UNIVERSITAS INDONESIA

ASSESSMENT OF SANITATION AND HYGIENIC STATUS IN HOUSE HOLD MOTHERS AND IT'S ASSOCIATION TO ASCARIASIS OF THEIR UNDER FIVE YEARS OLD CHILDREN OF SIKKA DISTRICT

THESIS

TAHIR SHAH NEKMAL

ID NO: 0906666632

FACULTY OF PUBLIC HEALTH

INTERNATIONAL MPH PROGRAM

UNIVERSITY OF INDONESIA

DECEMBER 2010

UNIVERSITAS INDONESIA

ASSESSMENT OF SANITATION AND HYGIENIC STATUS OF HOUSE HOLD MOTHERS AND IT,s ASSOCIATION OT ASCARIASIS OF THEIR UNDER FIVE YEARS OLD CHILDREN IN SIKKA DISTRICT

THESIS

Submitted to fulfill the requirments to obtain Master Degree

of public health

TAHIR SHAH NEKMAL

ID: 0906666632

FACULTY OF PUBLIC HEALTH

INTERNATIONAL MPH PROGRAM

UNIVERSITY OF INDONESIA

December 2010

STATEMENT OF ORIGINALITY PAGE

The research study by title of Assessment of sanitation and hygienic status of house hold mothers and it's association to Ascariasis of their under five years old children in District of Sikka NTT Province Indonesia is my own work and effort of my further analysis by using of secondary data which was collected by the Center of Health Research University of Indonesia in 2007. All sources that I have used or quoted have been indicated and acknowledged by means of complete references.

Tahir Shah Nekmal

ID: 0906666632

December 2010

APPROVAL PAGE

This thesis is submitted by:

Name	: TAHIR SHAH NEKMAL
NPM	: 0906666632
Study Program	: MASTER OF PUBLIC HEALTH
Thesis title	: *Assessment of Sanitation and Hygienic Status in Household Mother and Its Association to Ascariasis in Under Five Years Old Children of Sikka District*

Has been successfully defended in front of the Board of Examiners and was accepted as the requirements necessary to obtain a Master Degree of Public Health University of Indonesia Faculty of Public Health

EXAMINERS BOARD

Advisor	: Prof. Dr. dr. Kusharisupeni, MSc	(.....)
Examiner	: Dr. Dra. Dewi Susanna, MKes	(.....)
Examiner	: Iip Syaiful, SKM, MKes	(.....)

Approved in: Depok

Date: December 27th, 2010

ACKNOWLEDGEMENTS:

By the name of almighty allah the most compassionate and most Merciful.

This is the most compassion of almighty allah to accomplish this program with success. I would like to express my thinks from the Japan International Cooperation Agency (JICA) that provide fund for our scholarship who give capability us to attend this International Master Public Health Program. While our country Afghanistan is one of the post conflict country and our health system is re-established and the process of growing, so i kindly suggest from JICA to extent this program for long time. I would like to express fully think from Director of JICA Dr Khaiber Hasass and Director of Foreign Relation Ministry of Higher Education Republic of Afghanistan Dr Sher Shah Sadat that they select and give priority to one of Frontier University Sheikh zayed, and i hope that they never forgot this Universtiy in future plane.

I want to acknowledge with great appreciate from Dr Gul Nawaz vice chanceller of Sheikh Zayed Univesity that he motivated me for this scholarship.

I also offer my gratitude to Dr Humayoon Gardiwal who persuade me in every difficult situation and he was also one of our team leader that he lead of this MPH Program team with great courage.

While the process of thesis writing and analysis is one of a complicated process with out any support and direction is someswhat difficult. So I would like to express deep gratitude, think and appreciation from the bottom of my heart to my superviser Prof. Dr. dr, Kusharisupeni Msc, PhD, Head of the Nurtrition Department Faculty of Public Health University of Indonesia. She was one of the most kind, virtuous, truthfullness, profesional and qualified surperviser who give me capability to finalize this thesis with A grade, although she is head of the Nutrition Department Faculty of Public Health University of Indonesia and Internationaly verified professor beside her basy scheduale, but she gave me feedback, suggestion, recommondation and direction on time with open forehead.

I also want to express a lot of thinks from my examination board emxaminers every one Dewi Susano MPH,PhD and Pak Iip Sayfol MPH that they participated my examination seminar and give me valuable comments and suggestion for the precision and imporvement of my thesis.

Last I would like to express my appreciation from all of our lectureres and administrative staff of Public Health Faculty every one Nella and Fajor who provide the cource matterial on time and appropriatelly.

Tahir Shah Nekmal

Depok

December 2010

STATEMENT OF PUBLICATION APPROVAL FINAL

PROJIECT FOR ACADEMIC PURPOSE

As an academician of University of Indonesia, I hereby state that:

Name : Tahir Shah Nekmal

ID No : 0906666632

Study Program: International Master Public Health

Departement : Public Health

Faculty : Public Health

Type of work : Thesis

For the development of science, the University agreed to grant Indonesia royalty **(free rights)** own my scientific work, entitled:

ASSESSMENT OF SANITATION AND HYGIENIC STATUS OF HOUSE HOLD MOTHERS AND IT's ASSOCIATION TO ASCARIASIS OF THEIR UNDER FIVE YEARS OLD CHILDREN IN DISTRICT OF SIKKA

Along with the excisting device (if needed). With the Royalty-Free Rights, non excludable that University of Indonesian reserve the right to store, format, manage in the form of a database (the database), care, and publish my final assignment as long as mention my name as the writer/author and the owner of Copyright.

The statement which I make is the truth.

Created at: Depok

On : December 2010

with states

Tahir Shah Nekmal

ABSTRACT:

Name: Tahir Shah Nekmal

Program: International Master Public Health

Title: This study was aimed to assess the house hold mothers sanitation (source of drinking water) and hygiene factors (Time of hand washing with soap) and it's association to ascariasis of their under five years old children in the district of Sikka Nusa Tenggara West Timor (NTT) province. Stool samples were collected from 640 children from Sikka district. The prevalence of Intestinal ascaris infection was 12.50 % in this study. According to the education mother's only 2.3% of mothers have high education,while in a huge percentage 66.56% of mothers have low level of education. 32.20% of mother have some kind of activities to earn the money. Highet percentage of children are related in the age group between 1-3 years, but only 0.13% of children have relationship to the group of under one years . According to the nutritional status of children almost half percent of children were under nutrition. By source of drinking water the highest percentage 76.56% of house hold mothers use safe drinking water. According to the activities of hand washing with soap most of house hold mother do not have this habit. While hand washing with soap after cleaning the child defecation is a donminent variable in this study (Protective) with (OR 0.40 CI 95% 0,24 – 0,65). While in this study we do not find any significant difference of the independent variables to dependent variabe of ascariasis.

Key words: Ascaris infection, Source of house hold drinking water, activiteis of hand washing with soap by mothers.

ENDORSEMENT

Assessment of sanitation and hygienic status of house hold mothers and it's association to ascariasis of their under five years children of Sikka district.

Here by, it is to approve that the thesis meet and fullfilled the requirment of graduation and passed by the examiner board Faculty of Public Health

University of Inodnesia

27 December 2010

Depok

Prof. Dr. dr. Kusharisupeni MSc, PhD

Univesitas Indonesia

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

IDA: Iron Defficiency Anemia

STHI: Soil Transmitted Helminth Infection

NTT: Nusa Tenggara Timor

U5Ys: Under 5 Years

BMR: Basel Metabolism Rate

HIV: Human Immune Virus

AIDS: Acquired Immune Defficiency Syndrom

CAP: Community Acquired Pneumonia

IgG: Immuno globolin G

IgE: Immuno globolin E

CT: Computed Tomography

MRI: Magnetic Resonance Imaging

ERCP: Endoscopic Retrograde Cholangio Pancreaticography

GIT: Gastro Intestinal Tract

WHO: World Health Orgonization

ANC: Ante Natel Care

IMCI: integrated Management of Child Illness

UNICEF: United Nation International Child Fund's

LAC: Latin American and Carribean

SSA: Sub Saharan Africa

MENA: Middle East North Africa

SAS: South Asia

EAP: East Asia Pacific Islands

CDC: Center for Disease Contr

Hb: Heamo globin

PEM: Protien Energy Malnutrition

PSAG: Pre School Age Children

a = Urban Area

b = Rural Area

c = Coastal Area

d = Island Area

NS= Not Specified

EMRO: Eastren Midditranean Region Office

SEARO: South East Asia Region Office

CHAPTER 1

INTRODUCTION

1.1: Background:

The helminth infection of Ascaris lumbricoides is one of the most common infection in tropic and subtropic area of devoloping countries, because the moist and warm environment and unhygenic condition play a role by predisposing factor for growth and survival of Ascaris lumbricoides Infection larva and eggs.

The high prevalence of intestinal Ascaris infection is closely related with poor environmetal hygiene, non healthy sanitation status, poverty and impovershed health services.

Ascaris lumbricoide is a known cause of morbidity such as nutritional deficiency like Vitamin A deficiency and Iron dfficiency Anemia which is lead to malnurtrion, impaired physical development (growth retatdation), and decreased learning ability of the child.

Poor hygenic and sanitation condition provide a optimum environment for the develop and transmission of Ascaris worm.

In many parts of developing world include Indonesia under five years old age children are reported to have a high prevalence of Ascaris infection.

Ascaris lumbricoides is transmitted through the contaminated water, soil and food by feces. (Showkat Ahmad Wani et, al 2010).

Ascaris lumbricoides is one of the world important parasite in under five yeas old children which cause physical and intellectual and growth retardation. Yet, despite their educational, ecnomic and public health importance (panel), they remain largely ignore and neglect by the medical and international community. This situation seem neglected from three features: First the most population of the world are affected by soil transmitted helminth infection particularly those who live on less than US$2 perday; second the infections cause chronic ill health and have insidious and

ambiguous clinical trial which are often ignore by familly (espesially in children) and public health community; and third, quantification of the effect of Ascaris Helminth might also have a role to increase susceptability to some infection like malaria (Jeffrey Bethony et, al 2006).

1.2. Problem Statement:

Ascariasis is one of the most prevalent intestinal worm. More than 70 % for Ascaris and Trichuris infections in Indonesia. But the prevalence of ascariasis was about 10 % in Nusa TenggaraTimor (NTT) 10 % and only 1% for Trichuris infection in the tropical country of Indonesia (D.W.T. Crompton et, al 2003).The prevalence of the intestinal soil transmitted helminth infections is various 60% to 90% in the Republic of Indonesia (David R haburchak MD, 2008). One another survey which was conducted by Department of a Parasitology, Department of Nutrition Faculty of Medicine and Department of Experimental Psychology Faculty of Psychology, University of Indonesia the prevalence of ascariasis is various from 60—90% in pre-school age children of Northern Jakarta, Indonesia (Pinardi Hadidjaja et, al 1998). So intestinal Ascariasis is one of the public health problem among under five year age which have a close relationship to hygienic and sanitation status of their household mothers, on the other side the warm and moist climate of the Indonesia country is another most important health related problem which allow to the high growth of Ascariasis egg and larva, and the poor socioecnomic status of the population permit the parasites to spread and transmite easily from infected host to noninfected host.

The peoples can be infected with intestinal Ascaris worm through the contaminated soil or contaminated foods which has been contaminatd with the faces of infected host.

So the following are the most significant environmental factors.

1. High prevalence of Ascariasis infection in Indonesia is related to the poor environmental sanitation and hygenic health status of household mother.

2. Geographic location of the Indonesia country like warm and moist climate can cause high growth and breed of eggs and larva of the Ascariasis infection.
3. Poor socioecnomic status (like unaccesibility to safe water,lack of health system and etc) of some of the Indonesia population can also cause to spread and transmite the soil transmitted helminth easily from infected host to non infected host through by the contaminited soil or foods.

1.3: Research question:

What is the impact of household mothers hygenic and sanitation environmental health determinants among their under five years age children related to Ascariasis lumbricoides.

1.4: General objective:

To assess the relationship of household mothers environmental hygiene and sanitation (like source of drinking water, hand washing with soap) health determinants against in occurrence of Ascaris lumbricoide infections among their under five year children in Nusa Tengara Timor province Sikka district Indonesia.

1.5: Specific objectives:

1.5.1. To explore and evaluate the relationship between avaialible household water source (water company, protected dug well, protected spring, drilled well and etc) with occurrence of Ascariasis among their under five years children.

1.5.2. To identify the relationship between the habit of usual hand washing with soap by mothers with occurence of Ascariasis among their under five years children.

1.5.3. To explore that what and how hand washing with soap by househol mothers have association with the occurrence of Ascariasis among their under five years children.

1.6: Benefits of the study:

The benefit of this study is that we will explore the environmental and hygiene related determinants of Ascariasis among children under five years of old in Timor province Sikka district as follow.

1.6.1. To determine the environmental attributable sanitation and hyigenic health infuence factors which has association in high occurence of Ascariasis among household who have under five year children.

1.6.2. The survey result will also indicate the exist epidemiological situation of Ascaris infection in mention province.

1.6.3. The evidance of the study will be also essential to elicit for the government authorities to take care of controle and prevention methods.

1.7: Scope of the study:

While the child growth and development is on of the multidimensional and physiological process,due to the high BMR the child grow rapidly; so many factors and helminth infections like Ascariasis can deteriorate this complex process easilly. The study can determine all of these factors like sanitation and hyigenic environmental health indicators and the infuence on the occurence of Ascariasis infection.

CHAPTURE 2

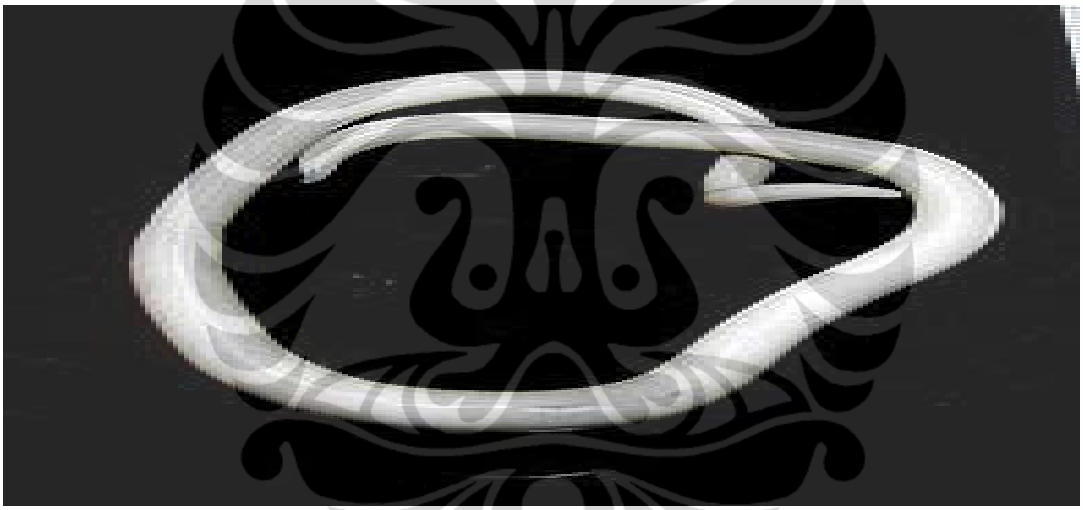
LITERATURE REVIEW

2.1: What is Ascariasis?

Ascaris is one of the most important species of Nematode worm which inhibit the small intestine of the human body the disease is called Ascariasis.

Figure no 2.1.1:

Ascaris lumbricoides



An adult female Ascaris worm.

