Attachment 1.

Date June 20, 1980

REVIEW BOARD ON THE USE OF HUMAN SUBJECTS, ICDDR,B.

300

Principal Investigator A. Khanam, B. Stoll, G. Huttl / Trainee Investigator (if any) _____

Application No. 80-025 / Supporting Agency (if Non-ICDDR,B) _____

Title of Study: Infant Diarrhea in Bangladesh: dy of the colonization of mother and child with a lamblia and the protective role of breast milk

Project status:
( ) New Study
( ) Continuation with change
( ) No change (do not fill out rest of form)

Circle the appropriate answer to each of the following (If Not Applicable write NA).

1. Source of Population:
   (a) Ill subjects (Yes) No
   (b) Non-ill subjects (Yes) No
   (c) Minors or persons under guardianship (Yes) No
2. Does the study involve:
   (a) Physical risks to the subjects Yes (No)
   (b) Social Risks Yes (No)
   (c) Psychological risks to subjects Yes (No)
   (d) Discomfort to subjects (Yes) No
   (e) Invasion of privacy Yes (No)
   (f) Disclosure of information damaging to subject or others Yes (No)
3. Does the study involve:
   (a) Use of records, (hospital, medical, death, birth or other) Yes (No)
   (b) Use of fetal tissue or abortus Yes (No)
   (c) Use of organs or body fluids (Yes) No
4. Are subjects clearly informed about:
   (a) Nature and purposes of study (Yes) No
   (b) Procedures to be followed including alternatives used (Yes) No
   (c) Physical risks (Yes) No
   (d) Sensitive questions (Yes) No
   (e) Benefits to be derived (Yes) No
   (f) Right to refuse to participate or to withdraw from study (Yes) No
   (g) Confidential handling of data (Yes) No
   (h) Compensation &/or treatment where there are risks or privacy is involved in any particular procedure Yes No NA
5. Will signed consent form be required:
   (a) From subjects (Yes) No
   (b) From parent or guardian (if subjects are minors) (Yes) No
6. Will precautions be taken to protect anonymity of subjects (Yes) No
7. Check documents being submitted herewith to Board:
   ___ Umbrella proposal - Initially submit an overview (all other requirements will be submitted with individual studies).
   ✓ Protocol (Required)
   ✓ Abstract Summary (Required)
   ✓ Statement given or read to subjects on nature of study, risks, types of questions to be asked, and right to refuse to participate or withdraw (Required)
   ✓ Informed consent form for subjects
   ✓ Informed consent form for parent or guardian
   ___ Procedure for maintaining confidentiality
   ✓ Questionnaire or interview schedule *

* If the final instrument is not completed prior to review, the following information should be included in the abstract summary:
1. A description of the areas to be covered in the questionnaire or interview which could be considered either sensitive or which would constitute an invasion of privacy.
2. Examples of the type of specific questions to be asked in the sensitive areas.
3. An indication as to when the questionnaire will be presented to the Board for review.

We agree to obtain approval of the Review Board on the Use of Human Subjects for any change involving the rights and welfare of subjects before making such change.

Asma Khanam, Barbara J Stoll
Principal Investigator

15 JUN 1980

Trainee

SECTION I - RESEARCH PROTOCOL

(1) Title: Infant Diarrhea in Bangladesh: A study of the colonization of mother and child with Giardia lamblia and the protective role of breast milk.

(2) Principal Investigators: Drs. A. Khanam, B. Stoll, G. Huldt

Co-Investigators: Drs. I. Ljungstrom, M. Faehlmann, A.M. Molla

(3) Starting Date: September 1, 1980

(4) Completion Date: August 31, 1981

(5) Total Direct Cost:

(6) Scientific Program Head:

This protocol has been approved by the Pathogenesis and Therapy Working Group.

