eye opener. There are several thousands of *Ascaris* carriers in some parts of Lahore. These carriers are sufficient to offend ultra modern localities. Cleaning of this group is more essential than those who have remote chances of infection. Rather it is waste of money and material if the factory production continues unchecked. Look after the slums and Sabians will take care of themselves, is one of our suggestions.

According to Svensson and Linders (1934) approximately all zooparasitic infections may be discovered after 10-12 consecutive examination. Dobell (1917) has previously stated that in routine examination at least 66 per cent infections are missed. We should not also forget, that encystment is periodical, might be less sporadic in some persons than in others (Ansari 1954). Boeck and Stiles (1923) have found that on an average 3 examinations may uncover all the infections. They further remark that this position should be accepted with reserve, for it frequently occurs that the cysts are not found until the 4th, 5th, 6th or xth examinations. They concluded that one should not be satisfied with a single examination even if it should prove positive for other protozoas but not *E. histolytica* for if the same case was to receive additional examinations, a chance existed of finding *E. histolytica* also. This should be taken into consideration when the presence of *E. histolytica*, purely on the basis of clinical symptoms, is suspected.

We lack health education and obtaining of a stool sample from a normal Pakistani is not a simple affair. The public health worker is to run after people, who cleverly avoid co-operation. Under these conditions there is no other alternative but to depend upon one-stool-examination results. We however, contemplate to make detailed examinations sometime, somewhere.

*There is a tide in the affairs of men,
Which, taken at the flood, leads on the fortune;
Omitted, all the voyage of their life
Is bound in shallows and in miseries.*

(SHAKSPEARE)

Professor Farooki (1964) has warned us of extremes. There are two greasy and inclined roads, leading either to over or under diagnosis. Both the inclined paths meet cross over under the field of microscope. The poor laboratory worker has to

alternative but to slip or drift and ultimately tread on one. The better part of valour is discretion and the better half of confidence is truth. His choice is between discretion and truth. The client brings the stool sample under the direction of a clinician. The clinician directs him because he suspects entero-gastric troubles due to one of the pathogenic parasites. For the Laboratory worker, it is the starting point for a bias and he therefore, becomes an optimist and pessimist in one frame. When he looks through a microscope, he may not detect a zooparasite but the ghost haunts him throughout. He is now onward a patient suffering from optical illusions. His client is a bread giver to him and his strings may become tight enough if he does not give him a positive report. In a country, where stethoscope is a symbol of physician, one may expect errors, nay, blunders in the field of diagnoses. The peasant expects from the clinician to apply a stethoscope to detect wrenching of a joint, otherwise his reputation and hard earned university degree are at stake. The Laboratories are giving more positive results than there are, probably because they believe that to label a negative sample as positive is an honest service to the patient. This procedure both pleases and satisfies their clients. On the contrary, to say negative to a doubtful positive is a greater service. Disputed sample must always be re-examined before passing a verdict. Mere knowledge of clinical diagnoses should not work as a guiding star. It should not be taken for granted that there is *E. histolytica*. Clinical diagnoses is not even a tentative identification. For laboratory workers, all stools, both from symptomatic and asymptomatic case, are alike. Who knows that from the former one may recover nothing but the later may show the presence of teeming millions of some zooparasites. For a biased mind, even *E. coli* cysts will appear *E. histolytica* cysts. We often enjoy with interest controversies of this nature in our laboratory and reminded of W. Lambbridge who said :

Two men look out through the same bars :
One sees the mud, and one the stars.
(W. LANGBRIDGE)

Specific identification of *E. histolytica* is not a straightforward affair. There are several species known to science which resemble it both in size and morphology. Our microscopists would do better if they do not base identifications on a solitary cyst in a slide. In our experience, several opinions count, and must be made use of where available. We, in the department of parasitology, always try to check and cross check our observations. It is our routine that all *E. histolytica* cysts must be examined by the Professor, Assistant Professor, Demonstrator and the Microscopist before a final verdict is given and specification is fixed. The doubtful and suspected cases do not find any room in our record books. This procedure has helped us in being rational. We know that *he is all fault who has no fault at all*. We confess that we commit mistakes but with a view to avoid blunders. Border line cases have chance to come either on our left or right. It is because of this leucinae, that we did not make any differentiation between pathogenic and non-pathogenic forms in this communication.

2.2. ENTAMOEBAS COLI (Grassi 1879)

Entamoeba coli is a harmless commensal living in the intestines of man. It abounds in the lumen of large intestines. It neither penetrates the tissue nor is capable of producing any lesions in areas of its predilection. Although it normally feeds on bacteria and other enteric microbes, yet it does not mind imbibing red blood cells in a dysenteric menstruum. Such instances have compelled some authors to distort the long established fact by stating that in some rare instances the colon amoeba may become pathogenic to its human host.

The incidence of *E. coli* varies from place to place. Even in a single country one may find the infection rate as high as 50 per cent in some and negligible in other communities. In USA, the minimum infection was recorded from Virginia (0.04 per cent). The highest record available is from Tennessee (Rural population, 70 per cent). According to Dobell (1921) one has yet to discover a race or a country in which infection with this species does not occur. In some places its incidence is more or less not more than 1.5-2 times as high as of *E. histolytica* while in others it may be 10-12 times more than *E. histolytica*.

Chaudhuri and Chaudhuri (1946) did not find it in more than 5.1 per cent hospital cases from Calcutta. The incidence in hospital patients in Bahawalpur however, was 12.5 per cent (Farooki 1964). The same author found *E. coli* in 58.1 per cent apparently healthy people of Mooltan. The Conservancy Staff of City Corporation of Lahore had it in 20.52 per cent cases examined (Ansari & Sapru 1963-64). In another series, consisting of primary School age-group children, the same authors recovered it from 23.1 per cent cases examined.

In Lahore, *E. coli* was present in 23.1 per cent people, claiming of gastro-intestinal troubles. The rate of incidence in males and females was worked out at 16.54 and 21.62 per cent respectively. Pure infections occurred in 14.41 per cent men and 14.03 per cent women.

In the two parasite infection group of the series, the incidence in males and females was found to be 41.97 and 53.33 per cent. It was found coupled with *E. histolytica* (7 cases), *I. butschlii* (12 cases) *E. nana* (3 cases), *G. intestinalis* (7 cases), Hook-worms (7 cases), *A. lumbricoides* (3 cases) and *H. nana* (3 cases.)

In three parasite infection group, it occurred in 20 individuals, and its partners were *E. histolytica* + *G. intestinalis* (one case), *E. histolytica* + *I. butschlii* (one case), *E. nana* + *G. intestinalis* (4 cases), *E. histolytica* + hook-worm (5 cases), *I. butschlii* + hook-worm (one case), *E. nana* + hook-worm (3 cases), *G. intestinalis* + *H. nana* (one case)

In one case it occurred with three other parasites viz., *I. butschlii* + hook-worm and *H. nana*.

The ratio of *E. coli* to other protozoal and helminthic parasites is given in Table IV (loc cit). Its incidence was more or less 1.1%, 3.03, 5.0, 3.03, 25.0, 20.0, 16.0 and 1.8 times higher than *E. histolytica*, *I. butschlii*, *E. nana*, *A. lumbricoides*, *E. vermicularis*, *T. trichiurus*, *T. saginata* and *H. nana* respectively. In this series its infection rate was equal to *G. intestinalis*. Hook-worm infection was more or less 50 per cent higher than *E. coli*.

2.3. EMDOLIMAX NANA (Wenyon and O'Connor 1917)

The infection rate of *E. nana* was found to be comparatively high in this series. Pure infection cases both in males and females occurred in 2.71 per cent cases. In two parasite infection cases, *E. nana* was involved in 3.71 per cent and 20.0 per cent males and females respectively.

Its associates in double infection group of the series were *E. coli* (3 cases), *G. intestinalis* (3 cases) and hook-worm (3 cases).

In three parasite infection cases, it occurred with *E. histolytica* + *E. coli* (one case), *E. coli* + *G. intestinalis* (2 cases), *E. coli* + hook-worm (5 cases) and *G. intestinalis* + *E. vermicularis* (one case).

Ansari and Sapru (1963-64) found it most uncommon (0.64 per cent) in the Conservancy Staff of the City Corporation, Lahore. In Mooltan series, Farooqi (1964) found it positive in 3.3 per cent cases. From Calcutta, it was reported from 6.9 per cent cases (Choudhuri and Choudhuri 1946). The figures obtained from Indo Pakistan sub continent are lower than the figures reported from other parts of the world (11.6-26.5 per cent).

E. nana is a delicate parasite. Direct sunlight, severe cold, desiccation and decomposition are extremely detrimental to its cysts. Warm and moist climate combined with low standard of personal hygiene raises its incidence considerably in a community. One may conclude that Lahore probably does not provide the ecological requirements for the development of this parasite.

The incidence level of *E. nana* stood below *E. histolytica*, *E. coli*, *I. butschlii*, *G. intestinalis*, hook-worm and *A. lumbricoides*. Its level of infection was 4.76, 4.0, 3.45 times higher than *E. vermicularis*, *T. trichiurus* and *T. saginata* respectively. *H. nana*, however, stood a little below *E. nana* in this series (Table IV).

2. 4. IODAMOEBIA BUTSCHLII (Prowazek 1911)

The over-all incidence of *I. butschlii* in cases with distinctive manifestations and generalized indisposition was found to be 5.71 per cent. The infectonate in males and females separately was found to be 5.47 and 8.25 per cent respectively.

Pure infection cases of *I. butschlii* were found in 4.12 per cent males and 5.25 per cent females.

In two parasite infection cases, it occurred in 19.75 per cent males and 20 per cent females. Its partners were *E. histolytica* (3 cases), *E. coli* (12 cases), *G. intestinalis* (one case), hook-worm (2 cases), *A. lumbricoides* (one case).

I. butschlii was also found involved in three parasite infection cases. Here it joined *E. histolytica* + *E. coli* (one case) and *E. histolytica* + *G. intestinalis* (one case).

In one quadruple infection in which *I. butschlii* was involved, the other three partners were *E. coli* + hook-worm + *H. nana*.

Some authors tie up the vegetative forms of *I. butschlii* with the gastro-intestinal troubles resembling *amoebiasis*. 5.71 per cent cases of the series, from which it was incriminated, complained of abdominal distress. It was either alone (17 cases) or with an innocent protozoa (*E. coli*, 12 cases) in 29 cases.

In 12 cases it occurred either with a pathogenic zooparasite viz., *E. histolytica* (6 cases), hook-worm (4 cases), *A. lumbricoides* (one case) and *H. nana* (+ hook-worm, one case), or with a partially pathogenic flagellate *G. intestinalis* (4 cases).

Absolute existence of a real pathogenic strain of this parasite yet remains to be ascertained. Those workers, who have facilities of a hospital are in better environmental conditions to thrash out this facet of the problem.

The available incidence of *I. butschlii* was equal to the incidence of *A. lumbricoides*. Its incidence stood bellow *E. histolytica*, *E. coli*, *G. intestinalis* and hook-worm. The infection level was 1.66, 7.7, 6.6, 5.5 and 1.8 times higher than *E. nana*, *E. vermicularis*, *T. trichiurus* *T. saginata* and *H. nana* respectively (Table IV).

2.5. GIARDIA INTESTINALIS (Lambel 1859).

The duodenal flagellate has now become very familiar parasite of children. In Lahore most of the people know that it is next to *E. histolytica* in children and may treat it with Atabrine (Mepacrine: quinacrine) without consulting their physicians (Ansari 1954).

The infection rate in symptomatic cases under report was 17.2 per cent. In the males and females separately the incidence was calculated to be 15.07 per cent and 28.87 per cent respectively.

In pure infection series, its incidence was 18.24 per cent in males as against 35.12 per cent in females. *Giardiasis* is a highly contagious infection. A high rate of infection in females may probably be due to more intimate contacts with the children,

The women-folk in this country live most of the time indoors and lead more or less an institutional life, where chances of exposures are extremely large.

In two parasite infections, it occurred in 22.22 per cent males and 33.33 per cent females. The partners involved were *E. histolytica* (4 cases), *E. coli* (7 cases), *I. butschlii* (one case), *E. nana* (3 cases), hook-worm (6 cases), and *A. lumbricoides* (2 cases).

In 14 cases, *G. intestinalis* occurred along with two other zooparasites viz., *E. histolytica* + *E. coli* (one case), *E. histolytica* + *I. butschlii* (2 cases), *E. coli* + *E. nana* (one case), *E. coli* + *G. intestinalis* (2 cases), *E. histolytica* + hook-worm (one case), *E. histolytica* + *H. nana* (one case), *E. coli* + hook-worm (3 cases), *E. coli* + *H. nana* (one case) and *E. nana* + *E. vermicularis* (one case).