Kingdom: Animal

Phyllum: Nematode

Class: Secernentea

Order: Ascaridida

Family: Ascarididea

Genus: Ascaris

Species: lumbricoides

Binomial Name: Ascaris lumbricoides

Ascariasis is the most common helminthic infection of the human being of the nematode class, with an estimated worldwide prevalence of 25% (0.8-1.22 billion people), also estimated that 59 milion case of ascariasis occur among children wich is associated with significant morbidity of Ascaris infection, The estimate of acute illness is 12 million cases per year with approximately 10,000 deaths. Usually most of these infections are asymptomatic, Ascariasis is most prevalent in children of tropical developing countries, due to dominant unhygienic environmental condition and also chiidren are succesively confront with soil which are contaminated with human feces.

Mostn of the ascariasis case are asymptomatic and progress insidiously and consequently bring the most deteriorate health problem like malnutration, Iron difficiency Anemai, growth retardation and cognative effects,especially in children (David R Haburchak, MD 2008).

2.2:HistoryofAscariasis(ascaris):

In 1683, Tyson discussed " *Lumbricus teres* …observations on the Round Worm bred in human body, that common Round Worm which children usually are troubled with." In 1758, Linnaeus proposed the name *Ascaris lumbricoide.* Although *A lumbricoides* has many thousands of years ancient history but sciencetificaley the biological elucidation of Ascaris has been began in 17th century, and effective chemotherapy was only developed in the late 20th century.

In 1856, Ransom reported that finding eggs in fecal samples was a reliable means of diagnosis. In 1862, Davaine concluded that ingested embryonated eggs produced ascariasis and that the infected host would produce eggs in feces that could pass the

infection to another host. In the 1980s, several reviews noted the public health impact of STH infection and suggested control strategies using antihelminthic drugs, some of which were introduced in the 1960s (eg, pyrantel pantoate) and 1970s (eg, mebendazole).

(William H Shoff et, al 2008).

2.3: Epidemiology of Ascariasis:

The above mentioned parasite infected estimate 25 percent of the world population. A number of features account for its high prevalence including an ubiquitous distribution, the durability of eggs under a variety of environmental conditions, the high number of eggs produced per parasite, and poor socioeconomic conditions that facilitate its spread (ascariasis 2004).

2.4: Prevalence and distribution of Ascariasis:

The high prevalence of Ascariasis occur in tropical and subtropical devoloping countries where warm climates and moist soil provide favorable environmental condition for breeding eggs .This contrast to that place where the climate is dry. Transmission to Ascaris makes seasonal which occuring perdominantly in rainy months. The majority of Ascaris infected population are live in Asia(73%), Africa(12%), and South American (8%),where some populations have infection rate as high as 95 % .In the United State the prevalence of infection decrease dramatically after the introduction of modern sanitation and wast treatment during 1900. It is estimated that the current prevalence of Ascaris lumbricoides in stool sample is approximately 2% in the United State, but it may be more than of 30 % in children between the age of one to five years, particularlly in rural areas of the South. It is also seen from travelers to endemic areas (Jessika lora et, al 2005).

Ascariasis is present in at least 150 of 218 countries in the world. Prevalence estimates widely vary among countries and within communities inside these countries. (Wiliam H Shoff et, al 2008).

A number of faeutures account for its high prevelance including a ubiquitous distribution, the durability of eggs produced per parasite, and poor socioeconomic conditions by asymptomatically infected and can continue to shed eggs for years, yet previous infection does not confer protective immunity.

Although Ascariasis occur in all ages but it is more common in the age of 2—10 years old, and the prevalence decreased over the age of 15 years. Infection tends to be cluster in families, and worm burden correlates with the family numbers which are living in one home. Infections of rate for Ascariasis are not having been reported to be high in Hummun Immune Virus (HIV).

(Jessika lora et, al 2005).

Transmission occurs mainly via ingestion of water or food (raw vegetables or fruit in particular) contaminated with Ascaris lumbricoides eggs and occasionally via inhalation of contaminated dust. Children playing in contaminated soil may acquire the parasite from their hands. Transplacental migration of larvae has also occasionally been reported. Co infection with other parasitic diseases occurs with some regularity because of similar predisposing factors for transmission (Peter Nejsum et, al 2005).

2.5: Clinical classification of Ascariasis:

The genus *Ascaris* is composed of 17 species. *A lumbricoides* has a high host specificity for humans and, rarely for pigs. It has been reported in other hosts, including cats, chimpanzees, domestic dogs, gibbons, gorillas, guinea-pigs, lambs, macaques, monkeys, rabbits, rats, and squirrels; however, it has not been demonstrated to achieve sexual maturity or to produce fertile eggs in these hosts. *Ascaris suum* has high host specificity for domestic pigs and, rarely, humans. It has been reported in other hosts, including domestic cattle, gorillas, goats, lambs, monkeys, mice, rabbits, and rats. As with *A lumbricoides*, *A suum* has not been demonstrated to achieve sexual maturity or to produce fertile eggs in these hosts. The

other 15 species of *Ascaris* are not reported in humans. Therefore, A lumbricoides does not have an animal reservoir

(Wiliam H Shoff et, al 2008).

2.6: Patho physiology of Ascariasis:

Adult worms move throughout the GI tract and habitate in small intestine, some time the parasite move to regional orgons, (eg, biliary tract, pancreas, appendix, diverticula, Meckel diverticulum) and may become incarcerated, leading to obstructive pathology. The worms may die, leading to inflammation, necrosis, infection, and abscess formation. If they migrate through an existing perforation in the bowel wall secondary to tuberculosis or typhoid, they can cause a granulomatous peritonitis. Larvae during migration may be deposited in the brain, spinal cord, kidney, or other organs, leading to granuloma formation, inflammation, or infection. They may become entwined in a bolus and obstruct the small bowel; this is most common in the terminal ileum, although other, more proximal, sites have been rarely reported.

This condition may be precipitated by the administration of antihelminthic drugs. Eggs may be deposited in the liver or biliary tract. If they gain entry to the blood, they are deposited in extraneous sites,leading to local reactions.
Only a small percentage of *Ascaris* infections produce serious, acute pathology; however, because about one quarter of the human population is infected, the number of cases is significant (Wiliam H Shoff et, al 2008).

2.7: Life cycle of Ascaris lumbricoide:

Adult worm of the Ascaris lumbricoide inhabit the lumen of the small intestine, usually in the jejunum or ileum. They have a life span of 10 months to 2 year s and then are passed in stool the invironment. When both femal and male worms are present in the intestine, each female worm produces approximately 200,000 fertilized eggs per day. When infections with only femal worms occur, infertile eggs that do

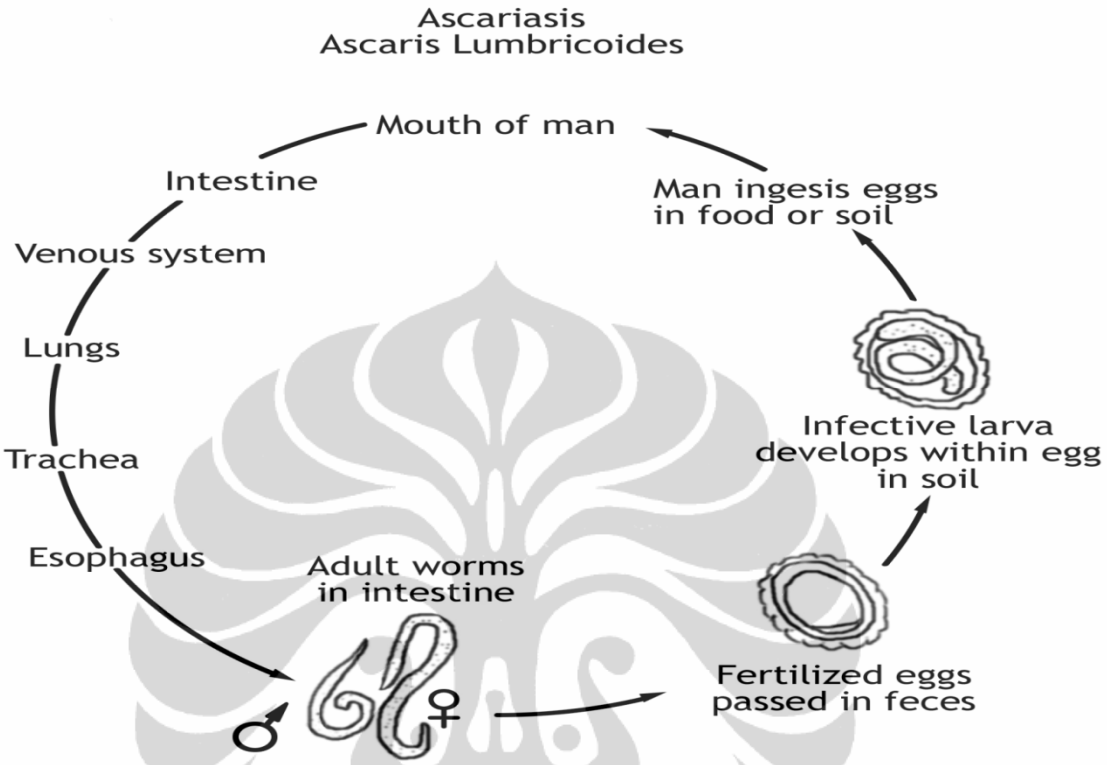
not develop into the infectious stage are produced. With male-only worm infections, no eggs are formed.

The egg, have a thick shell, an outer coat, and measure 45 to 70 µm by 35 to 50 µm. The ova are passed out to the external environment throuth the defecation of faces and they grow and produce larva accornding to available environmental conditions which is called first larval-stage, then embryos develop into infective second-stage larvae in two to four weeks (depending upon environmental conditions). When ingested by humans, the ova hatch in the small intestine and release larvae, which penetrate the intestinal wall and enter to blood stream or lymphatics vessles imigrate to the heart and then reache to lungs. Occasionally, some times the larvae migrate to the other orgons, including kidney or brain too.

After four day of the ingestion of eggs larva reach to the lungs. Within the alveoli of the lungs, the larvae mature over a period of approximately 10 days, then pass up via bronchi and the trachea, and are subsequently swallowed. Once back in the intestine, they mature into adult worms. Although the majority of worms are found in the jejunum, they may be found anywhere from the esophagus to the rectum. After approximately two to three months, adult females will begin to produce ova which, when excreted, complete the cycle.

Adult worms do not multiply in the human host, so the number of adult worms per infected person relates to the degree of continued exposure to infectious eggs over time. Worm burdens of several hundred per individual are not uncommon in highly endemic areas, and case reports of more than 2,000 worms in individual children exist. However the number of eggs produced per female worm tends to decrease as the worm burden increases. It has been estimated that 9 x 10(14) eggs contaminate the soil per day worldwide.

Figure no 2.7.1: schematic lile cycle of Ascaris



2.8. Clinical features of Ascariasis:

The majority of infections with A. lumbricoides are asymptomatic. Clinical disease is largely restricted to individuals with a high worm load. The symptoms of Ascariasis relate either to the larval migration stage or to the adult worm which lodged in the lumen of Intestine.

The symptoms of infection can be classified as follow (ascariasis 2004).

2.8.1. Pulmonary and hypersensitivity manifestations:

Transient respiratory symptoms can occur in sensitized hosts during the stage of larval migration through the lungs. Symptoms associated with pneumonitis, which are known as Loffler's syndrom, is most improtant which come by migrating larva to the lung tissue, this syndrome is characterized by varying pulmonary infiltrates, mild to marked respiratory symptoms and peripheral eosinophilia, which is clinacally most resemble to the symptoms of respiratory tract infection (fever, dypnea, hemoptysis and cough) and TB of the lungs.

Urticaria and other symptoms related to hypersensitivity usually occur toward the end of the period of migration through the lungs (ascariasis 2004).

2.8.2. Intestinal symptoms:

Intestinal symptoms of Ascariasis are abdominal discomfort, anorexia, nausea and diarrhea. However, it has not been confirmed that these are the pecific symptoms which are attributed to ascariasis, may be intestinal ascariasis have non specific features(ascariasis 2004).

2.8.3. Nutrient disturbances:

Also noted that impaired absorption of dietry proteins, lactose and vitamin A has been related with heavy infections of Ascariasis,and steatorrhea may occur. One review concluded that Ascaris-free or treated children showed better nutritional status in terms of growth, lactose tolerance, vitamins A and C, and albumin levels than Ascaris-infected children based upon almost 20 years of published cross-sectional and intervention studies from Africa, Asia and South America. Also found significant improvement in weight or height following therapy for ascariasis. It has also been proposed that heavy infections may be associated with impaired cognitive development in children (Ascariasis, 2004).

One the most greater and significant global health impact of the nutritional consequences of chronic ascariasis, including growth reduction (growth retardation)

due to increased fecal nitrogen loss, reduction in the ability to digest lactose, and diminished vitamin A utilization.

There is now general agreement that under certain conditions, infection with *A. lumbricoides* is associated with impaired growth and poor nutritional status in children which lead to malnutrition.

Several clinical studies have shown that absorption of Vitamin A is lower in *Ascaris* infected children so the chidlren who are suffer from Ascariasis is most prone to xerophthamia . Impairment of Vitamin A absorption may be related to the effects of infection on the brush border of intestinal villi (atrophy) or fat absorption.

It is to be expected that children experiencing abdominal pain, nausea and digestive disturbances due to helminth infection will probably have a reduced attention span when present in school, and may even miss a significant amount of schooling due to chronic illness. Chronic ascariasis also demonstrate such adverse effects on the intellectual development and cognitive performance of children (impairment of learning ability).(Peter J Hotes et, al 2003).

In one of another classification the ascariasis has been summarized as follow:

2. 8.4.Disease classification of Ascaris Lumbricoide:

Type A: Reversible growth faltering in children and or reduced physicall fitness in children and adult, which has been los in the duration of infection. This denotes from deficit in health which is recovered completely when the infection is loses, or the threshol of worm burden drop below.

Type B: Permanent growth retardation, which is longlife consequence of chronic infection of ascariasis. This denotes a deficit in health that may be recovered, but only partially, even if the individual loses the infection completely.

Type C: Clinically overtness of acute illness such as intermittent abdominal pain or discomfor, nasua, anorexia or diarrhoea mild to moderate severity with short

duration. The severity of illness would be such that it causes the individual to seek attention.

Type D: Acute complication such as acute intestinal obstruction and its complication, biliary or pancreatic disease, appendicitis, perotonitis, etc. There are of sufficient severity for the affected individual to be hospitalized

(Peter J et, al 20003).

2.9. Complications of Ascariasis:

2.9.1. Loefflers's syndrome: Is an eosinophilic infiltration of the lung usually seen in hypersensitive individuals.

2.9.2. Patholgic changes in the liver, brain, or eyeball as lavae, migrating through thte blood stream, may eventually be lodged in these organs.

2.9.3. Acute appendicitis.

2.9.4. Acute pancreatitis.

2.9.5. Acute cholecystitis.

2.9.6. Liver absceses.

2.9.7. Intestinal obstruction.

2.9.8. Bowel perforation.

2.9.9. Peritonitis.

(Round worm Ascaris Hub page 2010).

Some of the importants complication will describe with detail as follow.

2.9.1. Intestinal obstruction:

Intestinal obstruction is one of the common complication of intestinal ascariasis which are mostly occurring in children in developing world.

Intestinal obstruction may be acute, subacute or may be can due to ascaris-induced volvulus, instussusception, and may lead to the gangriene of small intestine. Plain abdominal X-Ray and Ultrasound are commonly use for the diagnosis of the intestinal Ascariasis. According to the burden of worms, the intestinal Ascariasis must be treated to avert the complication, if the conservative theraphy is not suffecient then surgical intervention therapy is necessary (Wani, 2010).