Signature of Scientific Program Head: G. Molla, Group Secretary

Date: _____

(7) Abstract Summary: Infantile diarrhea is a major cause of morbidity and mortality in Bangladesh. The role of parasites in infantile diarrhea has not been extensively studied here. Giardia lamblia is a protozoan parasite which inhabits the upper small intestine and is known to cause diarrhea and malabsorption. It is one of the most common parasites diagnosed in Europe and the US, but has been little studied in Bangladesh. Moreover, although antibodies to giardia can be demonstrated in serum and breast milk, little is known about the immune response to the parasite.

This study will attempt to learn more about 1) the relationship between maternal and infant colonization with giardia 2) whether breast feeding protects the infant from giardiasis and 3) whether pregnancy and lactation decrease resistance to giardia.

A cohort of 50 infants (25 exclusively breast fed and 25 bottle fed) and their mothers will be followed for 1 year. A field worker will visit the home every 2 weeks to obtain a recent diarrhea history. Monthly stool samples will be collected for stool microscopic examination to identify giardia and other parasites and for culture. Stool samples will also be obtained with acute diarrheal episodes. Fingerstick blood samples will be obtained four times per year to measure hematocrit as part of routine care and for giardia antibody determinations. After the first acquisition of giardia in the stool of a previously seronegative infant another blood sample will be drawn to look for seroconversion. Breast milk will be collected monthly from lactating mothers to measure total SIgA and antigiardia antibodies. Giardia status (determined by stool microscopic examination and serology) in the different groups will be compared to help elucidate the relationship between maternal and infant colonization with giardia and the possible protective effect of breast milk. Giardia status will also be determined for 10 pregnant lactating women and 10 age-matched non pregnant non-lactating women monthly during pregnancy and will be compared to answer the question of whether pregnancy and lactation decrease resistance to giardia.

Study patients will be given free medical care at the ICDDR,B Nandipara clinic for diarrheal and non-diarrhoeal illnesses and, if necessary, will be referred for further treatment to ICDDR,B Dacca or to another medical facility.

9. Review:

a. Research Involving Human Subjects: _____

b. Research Review Committee: _____

c. Director: _____

d. BMRC: _____

e. Controller/Administrator: _____

SECTION II - RESEARCH PLAN

A. INTRODUCTION

1. Objective

The objective of this study is to learn more about maternal and infant colonization with giardia and the interrelationship of the two, and to determine if breast milk protects against giardiasis.

2. Background

Giardia lamblia is a protozoan parasite which inhabits the upper part of the small intestine. With its large ventral sucking disc the flagellate adheres to the microvilli of the columnar cells in the crypts or lodges in the mucus of the unstirred layer. Other giardiae dwell in the intestinal lumen where cysts are formed. When the intestinal motility is normal, only cysts are excreted while excretion of trophozoites is usually associated with rapid bowel transit.

Giardia has a universal distribution and as no intermediate host is needed the parasite can exist in all climates. It is one of the most commonly diagnosed protozoan parasites in Europe (1-4) and the United States (5) and it is highly endemic in many non-industrialized countries. In endemic areas the parasite is most commonly found in children (6).

Experimental infection of volunteers indicates that only a small number of cysts is needed for infection (7). Transmission is often water-borne (8-10) but the frequent finding of giardia in children's institutions even in areas with low endemicity indicates that close contact can be sufficient for transmission. Poor sanitation greatly enhances the risk of infection.

Most clinical studies have been performed on travellers to endemic areas who presumably have had no previous experience with this infection. Routine examination of groups of travellers to Russia have revealed that a considerable number of those excreting cysts had only mild or no symptoms (11-13). A small number of patients had acute symptoms of foul-smelling watery stools, flatulence and abdominal distention. Less than 10% developed more marked symptoms with diarrhoea and weight loss (14-15).