In previous surveys, it was found in 28.85 per cent conservancy staff of the City Corporation, Lahore. In the children of a primary school its incidence was 20.5 per cent (Ansari and Sapru 1963-64).

In the world, its incidence oscillates between 0.9 to 78.5 per cent. In Germany the incidence varies from 4.2–15.5 per cent in healthy carriers. The incidence in children may be as high as 25 per cent. According to Dobell (1917, 1921) its incidence in dysenteric and nondysenteric English was 10.0 and 13.4 per cent respectively. In Russia, it was found in 12.2 per cent healthy persons. The averages for United States of America are 17.6 per cent for children and 5.5 per cent for adults (Ansari 1953).

The incidence of *G. intestinalis* was equal to *E. coli*. The incidence of all the rest stood at lower level except Hook-worm alone which stood 50 per cent higher. Its infection rate was more or less 1.18, 3.03, 5.0, 3.03, 25.0, 20.0, 16.6 and 1.8 times higher than *E. histolytica*, *I. butschlii*, *E. nana*, *A. lumbricoides*, *E. vermicularis*, *T. trichiurus*, *T. saginata* and *H. nana* respectively. (Table IV)

2.6. ANCYLOSTOMA DUODENALE (Dubini 1843)

The highest number of persons, suffering from intestinal parasites in this series, were found infected with hook-worms. An over-all incidence of *ancylostomiasis* was discovered in 25.82 per cent out-door patients examined. The infection rate in males and females separately was 26.82 per cent and 20.62 per cent respectively. The female have minimum chances of exposure and therefore, the infection rate in them is likely to be low.

This notorious parasite was found alone in 34.41 per cent males as against 22.81 per cent in females.

In two parasite infection group, it was found present in 27.16 per cent males and 46.66 per cent females. The common partners were *A. lumbricoides* (8 cases), *E. vermicularis* (one case), *T. trichiurus* (one case), *T. saginata*, (one case), *E. histoly-*

rica (9 cases), *E. coli* (7 cases), *I. butschlii* (2 cases), *E. nana* (3 cases) and *G. intestinalis* (6 cases).

The hook-worms were also involved in 13, three-parasite infection group. It was associated with *E. histolytica* + *E. coli* (5 cases), *E. histolytica* + *G. intestinalis* (one case), *E. coli* + *I. butschlii* (one case), *E. coli* + *E. nana* (3 cases) and *E. coli* + *G. intestinalis* (3 cases). All these occurred in males.

Hook-worms were also involved in a four parasite infection case, in which *E. coli* + *I. butschlii* + *H. nana* were involved.

In previous surveys, the incidence of hook-worms was found to be 44.23 per cent and 15.1 per cent in conservancy staff of the city Corporation of Lahore and in children of a primary school respectively (Ansari and Sapru 1963-64). Ahmed (1959) reported *ancylostomiasis* in 12 per cent Laborites. In Mooltan, the infestation rate in children was 1.9 per cent as against 0.3 per cent in adults. The incidence in Peshawar and Bahawalpur was, however, 1.8 and 5.51 per cent respectively (Farooki 1964). Recently U. S. Naval team (1961) reported 55 per cent *ancylostomiasis* in a village (East Pakistan : Dacca).

According to Chandler (1927), the incidence of hook-worm infection in Central India varied from 0—91.7 per cent, while in Madras it varied from 91 to 100 per cent. According to him the general average incidence, in India, however, did not exceed 16 per cent.

The ratio of hook-worm infections to the other zooparasite infections is presented in Table IV. Its level of incidence stood 15, 18, 4.5, 7.7, 8.4, 25.0, 33.3 and 50 times higher than *G. intestinalis* (& *E. coli*), *E. histolytica*, *I. butschlii* (& *A. lumbricoides*), *E. nana*, *H. nana*, *T. saginata*, *T. trichiurus* and *E. vermicularis* respectively.

2. 7. ASCARIS LUMBRICOIDES Linnaeus 1758

The giant round-worm is one of the most familiar parasites and has been more or less passed at least once in life by every Laborite. It is most amazing for one to find that children who live in the midst of congested old Lahore, away from cultivated fields and in localities well separated from manure heaps, occasionally pass this worm. Even those, who have the distinction of being healthy, wealthy and wise have been victims of its exploitations in the past, are beating their breasts in despair today and may continue lamenting of its nefarious activities in future too.* It is notorious parasite for its devastating activities. Repeated exposures and consequently reinfections damage a community, rather a nation — both physically and mentally.

The overall incidence of round-worms in this series was 57.1 per cent. The infection rate in males was 5.63 per cent as against females, in which the incidence

*A warning to ultra modern part of Lahore. It reminds us of Moulana Hali, who stated :

“Ek dastaras se teri Hali bacha hua tha
us ko bhi tune akhar charka laga ke chhiora.”

was slightly higher (6.19 per cent). Probably this is one of the lowest records in our experience from Lahore.

In 5.29 per cent males, it was the only parasite. Pure infection cases in females were, however, 7.02 per cent.

In two parasite infection cases, the incidence in men and women separately was 3.71 and 13.33 per cent. *A. lumbricoides* was found together with hook-worms (8 cases), *T. trichiurus* (one case), *T. saginata* (one case), *I. butschlii* (one case) and *G. intestinalis* (2 cases),

We do not find it in three and four parasite infection group in this series.

Higher percentage of infection in the small series of women is a testimony to the fact that it is one of the common indoor infections. It is usually more common in areas, which have most unsatisfactory arrangements for the disposal of human excreta. Localities which are near defaecating grounds have much more chances of higher incidence.

Contaminated water supply and vegetables meant for raw consumptions viz. radishes, carrots, tomatoes, turnips, saled are easy sources for the transmission of viable eggs, dust storms, blowing from the seed-beds, and flies breeding in human excreta are heavily charged with worm eggs and may contaminate both our food and fluids. Sugar available in the market is specially exposed to contamination. The "Sugar-fly" relationship is very close and therefore most serious. Incidence of *Ascaris* in places like Gulberg is more due to this menace than any other.

5.71 per cent incidence of round-worms in hospital cases is far too below our expectations. Usually every Lahoreite treats all suspected cases at home. For them, *kameela* and curd is a sure cure and panacea in all cases of round-worm infections. May we suspect that it is due to indigenous method of treatment which has kept its infection rate at lowest level in this series.

In a previous survey from Lahore, its incidence in Conservancy staff of the City Corporation was found to be 34.62 per cent, while in children of primary school going age it was 37.6 per cent. Farooki (1964) recorded it very low in Mooltan (0.15 per cent), Bahawalpure (0.3 per cent) and Peshawar (1.5 per cent). Its incidence in Rajshahi and Dacca did not exceed 10.8 per cent (Muazzam 1962) and 33.9 per cent (Muazzam 1961). The incidence in children in Dacca was, however, considerably higher (66 per cent, Kuntz 1960).

Chandler (1927) found an incidence of 40.7 per cent in Madras and 82 per cent in South India.

The incidence rate of *A. lumbricoides* kept pace with *I. butschlii* but lacked behind hook-worm, while *G. intestinalis*, (*E. coli*) and *E. histolytica* which were respectively 4.5, 3.0 and 2.55 times higher. Its infection rate was, however, 7.7, 6.6, 5.5, 1.8 and 1.7 times higher than *E. vermicularis*, *T. trichiurus*, *T. saginata*, *H. nana* and *E. nana* respectively. (See Table IV).

28 ENTEROBIUS VERMICULARIS Linnaeus 1758

The human seat-worm probably followed *Homo sapiens* from early stages of speciation. 99.99 per cent people are honest and will frankly admit of having been victims of the attack. The insignificant percentage of 0.01, who refuse to acknowledge of ever having any annoyance due to *enterobiasis*, are confused masses and warrant no notice whatsoever.

Coprological examination may give clue of *enterobiasis* in bare minimum cases. According to a conservative estimation the eggs of the seat-worm may be discovered from not more than 5-10 per cent apparent positive cases. The rest are always missed. Perianal and perineal scrapings usually reveal much higher incidence. N. I. H. (Cellophene) swabs and Graham swabs are only sure means of examination. These techniques need to be used with great care for better results.

In the series under review, the over all infection found was 0.71 per cent. The incidence in male was 0.66 per cent as against 1.06 per cent in females. This is another parasite, which mostly occurs in close contacts. Mothers and children live together for most of the time. The infected children always experience intolerable pruritis and for relief they usually get into the lap of their mother. Ultimately the two sleep huddled together and thus increase chances of transmission of viable eggs from the kid to kadein.

Pure infection cases of *enterobiasis* were detected in 0.59 per cent males and 1.75 per cent females

In two parasite infection cases, it occurred with hook-worm.

In three parasites infection cases it was however, involved with *E. nana* and *G. intestinalis*.

In previous survey, *enterobiasis* was detected from 14.74 per cent conservancy staff of the City Corporation of Lahore. In children of primary school age group, the incidence was 3.2 per cent only. These rates of infection were also based on stool examination and therefore, do not indicate real rate of infection in the series referred to.

Farooki (1964) reported an incidence of 0.6, 0.2 and 0.2 per cent from Moollan, Bahawalpur and Peshawar respectively.

The incidence level of *E. vermicularis* cannot honestly be compared with, due to the reason given above. The arbitrary figures obtained or calculated are however, given in Table IV.

2.9. TRICHOCEPHALUS TRICHIURUS (Linnaeus, 1771)

Out of 701 patients examined, the whipworm infection was found only in 6 males and a female (0.99 per cent). While separately, the infection was present in 0.99 per cent males and 1.06 per cent females.

It was found alone in 3 cases (0.88 per cent).

In 3 cases, it was associated either with *A. lumbricoides* (one case), hook-worm (one case) or *E. histolytica* (one case).

Farooki (1964) also gives very low figures from Mooltan (0.0 per cent), Bahawalpur (0.0 per cent) and Peshawar (0.2 per cent). Chandler (1927) found an incidence of 0.36 per cent in South India and 34.44 per cent in Madras.

The whip-worm is a parasite of children and adolescents. In the two previous surveys carried out in Lahore, it was also unexpectedly low. It was present in 0.64 per cent conservancy staff and in 5.2 per cent primary school children.

A perusal of Table IV will show that its incidence was lower than all the other zooparasites except *E. vermicularis*. The incidence figures of the latter parasite, obtained from stool examinations, are not real and therefore not comparable.

2.10. TAENIA SAGINATA (Goeze, 1782)

The beef tape-worm was once a rare infection in Lahore. In recent years however, its incidence has tremendously increased with a rise in the consumption of half cooked meat, beefsteak, *tikka kababs*, *sich kababs*, pickled meat, salted and processed beef.

In the series under report, its infection was discovered only in 0.99 per cent persons examined. Out of 6 men and a woman found infected, 3 men and a woman had *taeniasis* alone. In the rest *T. saginata* occurred either with a protozoan (*E. histolytica*, one case) or a helminthic parasite (hook-worms: one case, *A. lumbricoides*: one case).

In previous surveys also, its incidence was fairly low. It was found in 0.64 per cent of the conservancy staff while the primary school children were all free of infection because of apparent reasons of not eating steaks or inadequately processed beef. Farooki (1962) incriminated *T. saginata* eggs from 0.5 per cent and 0.2 per cent cases examined in Bahawalpur and Peshawar respectively. He did not find any case of *Toenia* infection in Mooltan.

Chandler (1927) found 0.2 per cent cases infected with *T. saginata* in Madras.

During recent times, we have received several specimens of *T. saginata* for identification from other districts in West Pakistan.

Most of the patients fail to note the infection so long as they do not pass the gravid segments in their stools. Spontaneous expulsion of gravid proglottids makes some patients nervous indeed. The liberated segments are motile, and move about briskly with a peculiar twist.

The incidence of beef-tape-worm stood below all the other parasite infections, except *E. vermicularis* and *T. trichiurus* (Table IV).

2.11. HYMENOLEPIS NANA (von Siebold, 1852)

The murine-tape-worm is supposed to be particularly common tape-worm in Indo-Pakistan sub-continent. It, like *G. intestinalis*, may infect more children than adults in a community. In endemic areas, the adult population usually develops resistance to its infection. Systemic toxemia and other abdominal troubles usually occur in tender and delicate children. The incidence is comparatively high in those children, who do not observe laws of personal hygiene.

Hymenolepasis was recorded from 3.14 per cent cases examined. The incidence was high in males (3.48 per cent) than in females (1.06 per cent).

3.53 per cent adult males had *H nana* alone as against 1.75 per cent females who had pure infections.