The symptoms of intestinal obstruction are the same like other form of abdominal obstruction include abdominal pain, vomiting and constipation.

Approximately 85% of intestinal obstruction due to intestinal Ascariasis occurs between the ages of 1-5 year children.

Some time due to serial examination of abdominal mass change the size and location may be lead to volvulus, iliocecal intussusception, gangriene and intestinlal perforation occasionlly.

Approximate incidance of intestinal obstruction in children occur one case out of 500 cases. It has also been showen that between 5 and 35 percent of all intestinal obstructions are occur in chidren due to intestinal Ascariasis (Ascariasis 2005).

2.9.2. Hepato Biliary complications:

The symptoms like biliary colics, abdominal pain, a calculus cholecystitis, ascending cholangitis, obstructive jaundice, bile duct perforation with peritonitis relates when the adult worms imigrate to biliary trees.

Strictures of the biliary tree may occur. Hepatic abscesses can also occur. Retained worm fragments can serve as a nidus for recurrent pyogenic cholangitis (Ascariasis 2005).

2.9.3. Others intestinal complications:

The pancreatic duct may also be obstructed, leading to pancreatitis. The adult worm of Ascaris lumbricoides may be imigrate to appendix vermicular resulting appendicitis.

Some time the Ascaris perforate the small intestine and produce peritonitis (Ascariasis 2005).

2.9.4. Others rare complications;

Occasionally, migrating adult worms emerge from the mouth, nose, lacrimal ducts, umbilicus or inguinal canal. High fever, diarrhea, spicy foods, anesthesia and other stresses have all been associated with an increased likelihood of worm migration.

Complications which are associated with Ascaris lumbricoides infections are fatal in up to five percent of cases. It is estimated that 20,000 deaths from ascariasis occur annually, primarily as a consequence of intestinal obstruction especially in children (Ascariasis 2005).

2.10. Differential Diagnose of Ascariasis:

1. Biliary colic.
2. Intestinal obstruction.
3. Acute pancreatitis.
4. Community Aqcuired Pneumonia (CAP).

2.10.1. Biliary colic:

Complet and proper medical history should elicit the nature, intensity, location, duration, onset, cessation, associated factors, aggravating factors, relieving factors, radiation, and frequency of the pain. The pain of ascariasis is term a paroxysmal pain that began and wanes, while, in actuality, the pain of biliary colic is generally a constant and slowly progressive pain. The pain generally follows a meal and began several hours later. In fact, pain immediately with a meal is not characteristic of

biliarycolic.

It is important while taking the history that one evaluates the risk factors for stone formation. This visceral pain is believed to result from impaction of a gallstone in the cystic duct and/or ampulla of Vater. The resulting impaction causes distension of the gallbladder and/or biliary tract, and this distension activates visceral afferent sensory neurons. The resultant pain is commonly localized poorly and generally refers midline to the representative dermatomes T8/9 (mid epigastrium, right upper quadrant), although it may radiate to the right upper quadrant. Localized pain or persistent pain generally represents a complication of cholelithiasis or choledocholithiasis (examples cholecystitis, cholangitis, and pancreatitis).

Biliary colic is the presenting symptom in 80% of patients with gallstone disease who seek medical care; however, only 10-20% of all individuals with gallstones experience severe gallstone pain. The risk of developing biliary pain or stone-related complications in asymptomatic patients is low, at 1-2% per year. For this reason, clinical practice favors treatment of only symptomatic disease, with the exception of a few unique circumstances. Two thirds of patients presenting with their first attack of biliary colic have recurrent pain within 2 years.
Fatty food intolerance (fatty dyspepsia) is not a symptom of biliary colic.

(Richard K Giliary et, al 2009).

2.10.2. Intestinal obstruction:

The obstruction of Large Intestine may be due to neoplasms or Anatomic abnormalities, such as volvulus, incarcerated hernia, stricture, or obstipation can be deffrentiate with proper mediacal history and physical and lab exam.

Obstruction of the large intestine leads to abdominal distention, abdominal pain, anorexia and vomiting.

In the case of Large Intestine mortality and morbidity is often related to the surgical proceduer used to relive the colonic obstruction.

The incidence of the obstruction of the large intestine is common in elderly because a lot of neoplasm and other intestinal mechanical obstruction are relate to this age(Marc D Basson 2008).

2.10.3. Acute pancreatitis:

The pancreas is one of the importand body gland with mix endocrine and exocrine secreation which are located in the upper, posterior abdomen, the endocrine secreation is release of Insuline hormone (endocrine pancreas) and the exocrine secreation are release of digestive enzymes (exocrine pancreas) leading to carbohydrate, fat, and protein metabolism. Approximately 80% of the gross weight of the pancreas supports exocrine function, while the remaining 20% is involved with endocrine function. The focus of this article is on the exocrine function of the pancreas.

The cardinal symptom of acute pancreatitis is abdominal pain, which is characteristically dull, boring, and steady. Usually, the pain is sudden in onset and gradually intensifies in severity until reaching a constant ache. Most often, it is located in the upper abdomen, usually in the epigastric region, but it may be perceived more on the left or right side, depending on which portion of the pancreas is involved. The pain radiates directly through the abdomen to the back in approximately one half of cases. Nausea and vomiting are often present along with accompanying anorexia. Diarrhea can also occur. Positioning can be important, because the discomfort frequently improves with the patient in the supine position. The duration of pain varies but typically lasts more than a day. It is the intensity and persistence of the pain that usually causes patients to seek medical attention (Timothy B Gardner, et, al 2010).

2.10.4. Community-acquired pneumonia (CAP):

CAP is one of the most common infectious diseases addressed by clinicians. CAP is an important cause of mortality and morbidity worldwide.

CAP is usually acquired via inhalation or aspiration of pulmonary pathogenic organisms into a lung segment or lobe. Less commonly, CAP results from secondary bacteremia from a distant source, such as Escherichia Coli from urinary tract infection and/or bacteremia. CAP due to aspiration of oropharyngeal contents is the only form of CAP involving multiple pathogens.

Patients with Community-Acquired Pneumonia (CAP) due to typical bacterial pathogens present with various pulmonary symptoms, while those with CAP due to atypical pathogens present with a variety of both pulmonary and extrapulmonary symptoms.

Patients with bacterial CAP typically present with variable degrees of fever, usually with a productive cough and often with pleuritic chest pain.

The clinical presentation of CAP due to atypical pathogens is usually less acute than CAP due to typical bacterial pathogens.

CAP due to atypical pathogens may have one or more extrapulmonary features, which is a clue to their presence.

Patients with Legionella Pneumonia may have a productive or nonproductive cough. In contrast, patients with pneumonia due to Mycoplasma Pneumoniae or Chlamydia Pneumoniae usually present with a nonproductive cough.

With the exception of Legionella pneumonia, chest pain is typically not a feature of CAP due to nonzoonotic atypical pathogens.

Othe proper physical examination and lab investigation can diagonose it(Burke A Cunha, 2010).

2.11. Laboratory diagnosis of Ascariasis:

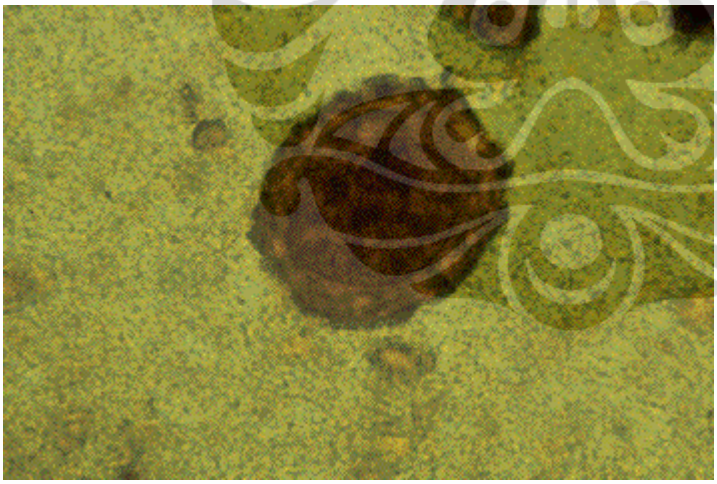
Very sample and most effective method for the diagnosis of ascariasis is stool microscopic examination. Without microscopy stool exam other forms of labortries

exams for diagnosis are blood examination (Eosinophilia), imaging like ultrasound and serology examination(Ascariasis 2005).

2.11.1. Microscopy stool examination:

The eggs of ascaris lumbricoides which have characteristic specific shape may be seen directly under the microscope, or following concentration techniques. However, eggs do not appear in the stool for at least 40 days after infection; thus, the main drawback of relying upon eggs in feces as the sole diagnostic marker for Ascaris infection is that an early diagnosis cannot be made, including during the phase of respiratory symptoms. In addition, no eggs will be present in stool if the infection is due to male worms only. Sometimes an adult worm is passed, usually per rectum. If an Ascaris worm is found in the feces, a stool specimen can be checked for eggs to document whether or not additional worms are present prior to instituting therapy.

Figure No: 2.11.1:



Ascaris lumbricoides in stool – Wet mount of stool (x400) showing the ovum of ascaris lumbricoides (Ascariasis 2005).

2.11.2. Blood Examination (Eosinophilia):

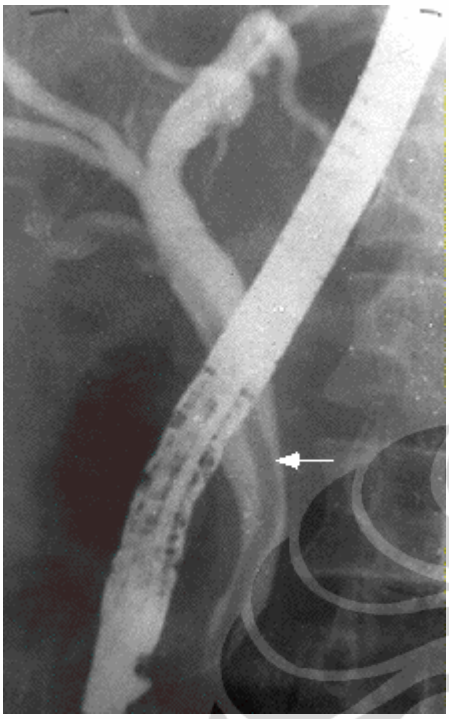
Peripheral Eosinophilia can be found, particularl during the phase of larval migration through the lungs but also sometimes at other stages of Ascaris infection. Eosinophil levels are usually in the range of 5 to 12 percent but can be as high as 30 to 50 percent. Serum levels of IgG and IgE are also often elevated during early infection (Ascariasis 2005).

2.11.3. Imaging:

In heavily infested individuals, particularly children, large collections of worms may be detectable on plain film of the abdomen. The mass of worms contrasts against the gas in the bowel, typically producing a "whirlpool" effect. Radiologic detection of adult worms is sometimes made by detecting elongated filling defects following barium meal examinations of the small bowel. The worms also sometimes ingest barium, in which case the alimentary canal appears as a white thread bisecting the length of the worm's body. Radiographs will also show when there is associated intestinal obstruction (Ascariasis 2005).

2.11.3.1. Biliary cholangiography:

Figure of cholangiography 2.11.3.1



Cholangiogram obtained during Endoscopic Retrograde Cholangio Pancreatography shows a linear filling defect (arrow) that was later identified as an adult Ascaris lumbricoides worm(Ascariasis 2005).

2.11.3.2. Ultrasound:

Ultrasound examinations can help to diagnose hepatobiliary or pancreatic ascariasis. Single worms, bundles of worms, or a pseudotumor-like appearance may be seen. Individual body segments of worms may be visible, and on prolonged scanning, the worms will show curling movements. Computed Tomographic (CT) scanning or Magnetic Resonance Imaging (MRI) may also be used to identify worms in the liver or bile ducts, but this is not usually necessary. Imaging the worm in cross-section gives a "bull's eye" appearance. When ascariasis involving the biliary tree or pancreatic duct is suspected, an ERCP will not only establish the diagnosis but also allows for the direct removal of the worms (Ascariasis 2005).

2.11.4: Serology:

Infected individuals make antibodies to Ascaris lumbricoides which may be can detected.However serology are only reserve for epidemiologic studies. Antibodies with Ascaris have also cross reaction with other forms of Helminths too (Ascariasis 2005).

2.12. Treatment:

2.12.1. Pharmacological treatment:

The treatment procedure of Ascariasis includes choice of antihelminthec drug; follow up the patient and supporative care.

Albendazole: albendazole 400 mg singal dose orally is the drug of choice.(David R Haburchak, MD 2008).

Mebendazole: Alternative therapy is mebendazole (100 mg bid for 3 d or 500 mg as a single dose). The three days theraphy may have approximately 95% effective, and singal 500 mg dose may also have same effectiveness. Mebendazole have same advers effect like Albendaziole. Mebendazole is not recommended during pregnancy; pyrantel pamoate is the drug of choice in these cases (David R Haburchak, MD 2008).

Paralyzing vermifuges deravetives: (eg, pyrantel pamoate, piperazine, ivermectin) should be avoided in patients with complete or partial intestinal obstruction since the paralyzed worms may necessitate or further complicate surgery.

The dose of pyrantal pamoate is 11mg/kg bwt of maximum dose for adult 1gm as a singal dose. Pyrantal pamoate is safe in pregnancy.

Adverse effects includes Gastro Iintestinla disturbances, headach, rash and fever. Although the parasite immoboliszation and death occur, slowly and complete clearance of the worms from GIT may take three days. Efficacy is belongs to various

with worm load, but singal dose therapy of pyrantal pamoate has 90% effective in the eradication of adult worms(David R Haburchak, MD 2008).

Vitamin A: supplementation improved growth development of children.

Drug therapy affects only adult worms. If the patient lives in an endemic area or has recently relocated, he or she may still be carrying larvae that are not yet susceptible. Such patients should be re-evaluated in 3 months and retreated if stool ova persist. In endemic areas, reinfection rates approach 80% within 6 months.

Nitazoxanide, a drug used primarily for protozoal infection, was shown to have 89% clinical efficacy for the treatment of ascariasis in rural Mexico and may offer a future alternative to other medications (David R Haburchak, MD 2008).

2.12.2. Surgical care

Usually the conservative management of partial intestinal obstruction and biliary ascariasis is effective. The patient is maintained on nothing-by-mouth status, and the partial obstruction usually spontaneously resolves. Preventing oral intake decreases the risk of food compounding the obstruction while normal peristalsis redistributes or evacuates the worms. A controlled trial from Pakistan found that, in patients without peritonitis, hypertonic saline enemas relieved obstruction more quickly (1.6 d vs 3.4 d) and resulted in shorter hospital stays (4 d vs 6 d) than intravenous fluids alone. A recent study from India demonstrated that conservative therapy was successful in 19 of 22 (89%) children with intestinal obstruction. The regimes which are used include

1. No oral intake.
2. Intravenous fluids.
3. Antibiotic .
4. Peprazine salt via naso gastric tube
5. Glycerine plus liquid paraffin emulsion enemas.

The following recommended criteria include for surgical operation.