In some instances, giardiasis is accompanied by malabsorption which can be a severe complication and significantly add to already existing malnutrition, especially in small children. Malabsorption of fat, D-xylose and vitamin B_{12} has been reported (14-18) and systematic studies performed by Wright et al. (19) showed that more than 50% of his patients with symptomatic giardiasis had malabsorption of at least two of the three substances. Malabsorption of iron (15) and vitamin A (20) has also been reported.

Little is known about the immune response to the parasite. With the aid of immunofluorescence, antibodies to giardia have been demonstrated in serum (21-23) and secretions (breast milk, saliva) (23). The observation that certain immunodeficiencies, particularly those involving IgA synthesis, are associated with a higher prevalence of giardiasis, suggests that immunoglobulin is important for protection. It is not known whether cell-medicated immunity is developed but the finding of inter-epithelial lymphocytes in jejunal biopsies from malabsorption patients has been interpreted as suggestive of cell mediated hypersensitivity, which might contribute to mucosal damage similar to that shown in coeliac disease (24).

Experimental animal studies have demonstrated that protection against infection is transferred passively from immune mothers to suckling mice via breast milk and also that protection is associated with specific anti-giardia IgA (25). On the other hand, immune lactating female mice lose their intestinal resistance to giardia but regain it after weaning (25).

An interesting question is whether giardia can interact with the host response to other enteropathogens by changing the intestinal microenvironment and/or the immune responsiveness. Such effects have recently been demonstrate in mice during the intestinal stage of experimental trichinosis (26). One might also question whether unrelated enteropathogens might change the parasite's environment in a favorable or unfavourable way. Few studies have so far looked at such interactions. Tomkins et al. (27) have shown that in clinical giardiasis, like in tropical sprue, the small intestine is often colonized by enterobacteriae and that treatment with metronidazole, which eradicates the parasite but is ineffective against these bacteria, results in improvement of mucosal morphology and function. The authors suggest that some of the clinical symptoms in giardiasis might in fact be due to concomitant infection with enterobacteriae.

While the disease pattern has been reasonably well studied in travellers from industrialized countries, the pathogenetic role of giardia in young children of highly endemic areas is not well understood. In a prospective study in a Guatemalan Indian village Mata et al. (6,28) found that during the period of exclusive breast feeding, infections with giardia were rare. The later appearance of giardia in stools was often accompanied by episodes of diarrhoea; however, in most instances also one or several other enteropathogens were present. Under such circumstances the intestinal microenvironment is complex. Child health is dependent on whether or not balance is reached between disease promoting factors due to multiple infections and malnutrition and disease-preventing factors such as immunity and the presence of protective breast milk components in the intestine. By causing mucosal damage, diarrhoea and malabsorption and by facilitating colonization of the small intestine with enterobacteriae, giardia might significantly contribute to disease and malnutrition.

Rationale

Infantile diarrhoea is a common disease in Bangladesh and is probably one of the main factors contributing to malnutrition. Giardia lamblia is an enteropathogen which can cause diarrhoea and malabsorption. Its role in diarrhoeal disease and malnutrition in young children in Bangladesh is largely unknown.

One question of importance concerns the relationship between maternal and infant colonization with giardia. In this context possible changes in immune protection to giardia during pregnancy and lactation should be studied. Animal experiments indicate that mice lose their resistance to giardia during lactation but regain it after weaning (25). It is also known that the resistance to another protozoan infection, malaria, is greatly impaired during pregnancy. It is not clear how pregnancy and lactation affect the resistance to giardia in humans.

Another important problem is whether breast feeding protects the young infant from giardiasis. Observations in other parts of the world indicate that this can be so (6,28). Animal experiments suggest that protection is mediated by secretory IgA antibodies in the milk (25). In humans, however, the role of breast milk antibodies has not been studied.

B. SPECIFIC AIMS

1. To explore whether pregnant and lactating women have giardiasis in higher frequency and degree than non-pregnant, non-lactating women belonging to the same age groups.