In two parasite group, *H. nana* was found to occur with *E. histolytica* (3 males). It also occurred in two, triple infection cases. In one case its partners were *E. histolytica* and *G. intestinalis*, while in the other it was found compatible with *E. coli* and *G. intestinalis*.

In one male, it occurred with three other zooparasites, viz., *E. coli*, *I. butschlii* and hook-worms.

It is a common parasite of large families. Congregation, huddling together and congestion promotes its distribution as of *E. vermicularis*.

The eggs of *H. nana* are most viable immediately after leaving the body of the host. The foremost source of infection is *Anus-to-mouth*. Contaminated fingers are important transmission hazards.

In a previous survey, Ansari and Sapru (1964) found it in 4.44 per cent conservancy staff of the City Corporation of Lahore. The rate of infection in the primary school children was however, 11.6 per cent. The highest incidence was found in children between 6-10 years of age. Probably the chances of *inter-auto-infection* occur in greater proportion in this age group.

In southern United States, faecal examination gave an incidence of one per cent.

TABLE V SHOWING INCIDENCE OF DIFFERENT INTESTINAL PARASITES
IN CASES COMPLAINING OF GASTRO-INTESTINAL TROUBLES.

Males Examined EH.	PROTOZOAS					HELMINTHS						
	EC.	IB.	EN.	GI.		HW.	AL.	EV.	T.T.	TS.	HN.	
Total examined	=	604		Total negative	=	162	(2.82%)					
Total positive	=	442	(73.18 per cent)									
		276	with protozoas (62.44 per cent)									
		221	with helminths (50.00 per cent)									
		54	with helminths and protozoas (12.44 per cent)									
Pure Infections												
(a) Protozoal (155 cases : 54.47%)	55	49	14	5	62	...	...	...	...	...	...	...
Percentages	29.13	26.97	7.57	2.71	3.35	...	...	...	...	...	...	...
(b) Helminthic (155 cases : 55.59%)	...	...	...	...	...	117	18	2	3	3	12	
Percentages	16.18	14.41	4.12	1.47	18.24	24.41	5.29	0.59	0.88	0.88	3.53	
Double Infections												
(a) Protozoal (32 cases)	6	6	...	...	...	...	...	...	...	...	...	...
	3	...	3	...	...	...	...	...	...	...	...	...
	4	...	...	...	4	...	...	...	...	...	...	...
	...	9	9	...	...	...	...	...	...	...	...	...
	...	2	...	2	...	...	...	...	...	...	...	...
	...	6	...	...	6	...	...	...	...	...	...	...
	...	...	1	...	1	...	...	...	...	...	...	...
	...	...	...	1	1	...	...	...	...	...	...	...
Total (32 cases)	13	23	13	3	12	...	...	...	...	...	...	...
Percentages (32 cases)	40.62	71.87	40.62	9.37	37.50	...	...	...	...	...	...	...
Percentages (81 cases)	16.05	28.39	16.05	3.71	14.81	...	...	...	...	...	...	...

Males Examined EH.		EC.	IB.	EN.	GL.	HW.	AL.	EV.	TT.	TS.	HN.
<i>(b) Helminthic (11 cases)</i>											
...	...	...	...	...	6	6	...	...	...	...	...
...	...	...	...	...	1	...	1	...	...	...	...
...	...	...	...	...	1	...	...	1	...	...	...
...	...	...	...	...	1	...	...	...	1	...	...
...	...	...	...	...	...	1	...	1	...	...	...
...	...	...	...	...	...	1	...	1	...	...	...
...	...	...	...	...	...	1	...	...	1	...	...
<i>Total (11 cases)</i>											
...	...	...	...	...	9	8	1	2	2	2	...
<i>Percentages (11 cases)</i>											
...	...	...	...	...	81.82	72.72	9.09	18.18	18.18	...	...
<i>Percentages (81 cases)</i>											
...	...	...	...	...	11.11	9.87	1.23	2.47	2.47	...	...
<i>(c) Protozoal and Helminthic (38 cases)</i>											
2	...	...	...	...	...	2	...	...	...	...	...
1	...	...	...	...	...	...	1	...	...	...	...
1	...	...	...	...	...	...	...	1	...	...	...
3	...	...	...	...	...	...	...	...	...	3	...
...	5	...	...	...	5	...	...	...	...	...	...
...	3	...	...	...	...	3	...	...	...	...	...
...	3	...	...	...	...	...	...	...	...	3	...
...	...	2	...	...	2	...	...	...	...	...	...
...	...	1	...	...	...	1	...	...	...	...	...
...	...	...	3	...	3	...	...	...	...	...	...
...	...	...	...	4	4	...	...	...	...	...	...
...	...	...	...	2	...	2	...	...	...	...	...
<i>Total (38 cases)</i>											
15	11	3	3	6	22	8	...	1	1	6	...
<i>Percentages (38 cases)</i>											
39.47	28.94	7.89	7.89	15.79	57.89	21.05	...	2.63	2.63	15.79	...
<i>Percentages (81 cases)</i>											
18.52	13.58	3.71	3.71	7.41	27.16	9.88	...	1.23	1.23	7.41	...
<i>Total (81 cases)</i>											
28	34	16	6	18	31	16	1	3	3	6	...

Males Examined	EH,	EC,	IB,	EN,	GI.	HW.	AL.	EV.	TT.	TS.	HN.
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Percentages (81 cases)	34.57	41.97	19.75	7.41	22.22	38.27	19.75	1.24	3.71	3.71	7.41
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Triple Infection

(20 cases)

(a) Protozoal (4 cases : 20 per cent)	1	1	...	...	1	...	...	...	...	...	...
---------------------------------------	---	---	-----	-----	---	-----	-----	-----	-----	-----	-----

(b) 2 Protozoal and helminthic (16 cases : 80 per cent)	...	2	...	2	2	...	...	...	...	...	...
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(16 cases :

5

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80 per cent)

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Total (20 cases)

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16

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11

13

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2

Percentages (20 cases)

45.00

80.00

10.00

30.00

55.00

65.00

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5.00

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10.00

Quadruple Infections

(one case)

...

1

1

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1

Grand Total (442 cases)

92

100

33

17

91

162

34

4

6

6

21

Percentages of the positive cases (442 cases)

20.81

22.62

7.47

3.85

20.59

36.65

7.69

0.91

1.36

1.36

4.75

Percentages of the total examined (604 cases)

15.23

16.54

5.47

2.81

15.07

26.82

5.63

0.66

0.99

0.99

3.48

Females examined (604 cases)

15.23

16.54

5.47

2.81

15.07

26.82

5.63

0.66

0.99

0.99

3.48

Total examined

=

97

Total negative

=

20 (20.62 per cent)

Total positive = 77 (79.38 per cent). 55 with Protozoas (71.43%)

27 with helminths (35.06 per cent)
5 with Protozoas and helminth both (6.59 per cent)**Pure Infections**

(a) Protozoal (37 cases : 64.91%)	5	8	3	1	20	...	...	...	...	...
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HW. AL. EV. TT. TS. HN.

...	...
1	1
5.00	5.00
1.75	1.75

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• • •

100

1	1
.29	1.29

Percentages of total 97 cases examined	10.31	20.62	8.25	7.21	28.87	20.62	6.19	1.06	...	1.06	1.06
Total males and females (519 cases)	102	120	40	24	120	181	40	5	6	7	22
Percentages of total positives (519 cases)	19.65	23.11	7.71	4.62	23.11	34.87	7.71	0.96	1.16	1.35	4.24
Percentages of total examined (701 cases)	14.55	17.12	5.71	3.42	17.12	25.82	5.71	0.71	0.86	0.99	3.14

Farooki (1964) found *H. nana* in 3.4 per cent (Mooltan), 1.1 per cent (Bahawalpur) and 2.8 per cent (Peshawar) cases examined. Chandler (1927) found it in 0.74 per cent in Madras and 0.19 per cent in South India.

According to consensus of opinion, the rate of infection in children is more or less four times as high as in adults.

The incidence of *H. nana* stood below all the protozoan parasites, hook-worm and giant round-worm infections. Its incidence was, however, 4.35, 3.7 and 3.1 times higher than of *E. vermicularis*, *T. trichiurus* and *T. saginata* respectively.

3. Discussion and Summary.

We are oft to blame in this ;

'Tis too much proved that with devotion's visage

And pious action, we do sugar o'er

The devil himself.

(SHAKSPEARE)

Human excreta is the most potential source of transmission of various intestinal parasites. It is not untrue to remark that a community with high incidence of bowel parasites is one which feeds on its own faeces. It reminds us of water borne epidemics of Greece (1925-30), Chicago (1931), Japan (1948), England (1951) and Indiana (1954). Wells and springs usually get contaminated with local sewage. Faulty plumbing is notorious hazard for pipe-lines. The problem of intestinal parasites is crucial in places, where water contamination and food pollution with human faeces is must, try what one may to evade or avoid. Suitable humidity and optimum atmospheric temperature are two essential prerequisites for the extrinsic development of zoonoparasites. Wherever, these ecological conditions, either due to natural or artificial means, are available, the intestinal parasites have chances to flourish.

All organic matter comes from soil and to soil it returns. Every day in Lahore several thousand tons of manure is added to the farms and several million seeds of

zooparasites are broadcasted in the fields. The promiscuous defaecation converts vast areas into hatcheries of human intestinal parasites. The vegetable gardens, fodder fields and tobacco farms flourish in our country on extensive manuring and copious watering. For growers, the sewage water is all gold for quickly raising of vegetables. Teeming millions of cysts of protozoas and ova of helminths are daily added to the open fields within the City Corporation of Lahore. From these hatcheries, the spread of intestinal parasites continue unchecked either directly or through indirect means.

The common man does not know of the dangers involved in the faulty disposal of human excreta. Filth depots at present do not serve the purpose for which established. Human waste disposal in open carts and trucks is annoying and abnoxious. Filth depots and fly-breeding are synonyms. Filth flies are notorious wagons, incessantly move about, laden with cysts, ovas and dust from filth to food and facilitate transmission of bowel parasites.

Dust raising storms, which are special features of Lahore, make it possible for the viable cysts and infective helminth eggs to move from manure hillocks, contaminated fields and seeded courtyards to our food supplies which are usually kept without a veil both in the shops and sheds. The percentage of privileged people, who get protected water supply in Lahore, is more or less insignificant. According to the whispering tongues even the safest are unsafe in this city. We know of some conscious few, who are using so to say safe water, after boiling since last several years. The proportion of our intelligentsia, who would like to follow the safety laws rigidly, is most fractional. One can expect patience from an individual but one cannot dream of top-level co-operation in such matters from a family. All credit goes to the man who puts principle before every thing else. Success is a lock which needs a master key to open it. A nation of principles is usually a successful nation in the field of health. The free nations in the true sense of the words, are slaves of principles but are monarchs in other fields but we on the contrary are slaves of traditions.

The areas, where the water supply line goes, may be partially sure of protected water supply. Firstly because the old tube-wells in Lahore are sunk in low lying areas and secondly the supply pipes run along the street gutters and most invariably enter houses through drain holes. Chances of contamination through leaking joints, during back pressure period, is also sure and certain.

The behaviouristic pattern of a community, plays an important role in the transmission of animal parasites. In most areas the private and public privies do not exist. Wherever privies are found, these are usually surface privies, mostly on the top of the residential houses for the use of women and stay at home folks. Public privies are used only by those, who can afford to use them. The sweeper-in-charge is a watch and ward in disguise and charges for the use of WCS. One, who does not care to tip, is not allowed to enter. Let competent people find out

if the entry fee is levied by the authorities or tipping means a step towards modernization. The rate of tipping is highest and a must on and near the Mall but optional on the Birdwood Road.

Promiscuous defaecation is a necessary evil. It is a common practice with children and grown up males. The use of mud balls, or earth lumps by the adults to desoil the anal region or clean the seats after defaecation is one of the most hideous practices. The children on the other hand roll or drag their buttocks on the road or the field after passing stools. To expect any change, with adequate education but little means to achieve the end, is too much to expect. Money makes the mare go, holds well in all walks of life. An economically sound community needs no sermon. Resources make them sufficiently wise to practise according to the principles and become healthy. *Dade da sat wiyan so*¹ is well said axiom.