1. Passage of blood via rectum
2. Multiple air fluid levels seen in the abdominal simple X-Ray abdominal distension and rebound tenderness
3. Unsatisfactory response to conservative therapy
4. Appendicitis and primary peritonitis
5. Hepatobiliary disease
6. Pancreatic pseudocyst

Most (49-90%) worms eventually migrate from the biliary system spontaneously. Drug therapy should be delayed in patients with right upper quadrant or pancreatic pain, as no evidence has shown that drugs are active against worms located in the biliary tree. Regardless, death of the worm in the duct may provoke both inflammation and obstruction. Patients with ascariasis who have only minor symptoms can undergo observation for 3 days. If the minor symptoms persist after 3 days or the patient develops frank cholangitis or pancreatitis, removal of the worms with ERCP should be attempted, if available. Although technically challenging at times, ERCP extraction rates have exceeded 90%.

Intestinal or biliary surgery may be necessary for complications of ascariasis.

Intestinal gangriene usually occurs at the terminal ileum, more often after the use of pyrantel pamoate, which tetanically paralyzes worms and thereby enhances the risk of obstruction. Recently, 2 cases of delayed distal intestinal disease have been reported, which were thought to be secondary to toxins from the worms. Therefore, patients should probably be monitored for some time after the surgical removal of worms.

Milking of worms to the large bowel, resection of gangrienous bowel, ileostomy, and enterotomy are the most common surgical procedures used to manage bowel obstruction.

Invasion of the gall bladder necessitate cholecystectomy, common duct exploration, and T-tube drainage until the patient is stabilized and dewormed.

Any elective gastrointestinal surgery in patients with ascariasis should be delayed until they have been dewormed and adequately nourished. In particular, patients who live in endemic areas should be dewormed before and after elective cholycystectomy (David R Haburchak, MD 2008).

2.12.3. Goals of the medical therapy:

1. Eradecation of infestations
2. Prevent complication
3. Reduce morbidity

Note: Albendazole and Mebendazole have same dose for adults and children.

Mebendazole and Pyrantal pamoate do not recommonde under tow year child more than two year child dose is same like adults.

(David R Haburchak, MD 2008).

2.12.4. Follow-up of the patient:

All of the above mention drugs act against the adult worm but not the larvae. So follow-up the individual patient is very necessory, reevaluated up to two to three months to ensure that no eggs are detectable in the stool, either inadequate elimination of adult worms cause of reinfection. Reinfection occurs in some endemic areas frequently; more than 80 percent of individuals within six months. Evaluation of other family members should be entertained whenever the diagnosis is made because of the propensity of the infection to cluster in families (David R Haburchak, MD 2008).

2.12.5: Supportive Care:

In addition to specific anthelminthic therapy, supportive therapy for complications of ascariasis may be required, including potential surgical intervention for intraabdominal complications. In biliary infections, conservative therapy with anthelminthics, often combined with antispasmodics, is often successful. However, surgical or endoscopic interventions may be required.

Since pulmonary ascariasis is a self-limited disease, symptomatic alleviation of wheeze and cough with inhaled bronchodilators can be recommond. Occasionally, systemic corticosteroids may be required for symptoms. Following symptomatic therapy, standard therapy for intestinal ascariasis can be given after the worms have developed to maturity in the small intestine . Anthelminth therapy is not usually given at the time of pulmonary symptoms because dying larvae may do more harm than migrating ones(David R Haburchak, MD 2008).

2.13: Prevention:

Prevention of reinfection is a substantial problem of Ascaris parasites abundant of dispersion in soil. Good sanitation to prevent fecal contamination of soil is required. An education program advising against the use of human feces as a fertilizer is also needed in some areas. Soil treatments have been attempted but are generally not practical.

Mass treatment with Mebendazole or Albendazole for all school-age children every three to four month has been used in some communities. This serves the dual function of treating the children and reducing the overall worm burden in the community. Indeed, mass community therapy has been shown to reduce Ascaris burden and transmission, although it has a greater effect on the intensity of infection than on the overall prevalence. This approach has been shown to be cost-effective. Because the reinfection occur so frequently in shorter interval.Targeted treatment helps control the morbidity of infection but does not have a substantial effect on transmission.

Prevention of Ascariasis also requires educated hygienic habits/culture and fecal treatment systems, because it's eggs are usually the most difficult pathogen to kill (beside prion), and the eggs commonly survive 1-3 years. Ascaris lives in the intestine where it lays eggs. Infection occurs when the invisible eggs are eaten. The eggs may get on to vegetables when improperly processed human feces of infected people, are used as fertilizer for food crops. Infection may occur when food is handled without removing or killing the eggs on the hands, clothes, hair, raw vegetables/fruit, or cooked food that is (re)infected by handlers, containers, etc. Bleach will not kill ascaris eggs but it will remove their sticky film, to allow the eggs to be rinsed away. Ascaris eggs can be reduced by most composing, but to completely kill them may require rubbing alcohol, iodine, specialized chemicals, cooking heat, or "unusually" hot composting (for example, over 120 degrees for 24 hours. Pests such as flesh-flies, roaches, rodents, skunks, etc, can transmit pathogens to anything they touch. For humanure composting to be sanitary it must also prevent the unheated feces from coming into contact with these pests, as well as flood water from rising waters or rain fall(Wikipedia Free encyklopedia 2010).

The prevention of Ascariasis also include improve sanitation and health education of the community population about this communicable disease. In endemic areas, school screening has demonstrated effectiveness in detection and early treatment of asymptomatic carriers. Benefits in health and educational performance have been reported with large-scale treatment of school-aged children every 6 months in countries where ascariasis is a public health problem. According to the WHO the STHI is the prime cause of infection disease in children age 5-14 years. There are three strategies have been identified to controle the STHI especially Ascariasis,

1. Chemotheraphy
2. Health education
3. Sanitation and hygiene

Sanitation like the clean water system and healthy Hygiene like toilet system and proper and usually washing of hand with soap and detergents in the most of necessory environmental factor which have more influence in the occurrence of STHI especially Ascariasis. In terms of education, better-educated households have better health. Specifically regarding STH, studies in Sri Lanka demonstrate that the more education mothers receive the lower prevalence of STH infection in their children. The challenge is to educate communities without clashing with local customs and cultures. That leaves chemotherapy as the current main stay for control of STH infection, although this strategy is limited by the enormous ongoing burden of environmental contamination. The goal is to reduce the intensity of STH infection in the community. Three chemotherapy strategies have been field tested for reducing the intensity of STH infections in the community,

1. Universal/mass treatment (all ages, both sexes, no exceptions),targeted treatment (defined age, sex, or other identifier).
2. Selected treatment (current diagnosis of STH infection). Only universal and targeted treatments are effective. Selected treatment does have a role, although it does not reduce community STH infection intensity.
3. Treatment delivered to children through the schools at intervals of a year, 6 months, 4 months, or 3 months has been shown to be effective. When given every 3 months to children in one study, a significant decrease in adult intensity was noted, as well (William H Shoff et, al 2008).

The overall objectives of preventing of intestinal ascaris infection are to improve children,s health, nutrition and learning capabilities and to improve the sanitation and hygienic status of household mother.

Recent evidence confirm that a significant reduction the worm burden can be achieved through a regular anthelminthic treatment of population who are at the rank of risk,but permanent with accompaned controle can be achieved only through

regular treatment wih accopanied by long term key preventive intervention in order to break transmission routes.

1. Sanitation like provision of safe and adequate water supply.
2. Healthy hygienic habits like usual washing of hands with soap.
3. Impovermint of environmental sanitation like good storage of human feces and other garbege.

A comprehensive control strategy for Ascaris helminth infection should include:

1. Ensure wide availability of anthelminthics drug in all health services in endemic areas.
2. Ensure good case management of symptomatic cases (exa IMCI).
3. Regular treatment of all children at risk, including adolescent girls, through school – and community based initiatives.
4. Treating pregnant women at risk, through Ante Natel Care (ANC) and other women health programm.
5. Ensuring a safe water supply and adequate sanitation facilities in all community schools.
6. Ensure provision of safe water and sanitation facilities in all household/community levels.
7. Promoting good and healthy Hygiene and sanitation paractices among household mother and school children (hand washing with soap,adequate toilet system and etc). (WHO joint statement UNICEF 2002).

According to the WHO accessibility to clean and safe water , sanitation facilities and better hygiene practices can reduce morbidity from Ascariasis by 29% and from Hook worms by

4 %(WHO 2004).

How to prevent an infestation of Roundworms:

1. Practice good hygiene.
2. Wash your hands often, especially after handling any animals, handling feces of any kind, using the toilet (home or public), or when out of the country.
3. Buy only inspected meat.
4. Do not eat undercooked beef, pork, or fish.
5. Do not eat any beef, pork, or fish that has not been refrigerated properly (refrigerator should be set at 40° F and freezer less than 18° F) and never eat meat or fish that has been sitting out without refrigeration.
6. Wash all utensils and surfaces that come in contact with raw beef, pork, or fish with antibacterial soap.
7. Change bed linens and towels daily.
8. Always wear shoes in soiled areas.
9. Keep cats and dogs away from children's play areas.
10. Make sure to have dogs and cats dewormed.
11. Make sure all fruits and vegetables are washed thoroughly before eating them.
12. Dispose of garbage and waste (feces) properly in specified areas out of the reach of community especially children.
13. Drink bottled or boiled water (one minute), and do not drink fountain drinks (Ascariasis 2005).

2.14. Global situation of Ascariasis:

The soil transmitted helminths infections not only found in developing countries but in developed countries also afflict with these insidious progress disease. More than 2000 million people are affected worldwide of whom 300 million are associated with severe morbidity; it is reported that 155000 deaths occure because of this infection each year. Soil transmited helmenths Infections (STHI) are making 40% of the global burden of all tropical disease except malaria.

It is estimated that Ascaris lubricoides infect more than 1.4 billions people who is representing of 25% of the world population. A number of features account for its

high prevalence including a ubiquitous distribution, the durability of eggs produced per parasite, and poor socioeconomic conditions by asymptomatically infected and can continue to shed eggs for years, yet previous infection do not confer protective immunity.

Although Ascariasis occur in all ages but it is more common in the age of 2—10 years old, and the prevelance decreased over the age of 15 years. Infection tends to be clustered in families, and worm burden correlates with the family numbers which are living in one home. Infections of rate for Ascariasis are not having been reported to be high in hummun Immune Virus (HIV).

The high prevalence of Ascariasis occure in tropical countries where warm climates provide environmental conditions which is favored year round transmision of infections.This contrast to the place where the climate is dry transmission of Ascaris perdominantly seen in rainy months. The majority of Ascaris infected population are live in Asia(73%), Africa(12%), and South American (8%),where some populations have infection rate as high as 95 % .In the United State the prevalence of infection decrease dramatically after the introduction of modren sanitation and wast treatment during 1900. It is estimated that the current situation of Ascaris lumbricoides in stool sample is approximately 2% in the United State, but may be more than of 30 % in children between one to five years old age particularlly in rural area of the South.(Jessika lora et, al 2005)

Table 2.22.1 show global summarize situation of soil transmitted helminthec infections (Ascaris Lumbricoide, Trichuris trichura, Hook worm include schistosoma).

Table: 2.14.1. Estimates global Morbidity and Mortality of Soil Transmitted Helminth Infections.

Parasite	Prevalence infection (million)	Morbidity (cases million)	Mortality (deaths thousand).

A Lumbricoides	**1450**	**350**	**60**
Hook Worms	1300	150	65
T Trichuris	1050	220	10
Schistosoma	200	20	20

2.15. Geographical situation of Ascariasis by Regions:

Geographically these infections are widely distributed in tropical and subtropical areas with poor hygenic sanitation status (for example, most population in subsaharam Africa, indegenous population in the rural area of American and periurban slum population). The Center for Disease Controle (CDC) also estimated that worldwide Ascariasis rate in 2005 were 86 Millions casces in the Republic of China , 204 Millions cases elsewhere in East Asia and Pacific, 173 Millions in Subsaharan Africa , 140 Millions in India, 97 Million in elsewhere in South Asia, 84 Millions in Latin American and the Caribbean and 23 Million in the Middle East and North Africa.Beacause the life span of adult worm in the intestine is only one year, persistent infection requires frequent re-exposure and reinfection. The frquency and intensity of infection remain high throughout life in endemic area and pose a risk to both elderly and young persons (David R Haburchak,MD 2008).

Table: 2.15.1. Estimates world wide distribution of Soil Transmittend Helminths Infection by Region (Milloins of cases).

	LAC	SSA	MENA	SAS	INDIA	EAP	CHINA	Total
Ascaris	84	173	23	97	140	204	86	**807**
Trichuris	100	162	7	74	73	159	29	604
Hook worms	50	198	10	59	71	149	39	576

LAC: Latic American and Carribean

SSA: Sub-Saharan Africa

MENA: Middle East and North Africa

SAS: South Asia

EAP: East Asia and the Pacific Islands

(Jeffrey Bethony et,al 2006)

2.16. Situation of Ascariasis in Indonesia:

The prevalence of intestinal parasites especially Ascaris lumbricoide in the Republic of Indonesia is 60% to 90%, The adult parasite of Ascaris lumbricoides feeds from the digestive products of the hosts, especialy children with marginal diet may suffer from the defeciency of protiens, caloriecs and vit A which result to growth retarded and increased susceptibility of infection such as Malaria (David R Haburchak MD, 2008).

The tropical climate of the Republic of Indonesia is very suitable for growth and highly favorable for persistance of the soil transmitted helminth infection espesially to eggs and larva. The most important and common Nematodes parasites which are found in this country are Ascaris lumbricoides, Trichuris trichura and Necator americanus. Ankylostoma duodonalis is rare compared with Necator american, when it is found it generally mix with Necator Americanus. This might be related to the temperature wich is need for devoloping of eggs in the soil:the optimum temeprature for maintenance of Ankylostma duodonalis eggs is 23—25 centigrades, but in the most area of Indonesia high temprature is mentioned.

In the period of 1970---1980 A surveys was conducted and found the prevalence of more than 70% for Ascaris lumbricoid and Trichuris trichur infections (D.W.T.

Cromptom et, al 2003). However the prevalence were very low in Nusa Tenggara Timur: 10 % for Ascaris lumbricoides and 1% for Trichuris trichura infections, possibly because of the dry climate of this province. The prevelance of Ascaris lumbricoides and Trichuris trichura in a group of under five year children in Joglo,

Jakarta were respectively 73.2 % and 60.9%, in urban Aria of Kramat, Central Indonesia, coressponding figure for 90 children of the same age were 66.67% and 61.12%. In North Jakarta, 762 stool samples from five primary schools were examined for intestinal helminths, the prevalence of Ascaris lumbricoid was 59.96% and Trichuris trichura 79.64%; however values for egg per gram (epg) of faeces an indicator of intensity of infection were respectively 2719 and 232.

In Mataram,(Lombok) high prevelance of Ascaris were found in two schools (78.5 and 72.6 %). The eggs values in these two schools were respectively 5192 and 7170 for Ascaris. In fast Lombok too, high prevalence were detected in tow primary school: 73.45% and 96.57% for Ascaris, and 69.03% and 79.43% for Trichuris infections. The epg values in these schools were respectively 2102 and 3883 for Ascaris infections, and 205 and 436 for Trichuris infections.

Low prevalence and epg values were reported from five Urban schools of Jakarta.Examination of 459 samples from primary schools (grades,3,4,5) showed prevelance 4.3% and 10.7% for Ascaris and Trichuris infections. The epg values were also low-236,387, and 87 for Ascaris infections in grades 3, 4, and 5, and 31, 55, and 15, respectively, for Trichuris infections.

At school 1 in Talang Dabok and at school 2 in Sungai Rengit, South Sumtra, the prevalence of Ascaris infections were 40.3% and 58.9%.