2. To investigate to what extent infants are infected with giardia: (i) during the period of exclusive breast feeding (ii) at the time when they receive breast milk and supplementary food and (iii) at the period after weaning, and to compare this with maternal giardia status. Bottle fed children in the same age groups will be studied for comparison.

3. To investigate whether there is a relationship between the presence of secretory IgA antibodies in mother's breast milk and protection of the child to giardia.

4. To introduce new laboratory techniques at ICDDR,B (see methods below).

C. METHODS OF PROCEDURE

1. Subjects

Investigations on the role of intestinal parasites, particularly giardia, in infant diarrhoea and malnutrition, will be performed in Nandi Para. We have chosen this area for several reasons. Nandi Para has a limited population which is well known to the Centre because of previous studies. Several ICDDR,B field workers are familiar with the area and would be valuable to the study. It is situated close to Dacca, so that samples can be transported to the laboratory within a short time after collection. Presently, ICDDR,B is running a weekly health clinic which provides medical attention to the mothers and children under study as well as to the community at large.

The following groups of individuals will be studied.

1) Ten pregnant women.

2) Ten non-pregnant non-lactating women, matched for age.

3) Twenty-five exclusively breast-fed infants.

4) Twenty-five age-matched bottle-fed infants.

5) The mothers of children in groups (3)+(4).

2. Clinical Procedure

A field worker will visit each family every two weeks for one year. At that time a questionnaire about diarrhea in the past two weeks will be administered (see appendix) to both children and mother. Every month, 3 stool samples will be obtained from children for microscopic examination and one for culture and 3 samples will be obtained from mothers and pregnant women for microscopic examination only. Also, stool samples will be obtained during all acute diarrheal episodes. Fingerstick blood specimens will be obtained four times per year to measure hematocrit as part of routine child care and to look for antibodies to giardia. An additional blood specimen will be obtained 2 weeks after a child is found to have giardia in his stool for the first time to look for seroconversion. Pregnant women and their non-pregnant controls will have a blood sample drawn on entry into the study, 3 months later and following delivery. Breast milk samples for the determination of total SIgA and giardia antibodies will be obtained from lactating mothers monthly.

Patients who are found to have giardia or other parasites in their stools or other enteric infections will be treated with the appropriate medication and repeat stool examination will be obtained after therapy.

Mothers and children in this study will be given priority treatment at the weekly ICDDR,B Nandipara clinic where we will provide general well-child care, including anemia screening and immunizations against diphtheria, pertussis and tetanus (if families agree). Pregnant women will be given prenatal iron and vitamins and tetanus toxoid immunization (if they agree). If an individual develops diarrhea between field worker visits, he/she should come to the clinic for physical examination and treatment and for stool examination. Moreover, if, at any time, a fieldworker finds a study patient ill, he/she will refer him to the Nandipara clinic, to ICDDR,B or to another medical facility. We will provide free transport to all study patients requiring further care at ICDDR,B.

3. Laboratory Procedures

Stool samples will be examined for giardia and other parasites after formol-ether concentration. Since excretion of giardia is irregular, often following a cyclic pattern, only semiquantitative determinations will be performed. Blood samples will be subjected to hematocrit determination and the remaining plasma stored at - 70oC for later antibody detection.

Milk samples will be centrifuged at 2000-5000g for 20 minutes and the interphase collected and stored at -70oC for determination of total SIgA as well as specific antibodies. Serum antibodies to giardia will be determined by the aid of immunofluorescence (IF) using class-specific conjugates.

The sera will first be screened with an anti-IgG conjugate and reactive sera subsequently tested with anti-IgM and anti-IgA conjugates.

Secretory antibodies in milk will be tested by IF, with the aid of a rabbit anti-secretory component FITC-conjugate. In order to increase the sensitivity of the test, an additional layer of anti-rabbit FITC-conjugate will be included in the staining procedure.