Our people are not conservative. They change with an unexpected tempo if provided means to adopt new ways of life. *Pakistanis are more Americans than the Americans themselves*, is a piece of smuggled news item from beyond the frontiers. It is said for those who have contacts with foreigners and have means to mimic them. *Nagal ra Agal Bayad. Over doing* is a testimony to the fact that we are suffering from *inferiority* complex. Every thing western, is superior for a crosssection and therefore, taken up by these people without any reason or rhyme. We belong to the block which is opposed to hasty changes and feel that from social point of view, the present civilisation is doing bad than good. It is running a roller on our traditions and sowing seeds of individualism. Joint Family System was an age-old Institution. It suited our country tremendously well. Today, it is materialism which rules our minds. Selfishness is on the top of every thing. Proper national outlook has not yet born. Our culture is under active stage of transformation. According to intelligentia, we are on cross roads. We are passing through transitional period, where the people most unfortunately adopt every thing which is gay and romantic in the present civilization but seldom take any notice of what may make the nation socially hale and mentally hearty. Drinking and dancing for most of us is an index of progress as it makes the life fast and brisk. Temperance is a stale practice and a retrogressive step as it makes us lethargic and morally timid. Activity leads to health and happiness while moderation brings lassitude. Let us pose a note of warning to this group. For us slow and steady wins the race' is meaningful. Islam lays stress on public health practices. According to Islam, healthy mind goes with healthy head. *Pak* and *Napak* have special significance in Islam. If we take care of it, our health will take care of itself and the well established bowel parasites will find no place in this country.

1. For a rich man, seven into twenty is equal to hundred. Solomon excellently sayeth, "Riches are a strong hold in the imagination of", rich man. Byron stated "Yes! ready money is *Aladdins lamp*," while Lygate was of the opinion that one cannot speed for lack of money.

Washing of hands before eating and after eating is essential. Islam lays tremendous stress on cleaning. We have yet to find people who practise cleanliness strictly according to the instructions laid down in our Holy Book.

Eating from the vendors, who sell adulterated and most unhygienically prepared foodstuffs, is a common feature sighted by those who have a stroll in any bazar in Lahore. One can see hawkers and vendors moving about through dust and dirt. In spite of rigid sanitary laws, these petty shopkeepers move about with their things uncovered. They argue, that seeing is believing and in their experience the clientage goes up if their stuff remains exposed to the sight and goes down when veiled or kept covered. We do not agree with this argument. We know, that the vendor knows, that we know, that he knows, that the client knows, that increase in weight, due to road dust and dirt and fly droppings and vomits, is the only consideration.

Our people cannot resist temptations. Even very careful individuals daily consume vast quantities of unclean, parasite laden, raw vegetables—raddish, carrot, tomatoes, green mint, green coriander, green chillies, green onions, green ginger, cucumber etc, and get infected with one or the other intestinal parasite. We, in Lahore should never forget that 90 per cent of our raw vegetables are produced on sewage farms.

According to the consensus of (clinicians) opinion, the incidence of different types of dysenteries and diarrhoeas within City Corporation of Lahore is fairly high. During some parts of the year, the morbidity and mortality rates become serious. A fraction of these cases come to the notice of medical profession and subjected to laboratory diagnosis. Others are based on clinical sense and therefore, do not represent real zooparasite cases. The annual hospital returns from Lahore show that on an average the mean ratio of deaths due to dysenteries and diarrhoeas vary from 0.25 (females) to 0.28 (males). The number of cases actually occurring are several times more.

In previous surveys, carried out in some healthy groups of Lahore, 89.75 and 80.6 per cent persons were found positive for one or the other intestinal parasite as against 73.04 per cent in those who complained of enterogastric troubles.

Nearly 182 persons, (25.96 per cent, 26.82 per cent (162) males and 20.62 per cent (20) females) complaining of entero-gastric troubles, were found free of intestinal parasites at the time of examination. 77 males and 16 females had only commensals. These findings further demonstrated that 275 persons (39.2 per cent) complained of entero-gastric troubles but had no pathogenic zooparasites.

The number harbouring two or more pathogenic organisms was fairly high. Due to double, triple, quadruple, quintuple and etc., infections the pathogenic effect could not be fixed on any one. For practical purposes, however, the signs and symptoms were considered to be due to the combined effect of the parasites involved.

TABLE VI. GIVING INCIDENCE OF INTESTINAL PROTOZOAS IN DYSENTERIC, DIARRHOEIC, NON-DYSENTERIC, NON-DIARRHOEIC AND CONVALESCENT CASES.

(A) <i>Dysenteric/Diarrhoeic Cases :</i>						
	EH.	EC.	EN.	IB.	CM.	GL.
1.	16.1	26.2	19.0	...	5.1	13.6
2.	11.1	26.2	17.7	...	5.0	13.4
3.	5.4	13.5	10.8	5.4	...	13.5
4.	5.4	8.6	5.4	2.1	2.1	4.3
5.	3.5	8.7	5.2	3.5	5.2	7.0
6.	5.1	11.3	8.4	3.7	1.8	5.6
7.	7.5	23.0	5.4	...	5.1	7.5
8.	10.5	25.8	4.8	...	4.5	4.1
9.	14.1	30.3	14.1	...	12.1	3.1
10.	14.6	17.2	3.4	5.7	...	17.2

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5. Boeck & Stiles (1923) : Home (Diarrhoea).
6. Boeck & Stiles (1923) : Foreigners (Diarrhoea).
7. O'Conner (1919) : White (dy/di).
8. O'Conner (1919) : Egyptians (edy/di).
9. O'Conner (1919) : Indians (dy/di).
10. Ansari (1964) : Pakistanis.

(B) *Non dysenteric/non-diarrhoeic Cases :*

	EH.	EC.	EN.	IB.	CM.	GL.
1.	3.6	19.3	12.5	6.1	3.1	6.1
2.	2.5	10.2	9.8	4.6	0.3	5.0
3.	2.3	12.0	11.7	4.2	1.0	5.8

4.	6.4	14.2	...	...	...	10.8
5.	6.4	14.2	...	...	2.0	6.0
6.	2.6	10.1	9.9	4.8	0.7	4.9
7.	2.1	11.6	12.0	4.2	1.0	5.6
8.	2.3	13.0	12.0	4.2	1.5	5.4
9.	7.3	24.2	2.7	-	1.4	3.4
10.	5.2	20.5	0.6	15.4	0.6	28.9
11.	4.6	23.1	0.8	22.5	0.4	20.5

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6. Boeck & Stiles (1923) : Home.
7. Boeck & Stiles (1923) : Foreigners.
8. Boeck & Stiles (1923) : Foreigners.
9. O'Conner (1919) : Egyptians.
10. Ansari & Sapru : (1964) : Pakistanis
11. Ansari & Sapru : (1964) : Pakistanis.

(C) *Dysenteric/Diarrhoeic Convalescents :*

	EH.	EC.	EN.	IB.	CM.	GL.
1.	5.9	15.5	...	...	...	11.3
2.	7.0	15.2	...	...	3.0	9.9
3.	...	13.1	...	6.6	...	...
4.	7.9	19.0	3.1	1.3	...	6.3

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In previous surveys carried out in healthy carriers, the protozoan infections were found in 55.13 and 25.8 per cent as against 47.22 per cent in the present studies. The helminthic parasites were however, incremented in 71.8 and 30.82 per cent healthy persons while 35.23 per cent of these who complained of entero-gastric troubles had the worms.

(i) 5.13 and 4.6 per cent persons, enjoying normal healthy life may harbour *E. histolytica*, while its incidence in those suffering from one or the other intestinal trouble may be as high as 14.55 per cent. An outstanding feature of the present observations is that comparatively much larger number of cases of *E. histolytica* may be expected in those who complain of abdominal distress, diarrhoea and dysentery.

(ii) *I. butschlii* is usually considered to be an innocent commensal. Some of the recent authors, however, give it the status of a pathogenic organism. It was found in 15.39 and 22.5 per cent healthy subjects. In hospital cases reported in this note, its incidence was 5.7 per cent. From this data one cannot conclude that *I. butschlii* does not play any important role in causing entero-gastric troubles.

(iii) The duodenal flagellate appears to be common bowel parasite of Lahories. It was found in 28.85 and 20.5 per cent healthy carriers. In the present survey, it was found in 17.12 per cent cases examined. *Giardiasis* is usually well marked in children. In the present series however, there were no children.

(iv) Although we have no figures to substantiate our statement, yet we feel sure that *ancylostomiasis* in Lahore has increased considerably during recent years. This is a parasite of submountaneous regions and had been brought to Lahore both from beyond the border (Kangra valley, Hoshiarpur and Ambala) as well as from Sialkot district. The parasite probably has discovered better suited environments for itself here than it had in its original home. Doesn't it mean that Lahories are hospitable both to the friends and the foes? The agriculturists, who worked behind the plough for generations, have now settled in the metropolis, because here they find new trades and new jobs to earn their livelihood with ease and lead a better standard of life. Although there is lot of stress and strain in urban life yet it is most alluring, glamorous and gay. Now they say "*Rehna Shehr men chahé qahar kiyon na ho, khana gehun chahé zehar kiyon na ho.*"¹ The hook-worm infection rate was 44.23 and 15.1 per cent in healthy subjects as against 25.82 per cent in the present series.

(v) Giant round-worm is one of the most common parasites in Lahore. In previous surveys, carried out in healthy people, its incidence was 34.62 and 37.6 per cent. In the present series of persons, complaining of different entero-gastric

1. *The crowd and buzz, and murmurings, Of this great live, the city (Cowley)*
Towered cities please us then, And the busy hum of men. (Milton)

troubles, its incidence was found to be 5.71 per cent. Like *T. trichiurus*, it is also a house hold infection.

Promiscuous defaecation contaminates the premises and promotes infection rate in family and the community. Consumption of raw vegetables, produced on raw human faeces also increases incidence of parasites intestinal. Sugars and sweets sold in the market also play important role in this regard. Dust storms also add premium to the infection rate.

(vi) *E. vermicularis* is one of the most familiar human parasites. This parasite makes no distinction between high and low. It is as common in the west as it is in the east. Data based on coprological examination is not reliable. It was found in 14.74 and 3.2 per cent healthy persons examined as against 0.71 per cent in cases complaining of entero-gastric troubles.

(vii) Somehow or other we always thought that *T. trichiurus* is one of the common human parasites in Lahore. Quite unexpectedly we found its incidence to be very low both in healthy and diseased persons examined so far. Its incidence was 0.64 and 5.2 per cent in healthy carriers and 0.86 per cent in sydrionic cases. From these observations we conclude that its incidence is of moderate nature in adults. Contaminated door yard and courtyards keep its incidence high in young age groups.

(viii) *Hymenolepis nana* is said to be common in some communities, while in others its incidence is comparatively low. It is a parasite of young age group. Its incidence was 4.44 per cent in healthy adults and 11.6 per cent in healthy primary schools children. The infection rate in the present series was found to be 3.14 per cent. Usually this parasite is more common in families and institution group, The incidence however is low in a community in general.

(ix) Beef tape-worm infection also seems to have increased during recent years. Its infection is most probably considerably high in those who can afford eating half cooked, partially roasted and salted meat preparations. Smoked tikka kababs, sish kababs, chapapal kababs may retain infective stages and safely lodge in those who eat. The percentage of such people is negligible and therefore, incidence per 10,000 people is considerably low. In group of healthy adults it was found in 0.64 per cent people while the incidence in healthy children remained nil. The infection rate in the present series was 0.99 per cent only.

Learning tends to mitigate the fear of adversity and also tends to prevent the demoralising effects of disquisition and care. The data presented heretofore is to arouse the feeling of the readers. It may raise one above losses, make one to hope than fear and licence one to face facts than distress. Cultivation improves a soil, a tree, a plant, and refinement improves a nation. A beautiful statue is the mechanical refinement of a block of marble. A nation rises up and above expectations when it learns to look after itself. Glory is something, which cannot be begged for. It is a commodity which has to be achieved with hard labour. No legislation has

ever got a nation freedom from parasites. If one parasite is suppressed for a while, it yields place to another. There is a chain of vicious circles. "Where to break, when to break and how to break," was once applied to one parasite and then for another. Both life and health have always remained uncertain in this world of ours. The lower animals are disciples of Satan and seem to have firmly pledged to challenge all the claims of man, who can yet scarcely flatter to have gained much victory over the pathogenic parasites.

Parasites always remained offensive, distressing and vitiating to human health and needing constant efforts to eliminate, lest the parasitism becomes too obstinate to be cured. The situation warrants timely and determined act to prevent contacts, if contacted warrants fighting well to eradicate.

We must improve our environments ourself and should never expect someone from heaven to come and correct our sanitation. "The days of miracles" is a story of hoary past, may better be heard and wondered at, but never to be believed. A dog wags its tail, sweeps clean the seat before it sits why not we, the conquerors of the world do as our pup does.