In two Municiple area of West Sumatra school chidren 58.6% and 58.6% were infected with Ascaris Infection, whereas 73.7% and 48.7% were infected by Trichuris. For two rural areas, prevalence were 6.6% and 55.2% for Ascaris infection, and 36.8% and 42.9% for Trichuris infections. In Urban area of South Sulawesi 98% and 92% school children are infected with Ascaris and Trichuris infections, respectively; corresponding figures for poor rural areas were respectively 66 % and 57 %.

Table 2.16.1: Prevelance % of Ascaris Lumbricoide and Trichuris Trichura infections in different Areas of Indonesia.

Area	Year	Ascaris Lumbricoides	Trichuris
North Jakarta	1996	59.66 (%) 40.3 (%)	79.64(%) 41.0 (%)
South Sumatra	1998	58.9 (%) 78.5 (%)	75.9 (%) 64.0 (%)
Wesl Lombok	1999	72.6 (%) 73.45 (%)	60.0 (%) 69.0 (%)
East Lombok	1999	96.57 (%) 92 (%)	79.43 (%) 98 (%)
South Sukawesi	1999	66 (%)	57 (%)

(D.W.T. Crompton et, al 2003)

2.17. Estimation of Ascariasis by age:

High prevalence of Ascariasis infection among devoloping countries especially in chidren is most importance. Intestinal Parasite (Ascariasis) infect about 10% population of the devoloping world, most of them are children.

The effect of intestinal worms on children is more critical compare to the effect of intestinal worm on the body of adults, because this is the period of chidren with rapid physical growth and rapid metabolism resulting in increase nutritional needs, when these nutritional needs are not adequately supply, or the necessary nutritonal needs consume by foreign body such as intestinal worms, the child will be more susceptable to growth retardation.

In the period of successive and extend infection the worm also effect learning ability they have negative cognative impact due to decreasing Hb which assimilate the oxegen supply to the brain.

When children are most exposed to soil and contaminited food unhygenic and unsanitation factors are more predominant cause to get infection .(A. Montresor et,al WHO Genewa 2004).

Table. 2.17.1. Global estimte numbers of infection cases of Intestinal Ascariasis among children by age.

Age group	Population (Million)	Infections (Million)	Percent
0—5 years	553	158	28.6%
5—10 years	482	167	34.6
10—15 years	437	154	35.2%
15+	2641	796	30.0%

(Peter J et, al 2003).

Iron Defficiency Anemia, malnutrition and growth failer due to the malabosorption of Vitamin A difficency and other nutrients. Iron Difficiency Anemia which is contribute to impaired congnitive functions and educational achivement has been demonstrated by the association between Iron Diffiency Anemia and malnutration (Jeffery Bothony et, al 2006).

Problem of this phenomen in chidren is important becaues most if the time the specifec clinical features of Ascariasis like abdominal distension, colic, anorexia, vomiting, intermittend diarrhea and partial or complete obstruction may not present but the infection progress insidiously .The public health community can,t give attention and piority to this health problem, so most individuals of the populations (children) may suffering from the following problems.

1. Protien Energy Malnutration.
2. Vit A diffeciency.
3. Growth retardation.
4. Suscepatibility to secondry infections such as Malaria.

5. Impaired cognative function.

In tropical and subtropical devoloping world more then one dozen of soil transmitted helminthec human infection are found, however four species of them are very signeficant due to their widespreads and high prevalence in hundreds million human.These are the large round worm Ascaris lumbricoides, the whip worm Trichuris trichura, and two species of Hook worms, Necator americanus and Ankylostoma duodenalis. The WHO estimated that anually about 2 Billion people are infected with one or more of these soil transmitted helminthec infection, accounting for up to 40% of the global morbidity from infection disease exclude Malaria. The greatest number of soil transmitted helminthec infection occurs in the tropic and subtropic of Asia, especialy China, India and Southeast Asia as well as in Subsaharam Africa. There are approximately 300 Million Morbidity occur. From these 1-2 Billion soil transmitted helminth infection, it was estimated that 59 milion case of ascariasis occur among children which is associated with significant morbidity .Estimation of acute illness is 12 million cases per year with approximately 10000 deaths. Epidemiological study conducted through out the developing world point that school age children as the population with greatest risk for acquired heavy infection with Ascaris and Trichuris. These children are suffering from the consequence of Acute Ascariasis, intestinal obstruction, hepatobiliary ascariasis, trichuris dysentric syndrom, or rectal cognative and educational impairments caused by heavy chronic infections.

The Chinese National survey carried out in Chinese between 1988 and 1992 founded that almost half of Chinese population (47%) was infected with ascariaisis. An estimation of 531 million of Ascaris infection and 212 million of Trichuris infections occur in this country . The prevalence of the Trichuriasis was lower, with a national average about 19%, and an estimate about 212 million infections. Higher prevalence seen in the South Eastren Province which has a tropical and subtropical climate compared with North Eastren Provinces. Subsequence survey carried out in South Yunan Province, found that the prevalence of Ascariasis and Trichuriasis remain

high. In Jiangsu province, however where rapid ecnomic devoloped has occur and a mass antihelminthec chemotheraphy has been implemented, the prevalence of Ascaris and Trichuris declined dramatically.

The National Survey found that, as in other parts of the world, the highest prevalence rates occur among school aged children. The widespread use of human nightsoilas a major source of fertilizer in agricultural production is an important reason for the high prevalence rates seen in China. Thus students from primary and highschools had high prevalence rates, as did farmers and vegetable growers. The high prevalence among fishermen is attributed to the lack of sanitary facilities and unhygienic habits, since most of them lived along rivers or lakes, and were unable to settle down permanently.

Low prevalence rates were found among herdsmen who live mostly in the low endemic North-Western Provinces. Similarly, a survey carried out among 738 residents of rural areas near Ulaanbaatar, the capital of Mongolia, did not find any major soil-transmitted helminth infection.

A lumbricoides and *T. trichiura* are present throughout South East Asia and explore them in geographical patterns. The results of a national survey in Vietnam show that the prevalence of these species is highest in the Red River Delta Region of Northern Vietnam and lowest Southern districts (peter j et,al 2003). High prevalences have also been described in the northern and Southern Regions of Myanmar, peninsular Thailland, central Lao PDR, and Kratie and Stung Treng provinces in Cambodia Prevalence is lowest in southern province of Vietnam and central provinces of Thailand. All soil-transmitted helminths are widely distributed across Indonesia and the Philippines. However, large scale control programmes have successfully reduced prevalence levels to less than 30% in some areas of Indonesia (peter J et al, 2003).

Of the two Ascaris is more predominant of soil transmitted helminth in any given area, although Trichuris is predominantes in some part of south Asia, Africa and the Caribbean. In some regions the prevelance may reach to 95% among children. In

devoloping countries it is common to encounter the children who coinfected with Ascaris and Trichuris, and there is statistically significant association between these tow infections. Ascaris and Trichuris infections are not exclusively tropical and still occur in poor, underserved area of the industrialized nations, including the United State (Peter j et, al 2003).

Preschool chidren account for 10%-20% of the 2 billion people world wide who are infected by soil transmitted helminths (STHs): Ascaris lumbricoide (Nematodes), Trichuris trichura (Whip worm), Ankylosmtoma duodenalis / Necator american (hook worm). Through a systemic reviev of the published literature and using information collected it World Health Orgonization headquarters, this issue summarized the available evidance to support the recommendetion that preschool age chidlren should also include in the piority of public health sevices and can,t be negelct from regular health survey analysis and deworming programe.

It is well known that preschool age children (PSAC) show the high rank of mortality and morbidity to the communicable disease:estimated that more then 10 million chidren died every year from Malaria, acute respiratory infection, diarrhea,HIV/AIDS,vaccine preventable disease like (Measle,Tetanus,and from Malnutrition and neonatal complication before reaching five days of their birth. Young chidren also afflict with heavy infection of one or more soil transmitted healminth infection: Ascaris lumbricoide, Trichuris trichura , Ankylostoma duodonalis and Necator american.

PSAC comprise about 10% and 20% of the 3.5 billion people living in the STHI endemic area,and also these infections are not among the big killers, but these infections are progress insidiouslly by some debilating clinical features like chronic infection which consequently interupt in growth , congitive , Iron status ,nutrition and immune system of the child.

Growuth altering typically occure between the age of 6 months and 2 years. Globally it is estimated that 200 millions PSAC suffering from growth retardation, 30% of

those PSAC are live in devoloping countries; STHI are also important contribution factors of Malnutration in this age.

From the health perspective, there are sufficient evidence that regular antihelminthec theraphy resulted immediate as well as long term health benefits, significant developement in the growth of affected individual particular in chidren. From the operational perspective, several issues have faverable argument including the anthelminthec drugs in large scale of public health intervention.

Table: 2.17.2. Estimate numbers of **i**nfections with STHI in pre shool age children.

Parasite	Total infection (Million)	Children < 5 years
Ascaris	1221	122
Trichuris	795	86
Hook Worms	740	21

(Macro Albonico et, al 2008).

Table: 2.17.3. Publishe report of prevelance of STH infections in PSAC population.

Country	Sample size	Age rang (ys)	Prevalence		
			Ascaris %	Trichuris %	Hook worm%
Mayanmar	1206	2-12	81	5	2
Bangladish	1402	2-6	71`	44	10
Indonesia	280	2—5	55	29	0
Mexico	508	2-10	NS	100	0
China	329	0-4	66	34	24
Philiphine	544	0-3	3a,19b	1a,35b	NS

DRCongoZair	**100**	0,5-2	66	48	**7**
Tanzinea	467	0,5-6	40	68	51
India	1061	1,5-3,4	50	NS	NS
Kinea	460	0,5-6	20	15	29
Brazil	200	2-6	35	13	NS

Ethiopia	7155	1-4	38	54	10
Malayesia	272	3-6	20	24	NS
Madagasacar	864	0-10	88	43	19
South Africa	200	4-6	82c,81d	96c,57d	44c,4d
Ghana	422	1-5	62c,23d	40c,2d	18c,2d
Nigeria	689	1-5	39	36	42

Urban Area= a

Rural Area= b

Coastal Area= c

Island Area= d

NS= Not specified

(Macro Albonico et,al 2008).

2.18. Environmental sanitation and hygiene factors and Ascariasis:

Intestinal Ascaris parasite infections will remain prevalent for a long period where there is no accesability to clean water and hygienic facilities for the disposal of human excreta and washing of hands after defecation and ect. The provision of clean water supply and better healthy sanitation and their use will make major contributions to prevent and control the intestinal Ascariasis.

The 10 years from 1981 to 1990 have been declared as the"International Drinking Water Supply and Sanitation Decade", during this period great emphasis is being placed on the improvement of water supply and sanitation services to the rural and poor periurban areas of developing countries. This segment of the human community, which makes up over 70% of the total worldpopulation, is the most deprived group in terms of access to water supply and sanitation and also experiences the most hardship from the various intestinal parasitic infections. According to a 1984 WHO estimate, at least 1200 million people in the rural areas of the world in some 90 developing countries (excluding China) are still without access to safe drinking-water. Also, close to 1600 million inhabitantsin the same rural communities lack safe sanitation. Although in recent years there have been

improvements, these have been mainly in water supplies; sanitation is still lagging seriously behind, and thus grave problems concerning the transmission of intestinal parasites will continue for several years.Planned urbanization and a high standard of living in developed countries have resulted in reduced prevalences of intestinal parasites.

On the other hand, uncontrolled migration of the rural poor to already overcrowded urban areas in developing countries has resulted in the spread of shanty towns.In which poor sanitation

facilities have caused heavy contamination of the environment and high prevalences of intestinal parasites.

The provision of sanitary facilities like washing of hand with soap especially in household mother after the defecation, cleaning the child defecation, before feeding to child, before preparing mail ect proper store of excreta disposal and their proper use are necessary components of any programme aimed at controlling intestinal Ascariasis (Dr A Davis 1986).

About 133 million people are suffering from high intesity of helminths infestinal infection, which often lead to severe consequence such as cognitive impairmnet, massive dysentry,

malnutration, growth retardation, diarrhea and anemia.

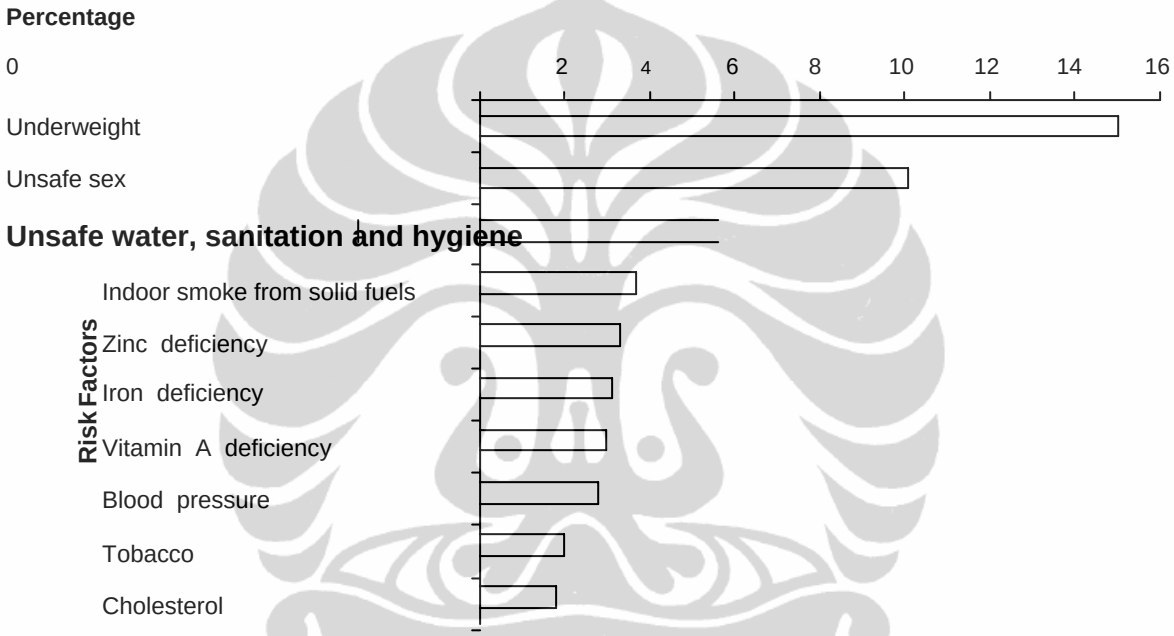
The disease cause around 9400 deaths every year. Access to safe water of sanitation facilities and better hygience practice can reduce morbidity from Ascariasis by 29% and from Hook worm by 4% (WHO 2004).

The impact of the clean water suply and sanitation on Ascariasis was examined through by 144 analysed studies in Canada. The study review showed that improved water supply and sanitation facilities resulted in substantial reductions in morbidity of diarrhea (26%) and Ascariasis 29% (Esrey SA et, al 1991).

Ascariasis depends for transmission on environments contaminated with egg carrying feces. Consequently these transmission of helminth infection ultimately associated with hygiene and sanitation environmental factors like lack of clean or safe water, poverty and etc (Peter j Hotez et, al 1990).

2.19. Water, sanitation and hygienic determinant of health in the South-East Asia Region-situation anlysis and role of Health Ministries.

Figure.2.19.1. Burden of diseases attributed to 10 selected leading risk factors in developing contries with high mortality:



Source: (WHO, 2002. World Health Report 2002: Reducing Risks, Promoting Healthy Life. WHO Geneva)

By global prospective the World Health Report 2002 stated that unsafe water, sanitation and hygiene were the third most important risk factors among developing countries having high rates of mortality (see Figure).Most countries in the South-East Asia Region fall into this group.