4. Data Analysis

Data analysis will be straightforward. The giardia status (by stool ME and serology) of pregnant lactating women and non-pregnant non-lactating women will be compared by simple two by two tables. The giardia status of the two infant groups (breast fed, bottle fed) will be compared. The mean age of first acquisition of giardia will also be compared in the above 2 groups. Because infants will be followed longitudinally, we will compare the period of exclusive breast-feeding with the period when an infant is receiving other foods and is completely weaned.

Also, the giardia status of children will be compared to that of their mothers and to the breast milk antibody status of their mothers.

D. SIGNIFICANCE

Infantile diarrhea is a major cause of morbidity and mortality in Bangladesh. The role of parasites, specifically giardia, in infantile diarrhea in Bangladesh has not been extensively studied. This study will attempt to elucidate some problems associated with maternal and infant colonization with giardia and to explore the possible protective effect of breast milk and breast milk antibodies. The possible protective role of breast milk is especially important at a time when more and more mothers, even in Bangladesh, are bottle feeding their infants.

The lab will benefit by our colloboration with Swedish scientists Dr. G. Huldt, M. Faehlmann, and I. Ljungstrom. Initially the analysis of blood and milk samples will be done by Drs. Huldt, Faehlmann, and Ljungstrom in Dacca and in Sweden. While they are in Dacca, however, they will train a laboratory technician who will continue the work after they leave. Moreover, we will benefit generally by their knowledge of laboratory and clinical parasitology.

E. FACILITIES REQUIRED

1. No new office space is required.

2. Personnel

   2 field workers

   1 lab technician

3. No new lab space is required.

4. Hospital support - occasionally study patients may be referred to ICDDR,B for therapy.

5. Logistical support: Transport to and from Nandi para will be needed daily.

6. Major items of equipment: No new item is required.

7. Other - none.

F. COLLABORATIVE ARRANGEMENTS

Full collaboration with Drs. Gunnel Huldt, Marrianne Faelmann and Inge Ljungstrom, Statens Bakteriologiska Laboratorium, Stockholm, Sweden has been agreed upon. The Swedish group will pay for their own expenses. They will also provide the necessary reagents for the blood and breast milk antibody determinations.

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Abstract Summary:

Infantile diarrhea is a major cause of morbidity and mortality in Bangladesh. The role of parasites in infantile diarrhea has not been extensively studied here. Giardia lamblia is a protozoan parasite which inhabits the upper small intestine and is known to cause diarrhea and malabsorption. It is one of the most common parasites diagnosed in Europe and the US, but has been little studied in Bangladesh. Moreover, although antibodies to giardia can be demonstrated in serum and breast milk, little is known about the immune response to the parasite.

This study will attempt to learn more about 1) the relationship between maternal and infant colonization with giardia 2) whether breast feeding protects the infant from giardiasis and 3) whether pregnancy and lactation decrease resistance to giardia.

A cohort of 50 infants (25 exclusively breast fed and 25 bottle fed) and their mothers will be followed for 1 year. A field worker will visit the home every 2 weeks to obtain a recent diarrhea hisotory. Monthly stool samples will be collected for stool microscopic examination to identify giardia and other parasites and for culture. Stool samples will also be obtained with acute diarrheal episodes. Fingerstick blood samples will be obtained four times per year to measure hematocrit as part of routine child care and for giardia antibody determinations. The giardia antibody determinations are especially important in helping to easily diagnose a potentially serious parasitic disease which is difficult to diagnose by stool examination only. After the first acquisition of giardia in the stool of a previously seronegative infant another blood sample will be drawn to look for seroconversion. Breast milk will be collected monthly from lactating mothers to measure total SIgA and antigiardia antibodies. Giardia status (determined by stool microscopic examination and serology) in the different groups will be compared to help elucidate the relationship between maternal and infant colonization with giardia and the possible protective effect of breast milk. Giardia status will also be determined for 10 pregnant lactating women and 10 age matched non pregnant non-lactating women for 5 or more months during pregnancy and will be compared to answer the question of whether pregnancy and lactation decrease resistance to giardia.