Allama Iqbal was always conscious of the needs of Muslim nation. He knew it full well that the muslims of Indo-Pakistan sub continent were short not only of direct vigorous action but also of discipline and direction under leadership. It was pre-eminently an act of faith with him and his trend of motivation is vivid in his poetry. One of his wonderful couplets is quoted below with gratitudes:

پیام عمل : تراش از تیشہ خود جادۂ خویش

برآۂ دیگران رفتن عذاب است

گر دست تو کار نادر آید

گناہے ہم اگر باشد ثواب است

*Carve thy own path with thy own axe,
To tread the path of others is a torment,
If a deed of wonder thou hast achiev'd,
Sin though it be, it is a glory.*

(Arnold)

4. ACKNOWLEDGEMENTS.

(*That alone is real gain which you honestly obtain*)

The information presented in this note was collected during 1958-59. It did not see the light of the day for the last five years because it was never contemplated to be published. It was however, incorporated in the lecture notes delivered to the post-graduate medical students either for D.P.H., D.M.C.H. or D.C.H. examinations of the Panjab University. The data is presented here with the solitary hope that it may serve as a ready reference for those who care to use it. Probably

it may prove to be contagious and tempt others to collect similar information with a view to correct or confirm these findings. In either case the information will serve its purpose. We owe grateful thanks to the future workers in anticipation, because we deem it a yeoman service to the teachers, who are at present obliged to quote epidemiological figures collected from elsewhere.

Sometimes back, we had an opportunity of discussing the trend of intestinal parasites of man in Lahore with Dr. S. M. K. Wasti, Professor of Medicine (Paediatrics), K. E. Medical College and Chairman of the Department of Child Health, Mayo Hospital, Lahore. Both of us harmonically lamened for the non-availability of reliable incidence figures of the intestinal parasites from the country. The data presented heretofore in this communication was shown to Dr. Wasti. A surmises was also prepared for his persual. Due to serious pre occupation in official and teaching work, the inspiration we received from our learned colleague, worked with sloth's speed. Anyhow, we have the consolation "to be late than never to be." It was a privilege for us to have benefit of advice from an elegant scholar, distinguished physician and delightful personality who reigns in the soul and heart of his colleagues.

Our thanks are also due to Dr. M. Riaz Mir (formerly Medical Officer, Borsial Institute, Lahore) for giving us all the facilities to collect stool samples from cases complaining of entero-gastric troubles. Without his unstinted co-operation, it would have neither been possible to collect stools nor present the data to our readers.

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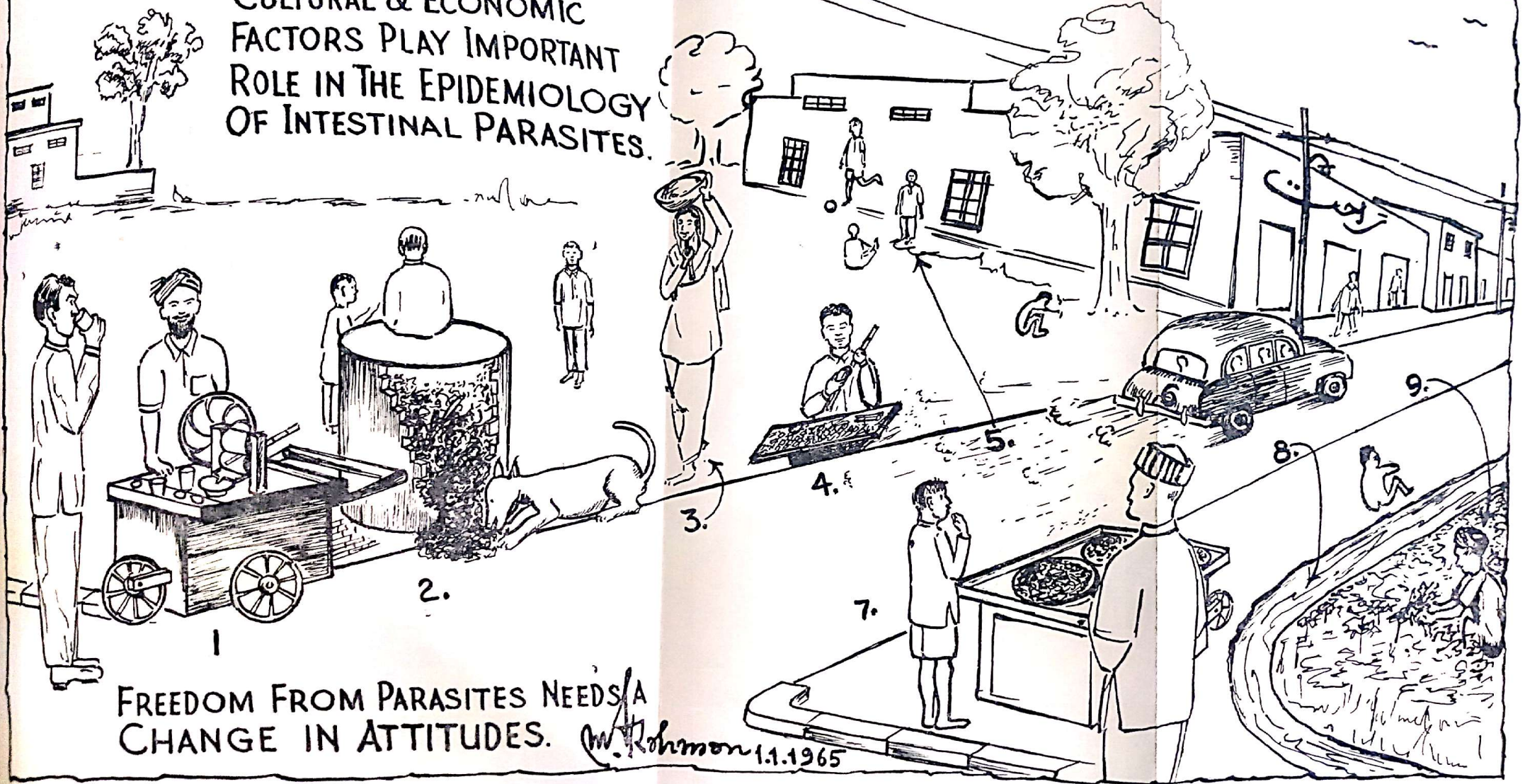
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CULTURAL & ECONOMIC FACTORS PLAY IMPORTANT ROLE IN THE EPIDEMIOLOGY OF INTESTINAL PARASITES.

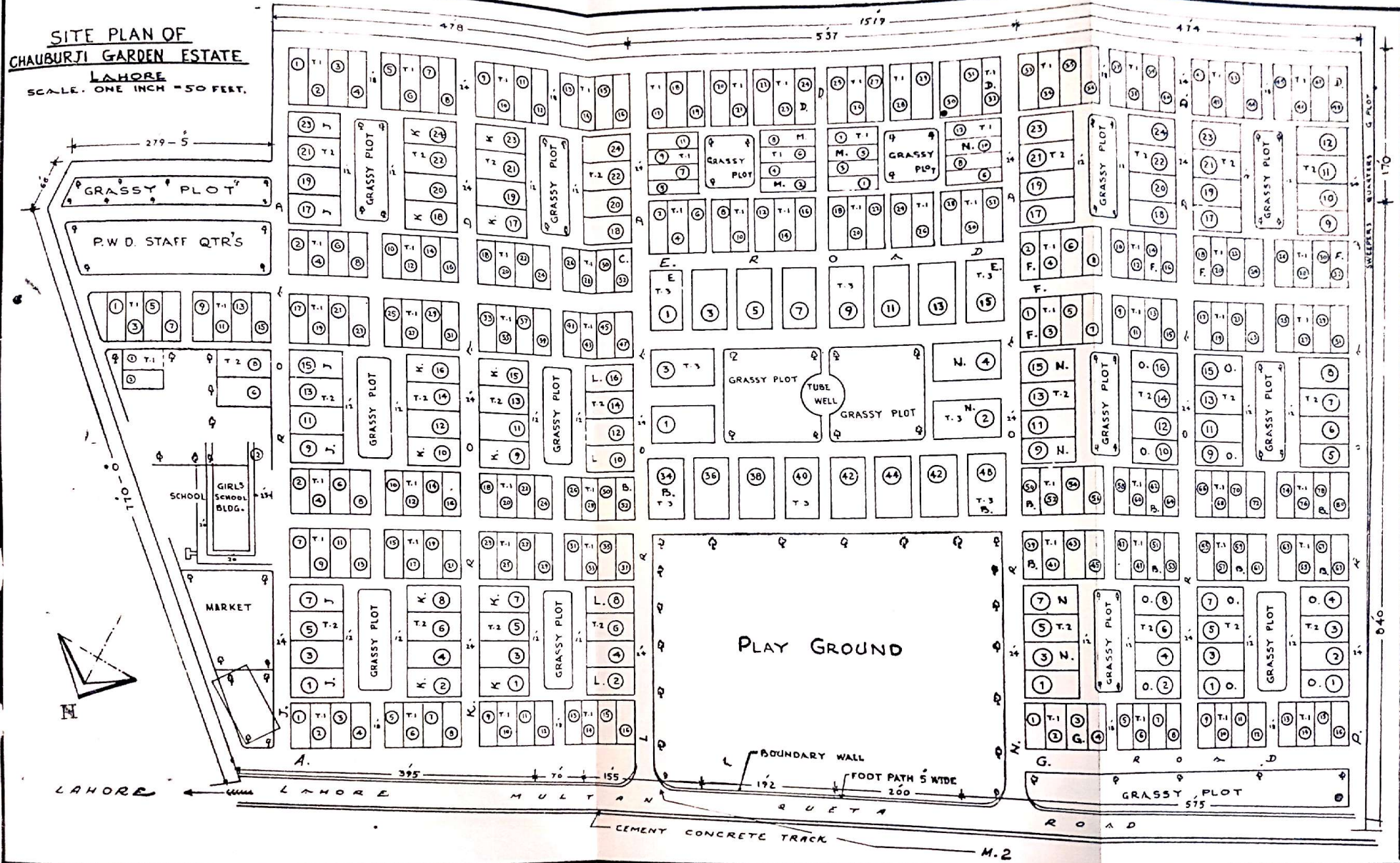


FREEDOM FROM PARASITES NEEDS A CHANGE IN ATTITUDES. W. Rahman 1.1.1965

Explanation to figures :—(1) Unsafe glass of sugar-cane juice vended on the road side. (2) Dilapidated manure-bin where flies are born and bred is also haunted by boys and bitches. (3) Proud sweepers with filth-basket on her head and food in her hand. (4) Sweet and soiled *gandairies* of the season are laden with teeming million parasitic organisms and dust particles. (5) Children play bare-footed and pick-up *onkylstomiasis*. (6) Dust clouds raised by fast moving vehicles quietly alight on the exposed eatables. (7) Filth and flies lick and kick unveiled cut fruits and sweets unchecked. (8) An open sewage channel flowing to the fields is another uisance. (9) Farmer courts infection while working with unprotected hands and bare feet in a sewage farm and contaminated fields.

SITE PLAN OF CHAUBURJI GARDEN ESTATE

LAHORE
SCALE: ONE INCH = 50 FEET.



PARASITIC INFECTION SURVEY IN CHAUBURJI ESTATE QUARTERS, LAHORE, WEST PAKISTAN.

By

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and

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INTRODUCTION

Worm infections form one of the most important and common group of communicable diseases that are present here in an endemic form. This has become evident through recent observations made here by (Ahmad)¹, (Ansari and Sapru)², (Zaman)³, (Shah and Zaman)⁴, (Jan and Choudry)⁵ and (Farooki)⁶. Cases of round worm infection have been recorded in Lahore even in people of better socio-economic status living in a very clean locality. This induced the authors to conduct parasitological survey in a controlled locality where co-operation of the people could be had for the purpose. The locality known as Government Servants Chauburji Estate in Lahore was selected for this investigation (Sketch map appended). It is situated on Multan Road and extends over an area of 47 acres. It is a comparatively much cleaner area in Lahore than many other localities. All houses are paca and there are metalled roads and lanes. Houses are arranged in blocks. There are 411 houses in all. Drinking water is derived from deep tubewells situated within the premises. Human excreta disposal is through water carriage system. For refuse collection there are dust bins from where the rubbish is removed to the filth depots almost daily. From the filth depot it is carried to a place 8 miles away. There are a number of dust bins without covers. All the residents are Government Servants; most of them are literate and belong to middle socio economic class. The are fairly conscious of their health conditions.