It has been estimated that the total number of deaths worldwide attributable to unsafe water, sanitation and hygiene is 1.8 million per year. This figure corresponds to 88 per cent of diarrhoeal diseases worldwide which is considered to be the percentage of diarrhoea due to unsafe water, sanitation and hygiene, and the following diseases: trachoma, schistosomiasis, ascariasis, trichuriasis and hookworm disease.

But the situation of water, sanitation and hygiene in South-East Asia region are importants risk factors for a rangs of diseases, most of the health gains achieved by improving in water, sanitation and hygiene are due to reduction of diarrhoeal diseasel illnesses include ascariasis.

The South-East Asia Region bears a disproportionate share of global diarrhoea-related deaths, accounting for 40.8 per cent of the world's total. Within the Region, diarrhoea is one of only six diseases that the number of deaths per year in this Region, due to diarrhoeal illnesses, exceeds the number of deaths per year due to all other infectious diseases except respiratory infections.

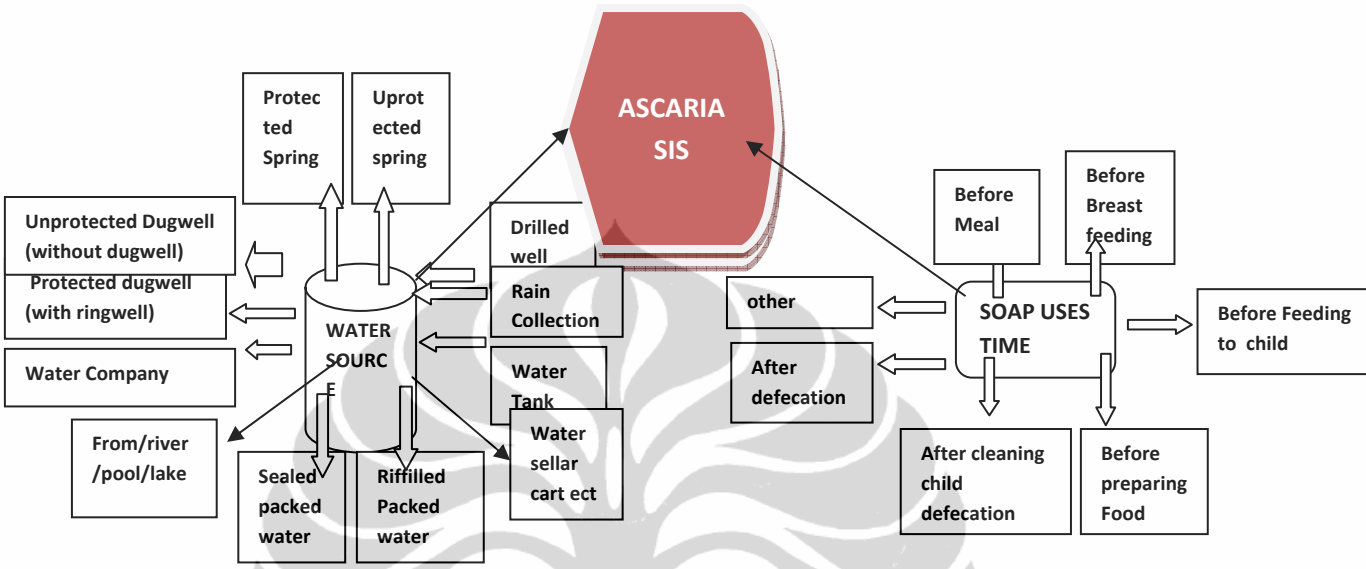
Table 2.19.2. Deaths caused by selected infectious diseases in SEA-Region, 2002 (figures in 000).

Diseases	**Mortality stratum**		
	low child, low adult	**High child, High adult**	**Total**
Respiratory infections	121	1256	1377
Diarrhoeal diseases	44	758	802
Tuberculosis	160	541	701
HIV/AIDS	60	385	445
Measles	32	161	193
Malaria	9	86	95

Most of the deaths due to diarrhoea occur in children under five years of age. Rural populations and the urban poor are at greatest risk of illness due to unsafe water, sanitation and hygiene.(WHO,2002.World Health Report 2002).

2.20. Theorethical Framework:

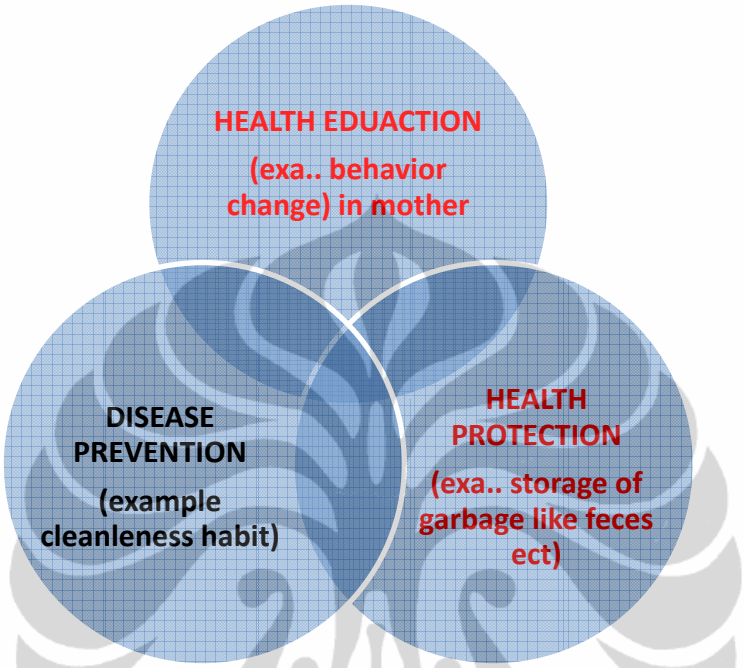
2.20.1 Diagram of theorethical Framework:



In the theorithecal Framework diagram Ascariasis in **dependent Variable**,while water sources like (Water company, Protected dugwell with ringwell, Unprotected dugwell with out ringwell, Protected spring, Unprotected spring, Water from rain collection, Water from river/lake/pool,Waterby cart etc,Sealled packed water,Riffilled packed water,Drilled well,water tank) are enivironmetal sanitational **inpendendent varibles** and soap uses time like before meal,before breast feeding,befor preparing food,after defecation,after child defecation,after cleaning child defecation,before feeding to child are another environmental hygienic independent variables which have relationship to ascariasis.

2.21. Downie, s Fyfe and Tannahi health model (2007).

2.21.1: Diagram of Downie, Fyfe and Tannahi Health Model (2007).



Health education

Health education (e.g. education of mother about dirty water or not proper storage of garbage and the consequences on health) is an activity involving communication with individuals or groups aimed at changing knowledge, beliefs, attitudes and behaviour in a direction which is conducive to improvements in health. Health education remains an important component of health promotion, although it is nevertheless a subset.

Disease prevention :

Disease prevention involves specific interventions aimed at avoiding contact with disease producing risk factors or, where this is not possible, treatment aimed at

minimising the harmful consequences of the disease process. It is commonly divided into three levels: primary, secondary, and tertiary.

Health protection

Health protection involves collective activities directed at factors which are beyond the control of the individual. Tannahill has given the following definition:

"Legal or fiscal controls, other regulations or policies, or voluntary codes of practice aimed at the prevention of ill-health or the positive enhancement of well-being.

CHAPTER 3

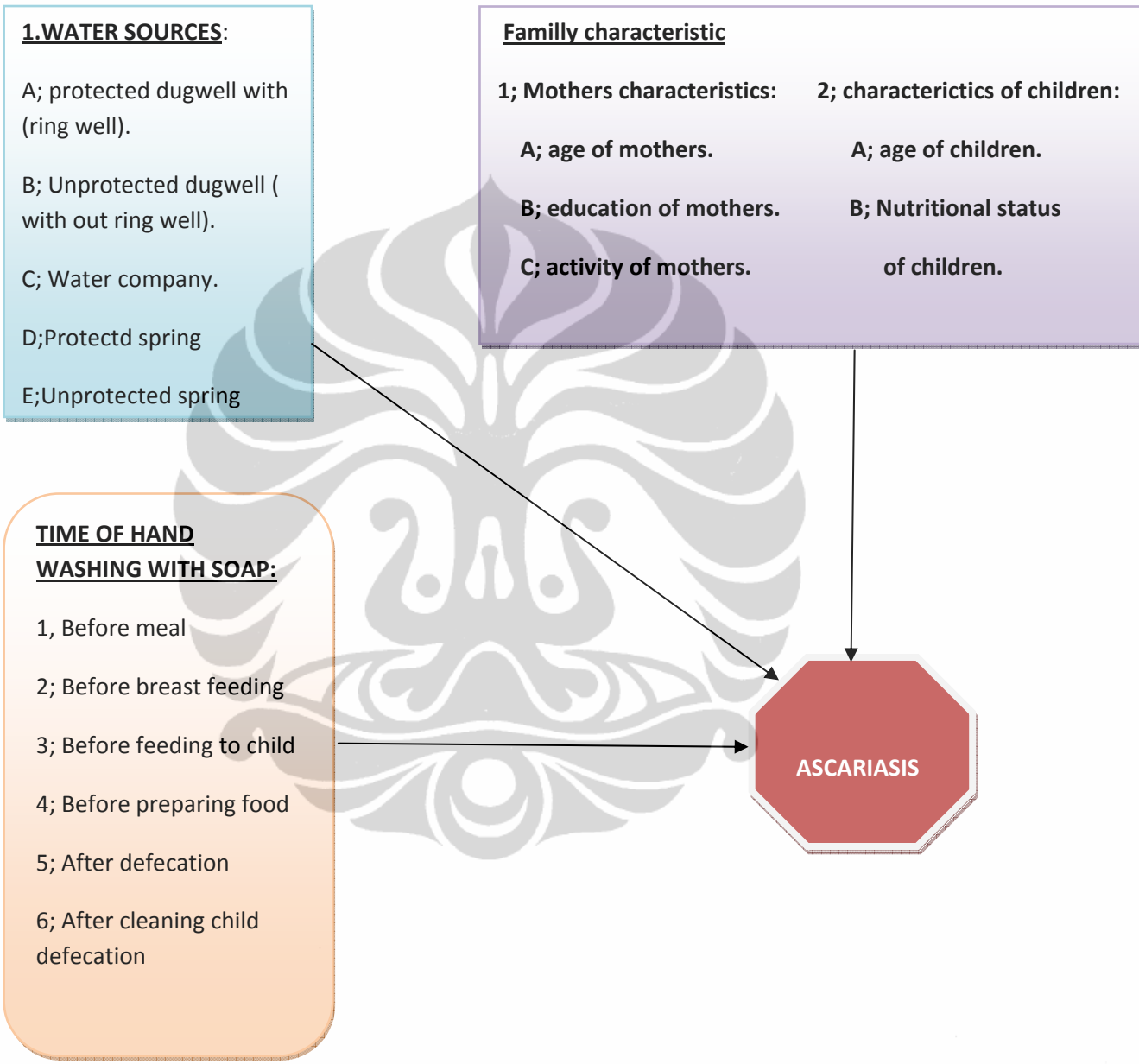
3.1. Conceptual Framework:

The focus of this study is to know the relationship of the household mothers hygiene and environmental health sanitation. The independent variables are source of drinking water like water from water company,water from protected dugwell (with ringwell),unprotected dugwell (with out ringwell) and hyigenic envirmental independent variables like hand washing with of soap before meal, before breast feeding, before preparing food, before feeding to child, after defecation and after cleaning the child defecation with dependent variable Ascariasis among their under five years old children that how these factors have association with ascariasis in Sikka district Nusa Tengara Timor (NTT) province.

Good sanitation and hyigene practice make health better like appropriate growth toddler free of disease. On the other side negative health habit will applied to those mothers whose children are not meeting to the above goals.

Finally the relationship of all mentioned variables will be assessed on the occurrence of Ascaris infections in this area. To find what is the specific healthy sanitation and hygienci practice in household mother who have under five years children which have influence in the occurrence of Ascaris infection in the District of Sikka province Timor all descreptive and inferential univariate, bivariate and multivariate statistical analysis will be conclude to test the hypothesis.

3.1.1: conceptual frame work diagramm:



3.2: Variables;

The **independent variables** are related to environmental sanitation like water from riffilled packed water, water from water company, water from unprotected spring and environmental hygiene like uses of soap after defecation, after cleaning of the child defecation, before feeding to childe which are all of independent nominal varibles.

Dependent variable is Ascariasis.

3.2.1: Table of operational defination:

Conceptual definition of variable	***Operational definition***	***Scale***	***Scale of measurement***
FMILLY CHARACTERICTICS: **Mothers characterictics:**			
A 102. Age of mothers	Age of mothers according their reproductive capability.	Reproductive age<20 or >49 years Unreoreproductive age 20—49 years	Categorical / Ordinal
A103.Education of mothers.	The level of eduction of household mothers.	Low Middle High Illeterate……...01 Not graduated elementry school02 Graduated elementry school03 Not graduated	Categorical/ ordinal

		middle school…04 Graduated middle school…….05 Not graduated high school…….06 Garduated high school…….07 Not graduated academic/college08 Graduated academic/college09 Other ……..96	
A104. Activity of mothers (to earn money)	Any occupation of household mother for income amount of money each month.	Working Not working	Categorical / Ordinal
Children characteristics			
A107 .Age of children	Age of the child12 months or more according to their birth certificate.	< 1 year 1-3 years 3-5 years	Categorical/ Ordinal
A108. Nutritional status of children	Nutritional status of children weight for age	Normal Under nutrition	Catergorical / Ordinal
G101. WATER SOURCES (One independent variable 01,02,03,04,05 are different questions)			
G101(01).Prote	Available water of dug	Yes/No	Categorical Nominal

cted dug well(with ring well)	well which is used for drinking at the moment in this district by household.	Dichomatous or Binary variable	Variable
G101(02)Unprotected dugwell(without ringwell)	Available water of dug well which is used for drinking at the moment in this district by household.	Yes/No Dichomatous or Binary variable	Categorical Nominal Variable
G101(03)Water company	Using of available pipe water by household mothers which is providing by a company to this district at the monment.	Yes/No Dichomatous or Binary variable	Categorical Nominal Variable
G101(04)Protected spring	Available water of protected spring which is used for drinking at the moment in this district by household.	Yes/No Dichomatous or Binary variable	Categorical Nominal Variable

G101(05)Unprotected spring	Availablewaterof Unprotectedspring which is used for drinking at the moment in this district by household.	Yes/No Dichomatous or Binary variable	Categorical Nominal Variable
Allwater source are divided in Safe and unsafe water.	Safe weter: Protected dugwel Water company Unsafe water: Unprotected dug well Unprotected spring	Safe water Unsafe water	Categorical/Ordinal
G107. USING OF SOAP FOR HAND WASHING BY MOTHERS (6 independant variables).			
G108(A).Washing hands with soap before meal	If soap is used by mother in washing their hand before preparing the meal.	Yes / no Dichomatous/ or binary	Categorical / nominal
G108(B).Washing hands with soap before breast feeding	If soap is used by mother in hand washing before breast feeding to her child.	Yes/ no Dichomatous or binary	Categorical / nominal
G108(C).Washing hands with soap before	If mother wash her hands with soap before of feeding her child.	Yes / no dichomatous or binary	Categorical / nominal

feeding the child			
G108(D).Washing hands with soap before preparing food	If mother wash her hands with soap before preparing her foods.	Yes / no dichomatous or binary	Categorical / nominal
3.5.Washing hand with soap after defecation	If mother wash her hands with soap each visit to latrine.	Yes / no dichomatous or binary	Categorical / nominal
3.6.Washing hands with soap after cleaning child defecation	If mother wash her hands with soap after cleaning her child defecationfeces.	Yes / no dichomatous or binary	Categorical / nominal

3.3: Hypothesis:

Characteristics of mothers:

1; There is relationship between age of mothers and ascariasis.