Study patients will be given free medical care at the ICDDR,B Nandipara clinic for diarrheal and non-diarrheal illnesses and, if necessary, will be referred for further treatment to ICDDR,B Dacca or to another medical facility. As part of routine child health care we will screen all study children for anemia and will immunize children against diphtheria, pertussis and tetanus if families agree. Pregnant women will receive prenatal iron and vitamin supplements and tetanus toxoid immunization (if they agree).

1. The study will take place in Nandipara. The study population will include infants and their mothers, and pregnant women (see description above).

2. The only risk to the patient is possible discomfort from finger-stick blood drawing.

3. Blood drawing will be done by trained field workers who will be under the direct supervision of a physician investigator. It will be done in the subject's own village - he will not have to come to an unfamiliar hospital setting.

4. All records will be kept strictly confidential. They will remain with the principal investigators. If data is put on computer tapes, study patients will be referred to by number only.

5. A signed consent form in Bengali will be obtained from all mothers and pregnant women (see attached consent form) before entry into the study.

6. Subjects will be interviewed in their home, every 2 weeks. The interview will take approximately 5 minutes.

7. There are several benefits to be gained by subjects. Because a field worker will be visiting the home every two weeks, the general health of subjects will be followed. If a subject becomes ill at any time, he/she will either be seen at the weekly Nandipara clinic, taken to ICDDR,B or referred to another medical facility. Moreover, because stool examinations will be done monthly and with each acute diarrheal episode, a more precise diagnosis and optimal diarrheal therapy can be given. In addition, well-child care which is routine in developed countries, will be provided to study patients, including immunizations and anemia screening. Scientifically the study hopes to address several important questions (see description above).

8. The study will require examination of stool and blood.

SECTION III - BUDGET

A. Detailed Budget

1. Personnel Services

Name	Position	% time used	Salary Taka	Salary Dollar
Dr. A. Khanam	Physician	25	9,375	-
Dr. B. Stoll	Scientist	10	-	1,850
Dr. A.M. Molla	Scientist	5	6,124	-
Dr. G. Huldt	Scientist	-	-	-
Dr. M. Faelmann	Scientist	100	-	-
Dr. I. Ljungstrom	Scientist	100	-	-
2 field assistants		50% each	14,100	-
1 Lab Technician		75	10,575	-
			40,174	1,850

2. Supplies and Materials

Item	Unit cost	Taka	Dollar
Stool Microscopic exam at 20 Taka each:			
20x50x12x3 =	36,000	83,000	-
20x50x12x3 =	36,000		
20x50x5 =	5,000		
20x20x5x3 =	6,000		
Stool culture at 40 Taka each:			
40x40x12 =	24,000	34,000	-
40x50x5 =	10,000		
Blood sample for antibody determination		No cost to ICDDR,B	
Milk sample for antibody determination		All necessary reagent will be provided by Swedish group.	
Stationary, forms, etc.		500	
Miscellaneous		500	
		118,000	

3. Equipment:

None

4. Patient hospitalization:

None

5. Outpatient care:

Patients may attend weekly Nandi Para Clinic.

6. ICDDR,B Transport:

Dacca to Nandi Para to Dacca 50 x 6 x 52 = 15,600

7. Travel and transportation:

None

8. Transportation of things:

None

9. Rent: communication, utilities:

None

10. Printing, publications:

Reprints	$ 200
Xerox	Taka 250

11. Other contractual services:

None

12. Construction, renovation, alteration:

None

B. Budget Summary

Category	Taka	Dollar
1. Personnel	40,174	1,850
2. Supplies	118,000	-
3. Equipment	-	-
4. Hospitalization	-	-
5. Outpatient care	-	-
6. ICDDR,B Transport	15,600	-
7. Travel	-	-
8. Transport, things	-	-
9. Rent/communication	-	-
10. Printing/publication	250	200
11. Contractual service	-	-
12. Construction	-	-
Sub total	174,024	2,050
30% overhead	52,207	615
	226,231	2,665