Eatables of the nature of fruits, sweets and vegetables, that are consumed in raw form, are sold uncovered within the premises as well as in the nearby market. House flies are highly prevalent and naturally have an easy access to the food articles particularly to the cut fruits which are sold un-covered

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METHODS AND MATERIAL

Stool collection was carried out in glass containers of about 2 ozs capacity. These glass containers were labelled showing the name of the person whose stool was collected. The containers were distributed by the Sanitary Inspector in the evening and the Head of the Family was directed to hand over the same with the stool of the family member to sweeper appointed for the purpose. Each house in the block was numbered and names of the family members of each house were recorded in a register. The stools collected were brought to the Epidemiology Laboratory for examination for the presence of Ova of common parasites. Each sample was examined by brine flotation technique as well as Merthiolate-Iodine-Formaldehyde concentration technique. Follow-up examinations were carried out about a fortnight after treatment.

Stool sample of each person was collected thrice on different dates. The record of the results of stool examination were kept in a register showing the name and age of the person with date of examination. The stool collection, stool examination and record keeping was done blockwise. The investigation was started on 12.9.61 and completed on 17.9.63 and as such it lasted for about two years.

RESULTS

Stools of 1,660 persons, 838 men and 822 women were examined during the investigation. The infection rate with any one of the following intestinal parasites was 19.9% in men and 19.59% in women and 19.76% in both sexes : (Table I)

1. *Ascaris-lumbricoides*.
2. *Ankylostoma duodenale*.
3. *Oxyuris vermicularis*.
4. *Hymenolepis Nana*.

TABLE No. 1
AGE AND SEX INCIDENCE OF COMMON PARASITIC INFECTIONS IN
CHAUBURJI ESTATE LAHORE - 1963-64

Age group (in years)	No	Male			Female			Total	
		Posi- tive	Percent- age	No.	Posi- tive	Percent age	No.	Posi- tive	Percent age
0 — 1	8	2	25.00	12	2	16.67	20	4	20.00
1 — 5	125	34	27.20	131	34	25.95	266	68	26.56
5 — 20	429	94	21.91	392	90	22.96	821	184	22.41
20 — 60	272	37	13.60	278	35	12.59	550	72	13.09
above 60	4	—	0.0	9	—	0.00	13	—	0.00
Total	838	167	19.93	822	161	19.59	1660	328	19.76

The incidence was highest in 1-5 years age group. Next age group in order of infection was 5-20 years. Thereafter it declined in both sexes. There was no significant difference in the incidence amongst males and females. The number of stools examined of infants and in persons above 60 years of age, were too small for drawing any conclusive inference.

ASCARIS LUMBRICOIDES INFECTION

It was found to be the most prevalent of the helminthic infections. The overall infection rate was 9.22 per cent. The infection rate was 9.07% in men and 9.37% in women showing that there was no significant difference in incidence in the two sexes. In boys as well as in girls the infection was highest in age group 1-5 years and there after it declined gradually. The number of infants and of persons above 60 years of age was again too small to draw any conclusive results (Table No. 2).

TABLE No. 2

AGE AND SEX INCIDENCE OF ASCARIS LUMBRICOIDES INFECTION IN CHAUBURJI ESTATE LAHORE -1963-64.

Age group	Male			Female			Total	
	No.	Posi- tive	Percent- age	No.	Posi- tive	Percent- age	No.	Percent- age
0 — 1	8	2	25.00	12	2	16.67	20	4 20.00
1 — 5	125	17	13.60	131	13	9.92	256	30 11.72
5 —20	429	37	8.62	342	36	9.18	821	73 8.89
20 —69	272	20	7.35	278	26	9.35	550	46 8.36
Above 60	4	—	0.00	9	—	0.00	13	— 0.00
Total	838	76	9.07	822	77	9.37	1660	153 9.22

ANCYLOSTOMA DUODENALE INFECTION

Hook-worm ova were found in 3.31% of all persons examined; 3.82% of males and 2.80% of females. These figures are comparatively very low as compared to the infection rates in the rural population, where 22.6% of persons in Lahore Corporation villages were found infected (Ahmad & Shah)⁷. The infection rate was highest in 5-20 years age-group. Thereafter it declined. The number of infants and persons of above 60 years of age were again so small that no definite results could be derived. (Table No. 3).

TABLE No. 3.

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AGE AND SEX INCIDENCE OF INFECTION WITH ANCYLOSTOMA
DUODENALE CHAUBURJI ESTATE EAHORE - 1963-64

Age group (in years)	Male			Female			Total	
	No.	Posi- :tive	Perce- :ntage	No.	Posi- :tive	Perce- :ntage	No.	Posi- :tive
0 — 1	8	—	0.00	12	—	0.00	20	—
1 — 5	125	4	3.20	131	2	1.53	256	6
5 — 20	429	23	5.36	392	15	3.83	821	38
20 — 60	272	5	1.84	278	6	2.16	550	11
Above 60	4	—	0.00	9	—	0.00	13	—
Total :	838	32	3.82	822	23	2.80	1660	55
								3.31

OXYURIS VERMICULARIS INFECTION :

It was found in 2.77 per cent of persons examined. The proportion of infected persons in men was 2.51% and in women 3.04% which did not differ significantly. The age group showing highest infection was again 1-5 years and 5-20 years in both men as well as women. The number of infants and persons above 60 years of age again were too small to give any useful results. (Table No. 4).

TABLE No. 4

AGE AND SEX INCIDENCE OF OXYURIS VERMICULARIS INFECTION
IN CHAUBURJI ESTATE, LAHORE - 1963-64.

Age group (in years)	Male			Female			Total	
	No.	Posi- :tive	Perce- :ntage	No.	Posi- :tive	Perce- :ntage	No.	Posi- :tive
0 — 1	8	—	0.00	12	—	0.00	20	—
1 — 5	125	4	3.20	131	4	3.05	256	8
5 — 20	429	14	3.26	392	18	4.59	821	32
20 — 60	272	3	1.10	278	3	1.08	550	6
Above 60	4	—	0.00	9	—	0.00	13	—
Total :	838	21	2.15	822	25	3.04	1660	46
								2.77

HYMENOLEPIS NANA INFECTION

It was found in 4.46 per cent of persons examined. The proportion of infection in men was 4.54% and in women it was 4.38%. In age group 1-5 years in the infection was 7.20% in boys and 11.45% in girls. Beyond 5 years the incidence gradually declined (Table No. 5).

TABLE No. 5

AGE AND SEX INCIDENCE OF HYMENOLEPIS NANA INFECTION IN CHAUBURJI ESTATE, LAHORE - 1963-64

Age Group (in years)	Male			Female			Total		
	No.	Posi- :tive	Perce- :ntage	No.	Posi- :tive	Perce- :ntage	No.	Posi- :tive	Perce- :ntage
0 - 1	8	—	0.00	12	—	0.00	20	—	0.00
1 - 5	125	9	7.20	131	15	11.45	256	24	9.38
5 - 20	429	20	4.66	392	21	5.36	821	41	4.99
20 - 60	272	9	3.31	278	—	0.00	550	9	1.64
Above 60	4	—	0.00	9	—	0.00	13	—	0.00
Total	838	38	4.54	822	36	4.38	1660	74	4.46

Blockwise analysis of infection rates for *Ascaris lumbricoides*, *Ancylostoma duodenale*, *Oxyuris vermicularis*, *Hymenolepis Nana* individually and for all the four parasites combined, showed that block A, B, C, D, and L were found to be worst affected. The number of cases examined in block H, J, K, and P were too small to give any purposeful results.

CONCLUSION —

In spite of the fact that the locality is clean and there is provision of safe water supply and disposal of human excreta by water carriage system there is fairly high incidence of intestinal from infections particularly with *Ascaris lumbricoides*. Worm infections in the comparatively unsanitary areas are likely to be higher. Further epidemiological investigations are needed to determine medium of transmission. The fact that cut fruits, sweets and some vegetables eaten uncooked are exposed to houseflies and dust incriminates these two to be most likely links in the transmission of these infections.

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FEEDING THE INFANTS: by

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More than half the infants attending the hospitals suffer from malnutrition. Because of this they are more vulnerable to diseases. Their recovery from illness is slow and they are more likely to develop complications. There is no lack of goodwill and desire on the part of the parents to see their young ones thrive and it is amazing to what extent they are prepared to co-operate. Unfortunately, in the absence of correct advice, unscientific vague, superstitious ideas prevail many of which are actually harmful. This paper is compiled to acquaint the young doctors and parents with the fundamentals of infant feeding and to stimulate their interest in asking detailed advice from suitably trained colleagues.

BREAST FEEDING

It is the ideal way to feed infants as it is economical, convenient, readily available and clean. Unfortunately it is becoming fashionable and a symbol of status to feed infants artificially. Though with the improvements and advances made in artificial feeding it is quite feasible to bring up a normal healthy infant, in an average family, breast feeding offers considerable advantages over artificial forms of feeding. The problem here is to convince the parents about the various merits of breast feeding and it rests on the family doctor to spend sufficient time with the parents to explain about it. Gastro-intestinal complications like diarrhoea and vomiting are far more common in bottle fed babies compared to the breast fed ones. Also parents have the habit of trying to simplify the time consuming procedure of making a bottle and consequently germs contaminate milk very readily. Full weight, therefore, should be thrown on the side of breast feeding.

(a) Preparation of breast feeding.

This subject should receive attention in the under-graduate teaching curriculum of young girls. In the anti-natal clinics the doctors and other personnel should pursue the subject of breast feeding more vigorously, try to obtain the views of the mother discuss the various aspects in detail and attempt to answer her questions and allay genuine apprehensions about breast feeding. It is useful to arrange short practical demonstrations and discussions with mothers who are actually successfully feeding their infants at the breast. As a routine in the ante-natal clinics breast should be

examined physically and defects if any, corrected. Proper advice should be given about the breast hygiene and care. A well prepared mother will be a successful mother.

(b) How to start breast feeding.

After delivery the new born should be put to breast for a few minutes every now and then. This will acclimatize the nipples to the trauma of sucking, the infant will learn to hold the nipple and suck at it and it will also stimulate the breast to produce milk. Until breast milk 'comes' the infant should be provided bits of plain boiled water.

After the first few days it should be put to breast every three or four hours and allowed to nurse at one or both breast till he is satisfied (generally 15-20 minutes). It should be explained to the mother that the full flow of breast milk does not establish till after a week of delivery and the limited supply of milk during this period should not worry her unnecessarily.

HOW TO FEED AT THE BREASTS :

It is preferable that before feeding the mother should be relaxed and seated or lying down comfortably. Feeding while she is tense or in a hurry reduces the amount of milk and is likely to upset the baby's digestion. She should wash her hands and clean the nipples and the black area around it with lukewarm boiled water or ordinary tap water. The infant is then placed on her right fore-arm for the right breast, in such a way that he is really lying on the respective forearm with his legs hanging one on each side. The breast is then supported with the palm of the other hand and the middle and index fingers are applied around the nipple, so that on pressing these it comes out. This is then touched to the side of the baby's cheek, who turns his mouth that side and the nipple slips into it. The nipple should be pushed well back in the baby's mouth so that he can compress the periareolar area with his jaws. Any obstruction to the nostrils with breast or fingers should be avoided as otherwise the child will not be able to feed. The feeding should be started from alternate breast at each feeding time and as much milk from one or both breasts be given as the child requires. The nipple and areola should be cleaned with water after feeding. Also the child is held on the shoulder and patted on the back for a few minutes to allow him to 'burp' (bring out the swallowed air). It is preferable not to allow the child to fall asleep at the breast but put him to sleep after feeding when desired.

HOW TO CONTINUE BREAST FEEDING :

Success of breast feeding depends not only upon determination of the mother but also on her own good health, the powerful sucking efforts of the child and the avoidance of complications. If the mother is ill nourished or her diet is insufficient or the infant is weak or for some reason debilitated and cannot suck properly, breast supply is not properly maintained.

Normally the infant is fed every three or four hours or when he demands, depending on his requirements etc, as prescribed by the doctor, but the feed falling in the middle of the night is generally omitted to allow rest to the feed and child, the last feed at night is, however, delayed and the first morning feed is advanced by an hour to reduce the feed free interval during the night. The pattern of four hourly feed, e. g., will be as such : 5-10 A. M. / 2, 6, 11 P. M.

Breast feeding can be supplemented with bottle feeding as soon as advised by the doctor. The decision to stop breast feeding in individual cases is a difficult one and depends on many factors. It is my opinion, that in these parts of the country, breast feeding may not be discontinued completely till the child is at least one year old and perhaps longer, depending on the health of the child and mother, the type and social status of the home and the ability of parents to comply with the doctor's instructions.