2; There is relationship between education of mothers and ascariasis.

3; There is relationship between the acitvities of mothers and ascariasis.

Characteristics of children:

4; There is relationship between age of children and ascariasis.

5;There relationship between nutritional status of children and ascariasis.

House hold source of drinking water:

6; There is relationship between the unsafe water of drinking and ascariasis.

7; There is relationship between the safe water of drinking and ascariasis.

Activities of hands washing with soap by house hold mothers:

8; There is relationship

- Between hand washing with soap before meal and acariaisis.
- Between hand washing with soap before breast feeding to child and acariaisis.
- Between hand washing with soap before prepare meal and acariaisis.
- Between hand washing with soap before feeding to child and acariaisis.
- Beween hand washing with soap by mothers after each visit to latrine and ascariasis.
- Beween hand washing with soap by mohters after cleaning child defecation and ascariasis

CHAPTER 4

Research Methodology

Secondary data **(RFP No.HS-N/2007/001)** from Center for Health Research University of Indonesia (CHR-UI) coordination with UNICEF was used in this Study.

4.1. Study design:

Cross sectional study approach has been used to collect data from household mother. Quantitative data was collected by using predesigned finalized questionaire of Center for Health Research University of Indonesia with coordination of UNICEF.

4.2. Study site and time:

The study site of this study is Sikka district Nusa Tenggara Timor (NTT) Province September 2007.

4.3. Study population:

The general population is household mothers of Sikka District Timor Province who have chidren 12—59 months were recruitped in this study. Mother of children 12—59 months were the study subjects.

4.4 Study Sampling procedure:

The study sample is 640 which was calculated randomely by two population proportion formula which is following.

$$n = \frac{\left[z_{1-\alpha/2}\sqrt{2P(1-P)} + z_{1-\beta}\sqrt{P_1(1-P_1)+P_2(1-P_2)}\right]^2}{[P_1 - P_2]^2} * deff$$

α = 5 (level of significance)

β = 80 %(power)

P_1 = 0.52 (estimated proportion in exposed population)

P_2 = 0.44 (estimated proportion in nonexposed population)

4.5. Sample selection:

We randomely select 640 sample of 12-59 months age children by using of two population proportion (tow-sided test) formula with 80% power which is mention above.

In the previous study which was conduct by the Center of Health Research University of Indonesia (CHR-UI) multistage sampling proceduce had been approached. First 6 health center were stratified in each district, 2 health center was in centeral, 2 health center was in fariest and the other 2 is in between. In each Puskesmas (health center) 7 villages were selected. Then in each selected village 14 infant 0-6 moths and 16 child 12-59 months were randomely selected.

In Summery for each district, the sample was 6 puskesmas, 42 villages and 588 infant of 0-6 months and 635 children 12-59 months.

4.6. Eligible criteria;

Inclusion criteria: All household mother who have 12—59 months of age children lived in mentioned Sikka District.

Exclusion criteria: those mothers who did not provided consent.

4.7. Data collection:

In this study, the data previously collected, has been used as a secondary data according to study objectives..

The previous data which was collected by the Center of Health Rearch University of Indonesia (CHR-UI) with coordination of UNICEF by title of Baseline Study of Health and Nutrition Services and Community Knowledge, Attitudes and Practices

Relating to Health and Nutrition in SIKKA – NTT 2007 (RFP No.HS-uN/2007/001). This study is focusing only to those environmental sanitation and hygienic variables of household mothers which have relationship with Ascariasis among their under five years children of Sikka district.

4.8. Data processing and analysis:

In this study we used secondary data for univariate, bivariate and mutlivariate analysis. SPSS 13 analyse software was carried out to assess the household mother sanitation and hygienic factors based on association with Ascaris infection among their 12-59 months age of children.

CHAPTER 5

5.1. Result:

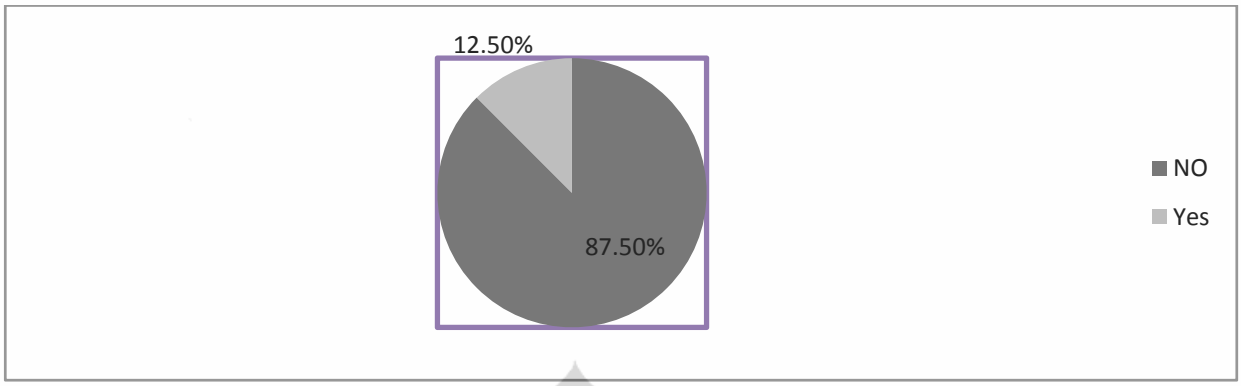
This study used data which was collected by the center of health research University of Indonesia the coordination with Unicef in 2007 (CHR-UI). The focus and purpose of this new study is to assess the relationship between sanitation and hygienic environmental factors among household mothers with Ascariasis among under five years children in the District of Sikka Nusa Tenggara Timor (NTT) Province, Indonesia.

Six hundred and forthy (640) samples aged 12-59 months participated in this study, Qualitative examintion of feces (a modification of the Kato-Katz technique) was conducted to diagnose worm infection whether eggs are positive in the feces or negative.

Table 5.1.1. Distribution of Ascariasis

Ascariasis	N	%
YES	80	12,50
NO	560	87,50
Total	640	100,00

Considering table 1 the children (12-59 months) old whose feces were examined and positive for Ascariasis were 80 (12.5%) and those children whose feces exam is negative for Ascariasis were 560 (87.5%). (Figure.5.1.1. Distribution of Ascariasis in Sikka district)



5.2. Univariate analysis:

Table.5.2.1. Univariate Analysis:

Variabel	Category	Percentage	Ascariasis cases
Characteristics of mothers:			
A;Age of mothers	<20 or > 49 years	2.5%	1.25%
	20—49 years	97.5%	98.75%
B;Education of mothers	Low	66.56%	71.25%
	Middle	31.10%	25.00%
	High	2.3%	3.72%
C; Mothers activity	Not working	67.80%	70%
	Working	32.20%	30%
Characterisics of children:			
A; Age of children	< 1year	0.31%	0.00%
	1—3 years	67.19%	67.50%
	> 3—5years	32.50%	32.50%
B, Nutritional Status of children	Under Nutrition	47.20%	48.75%
	Normal	52.80%	51.25%

Source of drinking water and time of hand washing with soap by household mothers:			
1; source of drinking water	Unsafe Safe	23.44% 76.56%	20.00% 80.00
2; Hand washing with soap before meal.	No Yes	47.34% 52.66%	45.00% 55.00%
3; Hand washing with soap before breast feeding.	No Yes	93.44% 6.56%	91.25% 8.75%
4; Hand washing with saop before feeding to child.	No Yes	91.40% 8.40%	92.50% 7.50%
5; Hand washing with soap before preparing food.	No Yes	87.00% 13.00%	88.75% 11.25%
6; Hand washing with soap after mother's defecation.	No Yes	72.65% 27.35%	60.00% 40.00%
7; Hand washing with soap after cleaning child defecation.	No Yes	75.78% 24.22%	58.75% 41.25%

According to mothers characteristics above table show that only 2.50% of mothers are in the age of unreproductive stage while a high percentage of mothers 97.50 % are in the age of reproduction.

Accoriding to the level of mothers' education only 2.30% mothers have high education but a high percentage of mothers are low education level.

In the categorization of children the smaller percentage (0,3%) is group of under one year while a highest percentage is the group of those children who are between the age of 1 and 3 years.

According to nutritional status of children almost half of the children 52.81% have normal nutritional status and half of those are 47.19% undernutrition.

According to source of drinking water 76.56% household mothers use safe water. Concerning hand washing with soap are as follow:

Not doing wash hands with soap befre meal is 47.34%, do not washing hand with soap before breast feeding 93.44%, do not washing hand before feeding to child 91.44%, do not washing hand before preparing food 87.00%, do not washing hands with soap after their own defecation 72.65% and do not washing hands with soap after cleaning child defecation is 75.75 % .

In conclusion most of household mothers do not have this habit to wash their hands with soap which could be suppor the prevalence of ascariasis.

5.3. Bivariate analysis (crosstabulation):

Table 5.3.1 bivariate analyse (cross tabulation):

	Ascariasis				Total	p
	Yes		No			
	N	%	N	%		
Age of mother						
<20 or >49 yrs	1	6,25	15	93,75	16	0,**707**
20-49 yrs	79	12,66	545	87,34	624	
mothers education						
Low	57	13,38	369	86,62	426	
Middle	20	10,05	179	89,95	199	0,346
High	3	20,00	12	80,00	15	
mothers activity						
not working	56	12,90	378	87,10	434	0,**749**
Working	24	11,65	182	88,35	206	
Age of children						
<1 yrs	0	0,00	2	100,00	2	
1-3 yrs	54	12,56	376	87,44	430	0,**707**
3-5 yrs	26	12,50	182	87,50	208	
child nutrition status						
under nutrition	39	12,91	263	87,09	302	0,**857**
Normal	41	12,13	297	87,87	338	
safe water drinking						
no safe	16	10,67	134	89,33	150	0,**526**
Safe	64	13,06	426	86,94	490	
washing hand before meal						
No	36	11,88	267	88,12	303	0,**742**
Yes	44	13,06	293	86,94	337	
washing hand before breastfeeding						
No	73	12,21	525	87,79	598	0,**546**
Yes	7	16,67	35	83,33	42	
washing hand before feeding child						
No	74	12,65	511	87,35	585	0,**873**
Yes	6	10,91	49	89,09	55	

washing hand before preparing food						
No	71	12,75	486	87,25	557	0,**756**
Yes	9	10,84	74	89,16	83	
washing hand after defacation						
No	48	10,32	417	89,68	465	0,010
Yes	32	18,29	143	81,71	175	
washing hand after cleaning childs defacation						
No	47	9,69	438	90,31	485	0,001
Yes	33	21,29	122	78,71	155	
Total	80	12,5	560	87,5	640	

The above table illustrates that:

6.25% children of those mothers who are not in their reproductive and their children have ascariasis while 12.66% children of those mothers are who are in their age of reproductive having children suffering from ascariasis but there in no significant difference(p=0.707).

According to level of education 13.38% children of those mothers who have low education(mean not complete primary education),10.05% children whose mothers have middle education(mean not complete junior high up to complete senior high) and 20.00 percent children where their mothers have high education (complete academic/university) have ascariasis, but significant difference are not found (p=0. 346).

According to the activity of mother for earning money (occupation) there are 12.9 % children who have ascariasis while their mothers do not work but 11,65 % children who are suffering from ascariasis while their motheres have work to earn money, but the significant difference was not found (p=0.749).

Accordring to the table chidren age was categorized into 3 stages: Children under one year (<1year), children whose age are between one to three years (1—3 years), and those children whose age are between three and to years (3—5 years).

<1year age children have 0 percent of ascariasis while 1—3 years children have 12,56 percent ascariasis and 3—5 years children have 12.50 percent of ascariasis but the p value is 0.707 so there is no significatn difference.

According to the status of nutrition there are 12.91 % undernutrition chidren who are suffering from ascariasis and 12.13 % children are with normal nutritional status, but

the significant differene among undernutrition and normal nurtion are not found (p=0.857).

According to the safe and unsafe water sources the mothers who used safe water source and their chidren have ascariasis 13.06 % while the mothers who are using non safe water source and their children have ascariasis 10.67 %, but there is no significant differnce (p=0.526).

Hand washing before meal was also considered in this bivariate analysis. There are 13.06 % children who are sufferingf from ascariasis while their mothers have the habit to wash hands before meal; 11,88 % are those children who are suffering form ascariasis but their mother do not have the habit to wash the hands before meal with p= 0.742 which is bigger than p= <0.05 so there is no significant difference.

Mothers who wash their hand before feeding and their children have ascariasis are 10.91 % and those who are not washing hand before feeding their child and their children have ascariasis 12.65 % but the p value is = 0.873 (no significant difference).

Hand washing before preparing food was also one of the question: the mothers who wash their hands befor preparing food 10. 84 % of their children have ascariasis while mothers who do not wash their hand before preparing food 12.75 % of their children are suffering from ascariasis but there was no significant difference (p= 0. 756).

Mothers who washed there hands after defecation, 18.29 % of their children were suffering from ascariasis while the mothers who do not washed their hands 10.32 % of their children are suffering from ascariasis. With **p=0.010. Significant difference was found**

Mothers who washed their hand after cleaning the child defecation 21.29 % of their children have ascariasis while mothers who do not wash their hands after cleaning the child defecation 9.69 % of their children have ascariasis. **Significant difference was found (p=0.001).**

5.4. Characteristics of mothers:

Table.5.4.1. Age of Mothers:

	Ascariasis	
	Yes	No
Age of mother		
N	80	560
Minimum	20	17
Maximum	63	50
Median	31	28
Mean	32	30
Standard Deviation	7	7

The minimum age of mother whose children feces exam were positive for Ascaris worm (80 mothers) is 20 years while the maximum is 63 years(mean 32 years, SD 7) and minimum age of mother whose children feces examination were negative (560 mothers) is 17 years and maximum is 50 years (mean 30 years, SD 7).

Table.5.4.2. Education of Mothers:

	Ascariasis					
	Yes		No		Total	
	N	%	N	%	n	%
Education of mother						
not school/illeterate	4	8,89	41	91,11	45	100,00
not complete primary	18	13,14	119	86,86	137	100,00
complete primary	29	15,18	162	84,82	191	100,00
not complete junior	6	11,32	47	88,68	53	100,00
complete junior	5	5,38	88	94,62	93	100,00
not complete senior	3	11,11	24	88,89	27	100,00
complete senior	12	15,19	67	84.81	79	100,00
not complete acad/univ	0	,00	2	100,00	2	100,00
complete acad/univ	3	23,08	10	76,92	13	100,00

Others	0	,00	0	,00	0	,00

Table.5.4.3. Distribution of mothers based on education category:

	Ascariasis					
	Yes		N0		Total	
	N	%	N	%	n	%
mothers education						
Low	57	13,38	369	86,62	426	100,00
Middle	20	10,05	179	89,95	199	100,00
High	3	20,00	12	80,00	15	100,00

Table.5.4.4. Activity /occupation of mothers (in earning money):

	Ascariasis					
	Yes		No		Total	
	N	%	N	%	N	%
Main activity of mother						
not working	56	12,90	378	87,10	434	100,00
Farmer	19	15,57	103	84,43	122	100,00
Crafman	0	,00	5	100	5	100,00
Merchant	0	,00	24	100,00	24	100,00
Home industrty	1	25,00	3	75,00	4	100,00
Govt employment	2	22,22	7	77,78	9	100,00
Army	0	,00	0	,00	0	,00
Private employment	0	,00	5	100,00	5	,00
Laborer	0	,00	23	100,00	23	100,00
In the area fo service	2	66,67	1	33,33	3	100,00
Private interpirze	0	,00	10	100,00	10	100,00
Indonesian labour force(TKI)	0	,00	1	100,00	1	,00
Others	0	,00	0	,00	0	,00

Table.5.4.5. Distribution of mothers based on category of activity/occupation (in earning money):

	Ascariasis					
	Yes		No		Total	
	N	%	N	%	N	%
mothers activity						
not working	56	12,90	378	87,10	434	100,00
Working	24	11,65	182	88,35	206	100,00

5.5.Characteristics of children:

Table.5.5.1. Age of children

	Ascariasis	
	Yes	No
Age of children months)		
N	80	560
Minimum	12	10
Maximum	60	59
Median	30	28
Mean	31	30
Standard Deviation	13	13

The minimum age of children who are suffering from ascariasis is 12 months while the maximum age is 60 months (mean=31,SD 13), while those children who do not suffering from ascariasis is almost the same.