Total $ 17,747

Consent Form (for infants and mothers)

Diarrhea is a very common and serious disease in Bangladesh, especially among children. Certain parasites can cause diarrhea and problems with digestion of food. We are studying one of these parasites, giardia lamblia, which can cause diarrhea, nausea, flatulence, foul-smelling stools and malabsorption of food-generally make one sick. We will study a group of infants and their mothers for one year.

If you agree to participate, a field worker will visit your home every 2 weeks to find out if you or your baby have had diarrhea or any other illness in the past 2 weeks. If you are ill you will be referred to the Nandipara clinic, to ICDDR,B or to another hospital for treatment. Every month we will collect 3 stool samples from you and your baby to look for parasites and other organisms. If your and/or your baby's stool is found to be abnormal you or your baby will be treated appropriately. Also, when you or your baby are ill a stool specimen will be examined. We will also collect a monthly, sample of your breast milk if you are breastfeeding to see if your breast milk can protect your baby against infection with this parasite. Four times in the year we will obtain fingerstick blood samples to see if you or your baby is anemic and to look for antibodies to this parasite, to help us diagnose if you are infected with the parasite.

We will provide you and your baby with general health care at the weekly Nandipara clinic. If you do not wish to participate you may still come to the weekly Nandipara clinic. If you choose to participate now, but change your mind later you may withdraw from the study at any time.

I agree that the above study has been explained to me and that I understand it and agree to participate.

_____
Subject

_____
Mother

_____
Investigator

Consent Form (for pregnant and non-pregnant women)

Diarrhea is a very common and serious disease in Bangladesh. Certain parasites can cause diarrhea and problems with digestion of food. We are studying one of these parasites, giardia lamblia which can cause diarrhea, nausea, flatulence, foul-smelling stools and malabsorption of food-generally make one sick. In particular we are studying whether pregnant lactating women are more succeptible to infection with this parasite than non-pregnant non-lactating women.

If you agree to participate we will follow you for 5 or more months during your pregnancy (until delivery) if you are pregnant or for the same period of time if you are not pregnant. A field worker will visit your house every 2 weeks to find out if you have had diarrhea or other illnesses in the past 2 weeks. If you are ill, you will be referred to the Nandipara clinic, to ICDDR,B or to another appropriate medical facility for treatment. Every month we will collect three stool specimens from you to look for parasites and other organisms. Also, we will collect a stool sample everytime you have diarrhea. If you are lactating, we will collect a sample of your breast milk every month. At the time you enter the study, 3 months later and after delivery, we will take a fingerstick blood sample to check if you are anemic and to look for antibodies to this parasite, to help us diagnose if you have been infected with the parasite.

We will provide you with general care at the weekly Nandi para clinic. If you are pregnant you will be given prenatal iron and vitamins and the opportunity to receive tetanus toxoid immunization. If you do not wish to participate, you may still come to the weekly Nandipara clinic. If you choose to participate now, but change your mind later, you may withdraw from the study at any time.

I agree that the above study has been explained to me and that I understand it and agree to participate.

_____
Subject

_____
Investigator

GIARDIA STUDY QUESTIONNAIRE

STUDY NO. ___ ___

NAME _____ PATIENT NO. ___ ___ ___ CARD NO. ___

CLINICAL: SIGNS/SYMPTOMS

WEEK: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51

DIARRHEA

LOOSE

LIQUID

WATERY

BLOOD

MUCUS

VOMITING

ANOREXIA

CHANGE IN STOOL COLOR

FLATULENCE/BELCHING

FEVER

COUGH

NASAL DISCHARGE

RASH

EAR PUS

OTHER

LABORATORY

R/S

STOOL ME