During the period of breast feeding the diet of the mother should be simple but ample and rich in proteins, vitamins and minerals. She should consume a pint of milk and fresh fruits in addition to her usual meals and take plenty of fluids. Any food which upsets the baby should be avoided. The simpler, the dietic habits, the easier the lactating process. Some drugs are excreted through the milk and produce their undesired effects on the baby e. g., sleeping pills and purgatives. Before taking any medicine it is available to consult your doctor.

COMMON CAUSES OF FAILURE TO BREAST FEED :

These generally are due to psychological handicaps in the mother or in the environments which, of course, are preventable. Physical defects are enumerated below and with proper antenatal care and advice they should occur very uncommonly. Some of them are detailed below :—

(i) Retracted nipples

Sometimes the nipples are too small and bound with adhesions, deep down in the breasts and do not come out with result that the infant cannot hold it in his mouth and is unable to suck at it. This should be detected in the antenatal clinic and treated. The mother should be advised during pregnancy to avoid wearing tight under clothing and to pull out the nipples a number of times daily, so that they are functionally fit before delivery. A nipple shield can be worn with advantage in such cases.

(ii) Cracked nipples.

The nipple of the mother is a delicate structure unused to the trauma of sucking. Vigorous or too much sucking produces a crack which is painful and it is liable to get infected. This should be prevented by allowing time for acclimatization. The new born should be put to the breast less frequently and for shorter

intervals to start with and gradually the time and frequency are increased, as mentioned above.

(iii) *Breast engorgement.*

Breast engorgement occurs especially when the baby is unable to suck vigorously and breasts are not emptied mechanically also. Restriction of fluids and cold packs to the breasts together with proper evacuation will relieve this painful condition.

(iv) *Less milk output.* (Common complaint by many mothers).

Some women normally produce less milk than others. The important factor towards success is determination and confidence of the mother. She should consume ample amount of fluids and an extra glass before breast feeding, in addition to a well balanced nutritious diet containing ample proteins, fruits, milk and vitamins. Re-assurance, calm persuasion and confidence with a balanced diet should prove helpful.

(v) *New born unable to suck.*

Through prematurity, debility and weakness, paralysis and diseases of lips, palate and tongue, blocked nose due to common cold etc. the infant is at times unable to suck. At other times he gets choked with sucking. These special situations need special attention and it is necessary to seek the advice of the doctor.

The above mentioned causes are removable and, therefore, it should be attempted to tide the infants over the crisis and once the offending cause is removed the infant should be put back to the breasts. However, in certain states pertaining to the general health of the mother when she is ill with a chronic disease or keeps a bad health, it might be desirable not to allow her to feed the infant in the interest of both the mother and the child, when artificial feeding will have to be resorted to as a necessity.

ARTIFICIAL FEEDING :

If for various reasons breast feeding is not possible or the yield of the breasts is low, artificial feeding will be required to replace or supplement the breast feeding. There should indeed be few reasons for stopping breast feeding completely and the doctor must insist that supplements of breast feeding should be continued till the child is at least a year old.

The doctor should advise the mother about the type of milk to use, the composition of the formula and the number of feeds the infant requires. The advice below might be of help :—

TYPE OF AVAILABLE MILK :

1. Fresh cow or buffalo or goat's milk.
2. Full cream dried milk (Oster-milk, Cow and Goat milk).
3. Condensed milk.
4. Special milks for special circumstances.
5. Half Cream milk (Cow and Goat, Oster-milk).

Fresh cow and buffalo milk yield about 20 cal/oz. One scoopful of milk dissolved in one ounce of water is equivalent in caloric value to 1 oz of fresh milk. 211

Condensed milk is unsuitable for feeding infants and special varieties of milk are useful only in certain children who are not able to digest ordinary milk.

EQUIPMENT :—

For artificial feeding the following equipment is required :—

1. A big sauce-pan for boiling water and other articles.
2. Feeding bottles and a rack for storing them.
3. Rubber nipples and a jar.
4. Measuring jug of enamel or metal.
5. Brush for cleaning the bottles.
6. Small sauce-pan for cleaning and boiling bottles.
7. Strainer.
8. Metallic tea-spoon.
9. Wooden spoon.
10. Forceps.
11. Sugar pot.

QUANTITY OF FORMULA.

The table below is a rough guide to assist you. The requirements of normal child tend to vary from day-to-day and different children have different habits and requirements. Gain in weight should be the yard stick by which to measure whether the child is being adequately nourished rather than the quantity of milk that he consumes :—

TABLE No. 1

Age of child	Average feeds required per day.	Average ozs formula required per feed.	Fresh milk.	Water in formula.	Sugar
New born to 1 month	5-7	3-4 ozs	1½ ozs	2½ ozs.	1 T. S.
1-2 months.	5	4-5 ozs.	2½ ozs.	2½ ozs	1 T. S.
2-3 months.	5	5-6 ozs.	5 ozs.	1	1 T. S.
3-6 months.	4-5	6-7 ozs.	6-7 ozs.	Nil	1 ½ T. S.
6-12 months.	3-4	7 ozs.	7 ozs.	Nil	1 ½ T. S.

TECHNIQUE OF FORMULA PREPARATION :—

Ideally the bottles, measuring jug, spoon, strainers, funnel and forceps are allowed to boil in water for ten minutes in the large sauce-pan. In the small pan

ordinary tap water is boiled and some of it poured into 2-3 boiled bottles for drinking. Next the water to be used for formula making is measured (allowing also in addition a few extra ounces that will be evaporated) and boiled in the small pan.

The required amount of milk is next added and the mixture is boiled for 10 minutes. It is then allowed to cool but before it gets so, sugar is added and stirred with the wooden spoon.

The milk is then transferred to the bottle using a strainer and a funnel. The nipple which has been cleaned and boiled separately for three minutes is applied to the bottle by holding it at the rim without touching the area of the nipple that will enter the child's mouth. It is advisable to prepare a fresh bottle every time you require a feed the child, but all the bottles required during the day can be prepared once and stored in the refrigerator. Such bottles should be warmed before use by putting them in a sauce-pan of hot water for 15-20 minutes before feeding.

GENERAL INSTRUCTIONS :

(a) For bottle feeding the child is held in the same way as for the breast. The bottle is held rather upright so that the air does not enter the nipple during feeding.

(b) If no separate entrance for air exists at the other end of the bottle, milk will not flow through the nipple and the child will have difficulty in sucking. In such cases the bottle has to be removed from the infant's mouth repeatedly to allow for air entry, thereby disturbing the feeding process. It is, therefore, preferable to utilise a bottle with a separate entrance for air.

(c) If a separate air entrance exists, on inverting the bottle milk should flow out drop by drop through the nipple hole. If the hole is too small, milk will come out with difficulty, and it should be enlarged using a red-hot needle. If the hole is too large milk flows out in a stream and may choke the child at feeding. Such nipples should be discarded.

(d) The appetite of child varies from time to time and from day to day. He might at times finish the bottle and requires more, while he may at times leave his bottle unfinished. This is quite normal and should not cause any anxiety.

(e) For a breast fed child, bottle milk is of a different taste and some children may only start liking it with a little hesitation. Hence it is advisable to persevere with patience for a certain time.

(f) Bottles of various shapes and materials are available for infant feeding. It is better to select a bottle made of glass with comparatively wide mouth or a glass bottle which is open at both sides, as this facilitates cleaning. But of course, any bottle is good enough only if it is properly cleaned and boiled in hot water.

SUPPLEMENT TO INFANT FEEDING :

The new born has small reserves of Vitamins A, D, & C. The milk (breast and artificial) does not provide enough of these constituents for normal requirements. Consequently additions have to made fairly early. At the age of six weeks Vitamin A, D, and C are started first in small amounts and gradually increased to fulfil the normal daily requirements. Vitamins A & D drops are generally put into the mouth straight through the dropper before or during the feed. Vitamin C, drops or orange juice should be diluted with water before administration.

Milk feeding is continued till the child is 5-6 months when solid food should introduced.

SUMMARY

Advice is compiled in the proper technique and preparation for infant feeding. The common problems arising during breast and artificial feeding along with their simple solutions are indicated.

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PREMATURITY

by

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&

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Prematurity needs to be clearly defined for three reasons :

- (i) For statistical purposes so that comparable data in regard to all aspects of premature infants birth's and death's may be obtained.
- (ii) For legal purposes, that is, for the determination of legitimacy.
- (iii) For clinical purpose in order to select infants needing special types of care and to evaluate methods for care and treatment in relation to the degree of prematurity.

In 1948 the World Health Assembly recommended the adoption by all countries, for purposes of vital statistics of the following definition. An immature infant is a liveborn infant with the birth weight of $5\frac{1}{2}$ lbs. (2500 gms.) or less.

If weight is not specified, a live born infant with a period of gestation of less than 37 weeks may be considered as the equivalent of an immature infant for purpose of this classification.

A premature infant in the strict sense of the word is an infant born before he has reached full maturity. As a rule he is smaller, has lesser weight and presents signs of poor adaptation to extra uterine life.

CRITERIA :—

The single criterion of prematurity that has been most generally used is a weight of 2500 grms. (5 lbs. 8 oz) or less. The weight is easily taken and although not an exact indicator of prematurity, has provided a satisfactory criterion of the need for special care as well as a uniform basis for statistical analysis. Measurement of crown-heel length tends to be in exact unless it is made by anthropometric techniques and by skilled individuals.

When weight, length and gestation period combined are used to determine prematurity the proportion of premature infants so classified differs widely from the proportion found by using any one or two of these criterion.

Roentgenographic demonstration of development of centre of ossification is of little value in determining degree of prematurity because of sex and race differences.

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in the age of appearance of the ossification centres. Reasons for not using length of gestation as the chief criterion include the difficulty in obtaining accurate information of the first date of last menstrual period and the fact that a considerable percentage of women continue to have bleeding at the time of expected menses flow for one or more months even after conception.

INCIDENCE OF PREMATURITY :—

The percentage of new born weighing less than 2500 gm. varies very considerably in the Eastern and Western countries :

The incidence ranges about :—	
50% in Thailand	
29% in Pakistan	
35% in India	
30% in Cylone	
	10% in Japan.
	7.6% in U. S. A.
	6 5% in England.
	5.5% in Sweden.

In Lahore birth weight of 815 babies was studied in 1960. The incidence of prematurity in this group was 28%. Britain weight 419 babies was studied at Public Health Nursing School, Lahore in 1961-62. Out of these 25% were of birth weight 5½ lbs. or less in 1962, 510 babies were studied in Lady Aitchison and Sir Ganga Ram Hospitals. 217 were male 239 female. There were 7 twin births in the male group and 4 twin births in female. The incidence of permatuity in the male babies was 20.6% and in the female babies 27 8%. This incidence is based on the presumption that a baby with a birth weight of 5½ lbs or less is premature.

FACTOR INFLUENCING PREMATUARITY :—

Several factors have been known to influence the incidence of premature births.

(i) Effect of Race and Sex :—A children's Bureau study in the U. S. A showed that in a series of approximately 3,000 live births the percentage of infants with birth weight of less than 2500 gms varied with race and sex :

6% of average white male and female infant.

8% of average male Negro infant.

14% of average female Negro infant.

PLURALITY OF BIRTH :—

Twin babies ordinarily weigh less at birth than single babies. Some workers do not regard this a very important factor because it is not very common. According to the National Office of Vital statistics (U. S A.) 2% of the total births are plural. Incidence of prematurity among single born and plural born babies by sex and race in New York is as follows :—

<i>Single born infants.</i>		<i>Percentage of prematurity.</i>
White Males		5.4%
White Females		6.6%
Coloured Males		8.6%
Coloured Females		12.6%

<i>Plural born infant</i>	<i>Percentage of prematurity</i>
White Males.	51.6%
White Females	61.3%
Coloured Males	61.2%
Coloured Females	52.5%

MATERNAL FACTORS :—

Age of the mother her parity and birth order are to be considered. The influence of the age of the mother and her parity on premature birth have been studied by several workers. Woodbury (1925) analysed records of nearly 23,000 infants and concluded that—

Prematurity is 8.6% among mothers under 20 years ; it decreased to 4.1% for mothers from 35-39 years and than increasing to 4.8% for the mothers of 40 and over. Anderson (1947) also found the highest percentage of premature infants among the mother of 15-19 years old and among primi papas. This incidence decreased with the age of mother and in multiparas.

SOCIO-ECONOMIC FACTORS :—

Obviously incidence is higher in lower socio-economic group in U. S. A., a children's Bureau study of infant's over a period of several years showed that the incidence of prematurity was higher among general patients (6.8%) than among the private and semi private patients (4.3%).

NUTRITIONAL FACTOR :—

The studies that have been made in U. S. A. and Canada in which the mother's diet during pregnancy was graded have shown that the incidence of prematurity is higher among the women with poor diet.

INCIDENCE OF DISEASES ASSOCIATED WITH PREMATURE BIRTH :

- (a) Toxamic of pregnancy accused for a very wide range (5.2-29%) of premature births.
- (b) Antipartum haemorrhage is also associated with premature births. As is evident from the report of Anderson and Lyon, the incidence of various types of bleeding influencing prematurity.

Percentage of prematurity :

Placenta preavia.	1.5 - 4.5%
Premature separation. ...	1.3 - 5.1%
Unstated causes. ...	1.2 - 18.2%

- (c) *Syphilis* :—The incidence of prematurity in syphilis pregnant women various widely in differ at conditions and within area of the same country 1-4 19% according to Anderson and Lyon.

Source :—Danham E. C. 1957 Hoeber and Harper Washington D. C.

Reference :—Danham E. C. 1957 Hoeber and Harper Washington D. C.,

(d) *Tuberculosis* :—The incidence is 0.2 - 3% (Anderson and Lyon). Rather and his co-workers studies the relation of severity of tuberculosis in the pregnant women to the incidence of prematurity. There were 266 cases out of those 201 were full term and 59 premature, so the incidence was 23%.

MORTALITY IN PREMATURE INFANTS :—

The neonatal mortality for premature birth in the U. S. A decreased by 23% in 10 years period from 1935-1944. Still majority of deaths of these infants occurs on the 1st day of life. Dunhom (1948) says that almost all the deaths from premature birth take place in the 1st month (94% in 1944). More than half of these in the 1st month take place in the 1st day (59% in 1944). The following table will show the mortality by age :

<i>Age of death.</i>	<i>Number.</i>	<i>Percentage.</i>	<i>Deaths per 1000 live birth.</i>
Under one day.	18,909	57.1	6.7
Under one week.	9,750	29.4	3.5
One week to under one month.	3,406	10.3	1.2
One month to under one year.	1,055	3.2	0.4

Total :— 33,120 100.0 11.1

Source :—(Awan, A. K. Pak. Med. Journal October, 1964)

The neonatal mortality rates from premature birth from the year 1948 in different countries are as follows :—

U. S. A,	10.8 deaths /1000 live births
England and Wales.	8.1 " "
Canada.	10.7 " "
France.	7.2 " "

50% of Neonatal deaths are due to prematurity in Pakistan (Wasti, S. M. K. 1963).

MAJOR CAUSES OF DEATH IN PREMATURE INFANT AT AUTOPSY INCLUDES.

1. Abnormal plumonary ventilation.
2. Birth Injury.
3. Infections.
4. Malformation.
5. Anoxia.
6. Blood dycrasias.

Factors influencing the survival of prematurity born infants are :

(1) Birth weight, is an important factor, since the lower the birth weight less the chance of survival. It is for this reason that in special community, programmes for premature infants should be started, and priority must be given to infants with lower birth weight.

(2) Sex and Race is another factor influencing the survival of prematurity born infants. The survival rate in non-white is greater than among white infants. Female infants have better survival rate than male.

(3) Gestation age has a considerable influence on the survival among premature infants in the same weight group.

(4) Mothers health during pregnancy also has an effect on survival of premature infants. Those premature infants delivered of mothers with a normal pregnancy have better survival rate than to premature infants delivered of mothers with abnormal pregnancy.

PROGRAMME FOR THE PREVENTION OF PREMATURITY.

Prenatal Care :—In general the standards point out the importance of visits to the physician for prenatal care, in early pregnancy and for continuing the visits at regular interval throughout the pregnancy. At these visits consideration should be given to the mother's general health and her past pregnancy as well as to the progress of her present pregnancy. The standards for prenatal care have been generally accepted but the evaluation of pre-natal care as a factor in preventing premature birth is complicated by the presence of other factors that play a role such as :—

1. Economic status,
2. Failure on the part of some women to appreciate the value of prenatal care.
3. In accessibility clinics and,
4. Some times the physician's failure to give adequate care.

An example is found in the report from the Women Hospital Sydney, Australia, of the efficiency in intensive antenatal care programmes in reducing the incidence of prematurity. These measures were described by Hamlin under seven step :

1. Stimulation of attendance at prenatal clinics by nurses, midwives and sisters.
2. Lectures to explain the need for regular prenatal supervision and danger on account of failure to attend.
3. Increased supervision of patient in rural area.
4. Co-ordination with prenatal clinics. The Women's Hospital sought and obtained good co-ordination with those physicians in the Government pre-

natal clinics, who supervised the patients living in outlying district of Sydney.

5. *Blood Pressure* : Any patient who, after the 20th week had rise in blood pressure up to 130/85 where the original reading has been less, was seen more frequently.
6. *Oedema* : Digital oedema sufficient to cause a ring to be uncomfortably tight at the 31st week, specially in young primipara was considered a working sign.
7. Increasing control was exercised over the women's weight gain between 20th to 30th week of pregnancy because a gain more than 8 pounds during that period was considered as evidence of pathological condition.

Since a large proportion of the deaths are associated with low birth weight, early and adequate prenatal care is of prime importance to prevent complication of pregnancy or to prolong pregnancy safely until the infant is sufficiently mature to have good chance of survival, W.H.O. Expert Committee on maturity wishes to emphasize the importance of giving two types of programme.

- (a) For lowering the incidence of prematurity.
- (b) For the care of prematurely borne infants.

The committee considered the pre-requisites and contents for undertaking each type of programme and recognised institution of a preventive programme might well proceed the initiation of specialised care programme. Either type of programme may be started a localised or on a country wide basis.

Setting up of these requirements does not necessary less wide developed countries from developing premature infant programme but it is intended to encourage the establishment of general public health measures and the strengthening of maternal child health programme before embarking on a specialized programme aimed especially at the reduction of premature infant morbidity and mortality.

PREVENTION OF PREMATURE BIRTH.

Preparation of mother for child bearing must be a continuous process. We must make sure that woman is healthy and fit for motherhood.

1. Mother's must be encouraged to seek prenatal care as early in pregnancy as possible and careful history must be taken of previous still birth abortions and miscarriages.

2. Diet in pregnancy.

There is a relationship between low caloric intake low weight gain of mother and low birth weight of infant. But if the diet is overloaded with calories, there is excessive weight gain. Excessive weight is associated with pre-eclampsia and babies born of pre-eclamptic mothers are of low weight. The diet should therefore be well balanced and must be based on individual needs.

Prematurity

3. *Mothers health before pregnancy.*

Previous diseases which exist in the mother before pregnancy such as tuberculosis, anemæa diabetes nephritis and heart disease etc., as well as hypertension must be treated. If mother has nephritis heart disease or hypertension the advisability of pregnancy must be well considered.

4 *Mother's Health during pregnancy.*

Acute infection and disease like rubella when occur in early pregnancy may lead to abortion. Later on there disease may result in premature birth. German measles or rubella can lead congenital abnormalities and such babies tend to be premature.

5. *Blood incompatibility.* i.e. Rh. factors.

Summarising one can say that prevention of prematurity must include the following step :

(i) Instigation of preventive programme on a National state and local levels designed to : —

- (a) Provide better living conditions.
- (b) Educate the public to strive for high level of health at all times.
- (ii) Early and continued prenatal care with stress on : —
 - (a) Dietry and general hygiene.
 - (b) Immediate treatment of the complications of pregnancy.
- (iii) General improvement in pre-natal and obstetrical care through.
 - (a) More extensive research into causes of premature deliveries.
 - (b) Socio-economic measures instituted to provide adequate Hospital and clinics facilities for the indigent pregnant women. i. e. making medical care available to those who cannot pay.

Role of Public Health Nurse or Lady Health Visitor in the West

The nursery nurse utilises every opportunity to lay the ground work for the Public Health Nurse, the parents guided by the Public Health Nurse are responsible for the actual preparation of the home.

Standard refer all procedures usually follow this pattern. The Public Health Nurse is notified, in advance of the infant discharge so that information in regard to the home environment and the parent attitude may be relayed back to the Hospital. The social service worker than alerts the physician and premature nursery supervisor in regard to the readiness of the infant for discharge into the home situation. She inquires about the following home environmental factor and also makes recommendations.

The number of rooms in the house and the number of people living, in these rooms (also information in regard to the physical condition of people living in the home).

Window screens, mosquito, netting for fly protection, general measures of cleanliness.

To layette bed or basket equipment available for formula preparation, financial ability of parents to provide proper food, clothing and other essentials.

The amount of supervision that the mother will require in caring for the infant.

Later she makes plans to return after the infant is discharged to render assistance in accordance with mother's individual requirements.

Feeding instructions

The formula is written and explained.

How to hold the infant at feeding time, size of nipple hole, cautious feeding.

Type of medication or vitamin supplements if ordered by physicians.

Techniques of administration.

Avoidance of infection. Discussing the possible source of contamination that could lead to infection (e. g. poor sanitation relative with colds etc). Period for medical examination of the infant.

Anticipatory counselling about growth and development assuring the mother that the physician will follow the infant's progress. Last but not least, that the prematurity born infant after discharge from the hospital does not need to be protected more than a full term infant, as the infant grows older, his being born prematurely will become less and less limiting.

Care of Premature infants in Pakistan.

In Pakistan there are no such separate unit especially designed for the premature infants who are being looked after by the obstetricians as they are kept in the obstetrical ward.

A few hospital have their separate premature infant unit. These units are especially equipped with modern incubators and oxygen tents. In these units the premature infants are cared for by the paediatrician and obstetrician jointly. This joint supervision is very much appreciated. This should be the practice every where.

It is suggested that there should be separate units for premature infants especially in the teaching institutions and every facilities regarding the modern equipment, and trained personnel should be provided in these units.

LIFE SKETCH OF

Dr. NIAZ-UD-DIN, PHS (I).



Dr. Niaz-ud-Din was born in 1905 in Jullunder (now in East Panjab, India). He graduated from King Edward Medical College and then went abroad for higher education in Public Health and obtained D. P. H. from London School of Hygiene, D.T.M. & H., from Liverpool and L.M. from Dublin. On his return, he was appointed District Medical Officer of Health and in this position he served in several districts.

In 1946, Dr. Niaz-ud-Din went abroad for the second time for higher studies in Industrial Medicine. On his return he took over as District Health Officer of Lahore with additional duty of Provincial Medical Inspector of Factories. He was appointed as Superintendent, Panjab Vaccine Institute in 10-6-1954 and on 23-2-59 took over as Dean of the Institute of Hygiene and Preventive Medicine, Lahore. He was also appointed in March 1955 as Professor of Occupational Health at the Institute. He also taught Hygiene at King Edward Medical College, Lahore.

During his career, Dr. Niaz-ud-Din took considerable interest in the development of Medical Education. He was an elected Member of the West Pakistan State Medical Faculty and Member of the Pakistan Medical Research Council. Dr. Niaz-ud-Din's interest in Medical Education is also indicated by the fact that he was an author of "Manual of Hygiene and Preventive Medicine" which is a basic textbook in various Medical Institutes in Pakistan.

Throughout his career, Dr. Niaz-ud-Din was a lover of Urdu literature and himself wrote poetry in the beginning of his career. He had close association with well known Urdu writers and Poets and as a Health Officer in the various districts invariably instituted

Magzine devoted to Health and Preventive Medicine. He was also Editor of Pakistan Journal of Health. Dr. Niaz-ud-Din always enjoyed great reputation for his human approach in solving the administrative problems and for that was always held in high esteem by the employees at the lower as well as high level.

Dr. Niaz-ud-Din has left behind a family with four sons and three daughters. His elder son Dr. Iftikhar Ahmad, MRCGP, is Assistant Professor of Medicine at Nishtar Medical College, Multan. One of his sons Dr. Imtiaz passed his primary FRCS in Pakistan and is at present doing final FRCS in U.K.



WHEN LIFE IS A MATTER OF SECONDS

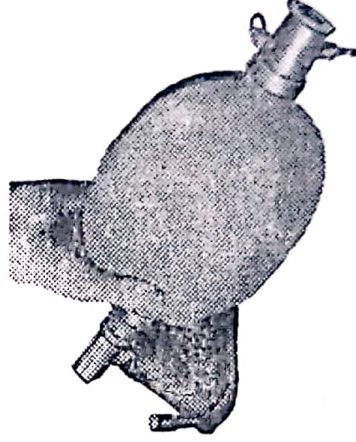
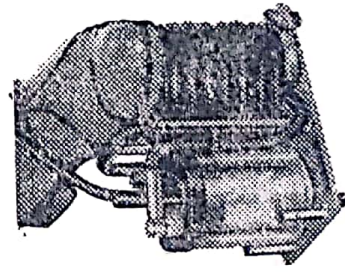
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