Table. 5.5.2.Distribution of children based on category of age

	Ascariasis					
	Yes		No		Total	
	N	%	n	%	n	%
Age of children						
<1 yrs	0	0,00	2	100,00	2	,00
1-3 yrs	54	12,65	376	87,44	430	100,00
3-5 yrs	26	12,50	182	87,50	208	100,00

The children are categorized into three groups of age one

1. less than one year
2. second 1-3 years
3. third 3-5 years

The percentage of children who are suffering from ascariasis by age category compare to those children who are not suffering from ascariasis is very small.

5.6. Nutritional status of children:

Table.5.6.1.Nutritional status of children measured by Weight for Age (Z- score)

	Ascariasis	
	Yes	No
weight (kilo gram)		
N	80	560
Minimum	6,20	4,70
Maximum	15,10	19,90
Median	10,55	10,10
Mean	10,64	10,53
Standard Deviation	2,05	2,08
height (cm)		
N	80	560
Minimum	62,50	62,00
Maximum	99,50	113,00
Median	83,25	81,15
Mean	82,44	82,14

	8,99	8,91
Standard Deviation		

Weight per Age Z-score		
	Yes	No
N	80	560
Minimum	-3,74	-4,77
Maximum	,64	1,91
Median	-1,96	-1,93
Mean	-1,85	-1,90
Standard Deviation	,98	1,00

The above table shows that minimum z-score for those who are suffering from ascariasis measured by W/A is -3,74 and for those who are not suffering from ascariasis is -4,8, while the maximum z-score for those who are suffering from ascariasis is 0.6 while those who are not suffering from ascariasis is 1.91.

Table.5.6.2. Distribution of nutritional status of children (measured by Weight/ age) based on category.

	Ascariasis					
	Yes		No		Total	
	N	%	N	%	N	%
child nutritional status (W/A)						
under nutrition	39	12,91	263	87,09	302	100,00
Normal	41	12,13	297	87,87	338	100,00

5.7: Multivariate analysis (logistic regression):

Table.5.7.1. Multivariate analysis (logistic regression):

From bivariate analysis, variables with p< 0,25 and thought to be very important in substance are candidates for for multivariate logistic regression analysis. Those variables are

Education of mothers

Hand washing after defecation

Hand washing after cleaning child defecation

Model 1

Ascariasis	B	S.E.	Wald	p	OR	95%CI	
washing hand after defecation	-0,27	0,30	0,85	0,355	0,76	(0,43	1,36)
washing hand after cleaning childs defacation	-0,78	0,29	7,01	0,008	0,46	(0,26	0,82)
Education			1,82	0,403			
education(1)	-0,23	0,67	0,12	**0,728**	0,79	(0,21	2,96)
education(2)	-0,58	0,70	0,70	**0,403**	0,56	(0,14	2,19)
Constant	-0,90	0,67	1,81	0,178	0,41		

The large p should be excluded one by one: education, then hand washing after defecation. The result is found in Model 2. Further Model with the same way we found the result in Model3.

Model 2

Ascariasis	B	S.E.	Wald	p	OR	95%CI	
washing hand after defecation	-0,27	0,29	0,86	**0,355**	0,76	(0,43	1,35)
washing hand after cleaning childs defacation	-0,78	0,29	7,18	0,007	0,46	(0,26	0,81)
Constant	-1,22	0,22	32,16	0,000	0,29		

Model 3

Ascariasis	**B**	**S.E.**	**Wald**	**p**	**OR**	**95%CI**	
washing hand after cleaning childs defaecation	-0,92	0,25	13,77	0,000	**0,40**	(0,24	0,65)
Constant	-1,31	0,20	44,41	0,000	0,27		

The determinant variable in this study is a **hand washing with soap after cleaning the child defecation with p=0,000** and OR 0, 40 (protective). Mothers who have

this activity to wash their hands after cleaning child defecation are 0, 4 time greater chance to get thier children ascaris infection compare to those who do not have this activity to wash their hands after cleaning child defecation.

CHAPTER 6

6.1. Discussion:

Improvement in water supply (focus on water quality), sanitation services (promoting hand washing with soap is a particularly cost effective) and hygiene promotion (proper storage of human feces through the healthy toilet and tank systems) are the public health priorities which have important role to reduce the incidence of ascariasis (www.dcp2.org 2007).

According to WHO 3.1% of deaths (1.7 million) and 3.7 % of disability –adjusted-life-year (DALYs) (54.2 million) worldwide are attributed to unsafe water, sanitation and hygiene. In Africa and developing countries in South-East Asia 4—8 % of all diseases burden are attributed to these factors.

Most of the intestinal infections including ascariasis are spread and transmitted through the human excreta. The most effective way to reduce and eleminate this way of spread is public health approach (like washing hand after defecation and after cleaning the child defecation and construction sanitation facilities like safe water, health sewage feces system) to build primary barier which prevent the pathogen from entering to the environment(WHO 2000).

From public health point of view improvement in health sanitation and hygienc status can have a major affect on the incidence of intestinal infection like ascariasis among under five years children, because most of the ascariatic parasitic phemomen like abdominal distension, abdominal pain, anorexia, vomiting, intermittend diarrhea and partial or complete symptoms even though they do not present but the infection progress insidiously. In this case public health community can;t give attention and give priorities to this health problem so most individual of the population especially children which is the most vulanerable group may suffering from undernutrition and growth retardation health problems.

One to five years of age (1-5 years) is the period in which chidren have their rapid physical and mental growth which result in increase nutritional need due to rapid metabolism. Where these nutritional necessities are not adequately supply thus the available nutrition will be consumed by the foreign organism like intestinal worm. Therefore the child growth will be retarded, beside they suffer also from impaired congnitive function (mental problem), susceptible to secondary infection (due to immune compromised), Iron Difficiency Anemia and Vit A difficiency (Peter J el, al 2003).

6.2. Limitation of study:

1. As in this study we used secondary data for analysis (because lack of resources and time) thus the result of the secondary data some time do not correspond to the desire objective of the investigator.
2. While our outcome are concluded base on the secondary data which was collected earlier in 2007 by the Center of Health Research University of Indonesia (CHR-UI) with different purpose and aspect of study and different analysis indicators. By using secondary data the researcher could only analysis those variables which were in the former study.
3. In this study we use cross sectional approach so the cause and effect association will be underestimated.
4. Sample size (640) of children 12—59 months was randomly selected and we exclude all of those children whose age are 0-12 months because the occurrence of ascariasis among these children are scarce. This may influence on the outcome of analysis of this study.
5. Data was collected in Indonesian language and translated into English. If any phrase or words are not exactly the same with local terms this also will be limitation of the investigator.

6.3. Distribution of ascariasis

According to the distribution of ascaris infection among 12—59 months of children which was shown in chapter 5 table 1,total sixty hundred and forty (640) chidren samples age 12—59 months were participated in this cross sectional study. Qualitative examination of feces (modification of the Kato-Katz technique) was conducted to diagnose worm infection (ascariasis) on the presence of ascaris eggs in feces (positive or negative for ascaris worm infection) but the severity of the infection was based on the degree of worm eggs.

Among these 640 samples 80 (12.50%) sample of feces (age 12- 59 months) were positive for ascraris infection while 560 (87.50%) were negative from ascaris infection.

Survey over the period of 1970—1980 found that prevalences was more than 70 % for ascaris and Trichuris infections in Indonesia. But the prevalence were very low in Nusa Tenggara Timor (NTT) 10% for ascaris and only 1% for Trichuris infections, possibly because of the dry climate of this province which eradicate the development of eggs to the larve in soil (D.W.T. Crompton et,al 2003).

One another survey which was conducted by Department of Parasitology and Department of Nutrition Faculty of Medicine and Department of Experimental Psychology, Faculty of Psychology, Univesrsity of Indonesia in pre-school age children in northern Jakrata, Indonesia prevalence of ascariasis was varies from 60—90%(Pinardi hadidjaja et, al 1998).

6.4. Chararcteristics of mothers:

6.4.1. Age of mothers:

According to the descriptive univariate analyse, age of mothers which is shown in table 5.2.1chapter 5, children who are suffering from ascariasis are 80 children and their mothers minimum age is 20 and maximum age is 63 (mean 32, median 31, SD 7) while those children whose feces exam were negative for ascariasis are 560

children and their mothers minimum age is 17 and maximus age is 50 years(mean 30, median 28, SD 7).

Then we further categorised the mothers age based on their reproductive age that those mothers whose age is less than 20 years and above than 49 years(< 20 years or >49 years) is the age of their unreproducation and only 2.50% mothers are in unreproductive age and have less percentage 1.25% of children suffering from ascariasis, while most of mothers 97.50% are in the age of their reproduction between (20 – 49 years) and have children suffering from ascarias is highest percentage 98.75% which is shown in table 5.2.2 chapter 5.

When we analyse mother age through a bivariate analyse (cross tabulation) which is shown in table 5.5.1 indicate that only a small percent age of ascariasis (6.25 %) was seen in those children whose mothers age is below 20 years and above from 49 years, (<20 years or >49 years) compare to those mothers whose age is between 20-49 years and ascariasis are seen in their children feces exam 79 (12.70%) Thus the distribution of ascariasis occurrence is high among those children whose mothers age is between 20-49 years compare to those children whose mothers age is below 20 years and above 49 years (<20 or >49 years) . We can't find any research data in which the mothers age have influence in the occurrence of ascariasis among thier under five years age of children.

Age of mothers do not have significant differnce (P= 0.707), so we did not further analyse it through a multivariate logistic regression.

6.4.2 Education of mothers:

Throughout a univariat descriptive analysis which is shown in chapter 5 table 5.2.2. only 7.00% of mothers are illetrate and remain 93.00% mother have some education, but when we categorized this variable in low, middle and high level of education in table.5.2.3 chapter 5. It shows that 66.56% mothers have low education and have children 71.25% which are suffering from ascariassi, 31.10% mothers have middle

education and have 25.00% children which are suffering from ascariasis while only 2.3% mothers have high education and have children 3.72% who are suffering from ascariasis mean that mothers education have an important positive deviation among the occurrence of ascariasis in their under five years old children.

By bivariate analysis (crosstabulation) which is shown in table 5.5.1 chapter 5 elecit that mothers who have middle education level have small percentage of children 20 (10.05%) with ascariasis compare to those mothers who are educated have the highest percentage of children (20.00%) with ascariasis and the illeterate mothers who have the second high percentage of children 57 (13.40%) with ascariasis after the high educated level mothers in this group. Possibly the educated mothers are busy with their job which could not find time to take care of their children, may be the reason of high distribution of ascariasis among their children compare to the illetrate mothers in Sikka district.

In the above bivariate analysis we do not find the significant difference (P= 0.346),while mothers education is an important variable, thus mothers education will further analysis in the multivariate logistic regression.

We found the importance of this variable through another studies such as a study which was conducted by the University of Srinagar, Kashmir Department of Gasteroenterology SK Institute of Medical Science in 2010, it was found that maternal education have a significant association (P=< 0.05) with the prevalence of helminth infection, i.e., prevalence of infection decreases as the level of maternal education increases (Showkat ahmad et,al 2010).

According to another cross sectional discriptive study which was conducted in Luweero district, Uganda 2008 mother's education was the only variable among the socio-demographic characteristics associated with helminth infections (P = 0.006). The rate of helminth infection decreased while the mothers education increased(Rubinah Dumbah et, al 2008).

Well educated mothers are more conscious about personal hygiene and their health through the public media (radio, TV, newspapers and magazine)(Ahmad Khan et, al 2004).

6.4.3. Activity/ occupation of mothers (in earning money):

According to the activity/occupation of mothers which is shown in table 5.2.4 chapter 5, we categorized this varaibe in tow groups. Mothers who are working and mothers who are not working. Mothers who are not working is 67.80% and have children with ascariasis 70.00% while those mothers who are working is 32.20% and have children which are sufferingf from ascariasis 30.00%. It means that the mothers who are not working have high percentage of children suffering from ascariasis compare to those mothers who are working.

Through a bivariate analysis (cross tabulation) which was shown in table 5.5.1 chapter 5. Mothers who do not work mean do not have any activity / occupation to earn money have children 56 (12.90 %) with ascariasis compare to those mothers who work mean have activity to earn money have children 24 (11.65 %) with ascariasis, so here the mothers who are working have slighty less percentage of children with ascariasis compare to those mothers who are not working. Activity of mothers do not have any influence in the occurrence of ascariasis among their children through a bivariate analysis (p=0.749).

There is no data which show the importance of mother activity against the occurrence of ascariasis in their children.

P value =0.749 significant difference was not found so this variable also exclude from multivariate logistic regression analysis.

6.5. Characteristics of children:

6.5.1. Age of children (months):

According to table 5.3.1 chapter 5 the minimum age of those children who are suffering from ascariasis was 12 months, maximum 60 months (mean=31, median=30., SD =13) and the minimum age for those children who were not suffering from ascariasis is 10 months maximum 59 months (mean=30, median=28, SD= 13).

But in table 5.3.2 when we further distribute the age of children based on age category into three groups: first less than one year (<1 years), second between one and three years (1- 3 years), third between three and five yeas(3—5 years), the percentage of children whose age is less than one year is very low only 0.30% and on one is suffering from ascariasis, but those children whose age is between one and three years is a high percentage 76.25 % and 67.50% of those are suffering from ascariasis, while those children whose age is between three and five years are 32.50% and 32.50% have ascariasis.

From bivariate analysis (cross tabulation) we find result which is shown in table 5.5.1 chapter 5 children whose age is less than one year no one is suffering from ascariasis in this group, but those children whose age is between one and three years and have ascariasis 54 (12.56 %) but those children whose age was between three and five years and they were suffering from ascariasis 26 (12.50%) . As we do not found the significant difference (p= 0.346), so we exclude this variable from multivarialte analysis logsitic regression.

Comparing the mean age category of children those who have ascariasis compare to those who do not have ascariasis the percentage is very small. The age of children do not have any influene in the occurrence of ascariasis in this study.

But other studies shows that age of children have an important role in the occurrence of intestinal helminths infections(ascariasis), such as a study which was conducted in Gurez Valley of Jammu and Kashmir, State India in December 2008 show the highest prevalence of infection in the age group of 11-15 years (84.91%) followed by the age group of 6-10 years (81.70%) and age group of 0-5 years (50.54%) [$P<0.05$].

This study indicated that the prevalence (84.91%) of intestinal parasites among children 11-15 years age in Gurez Valleyis is the highest.

The high prevalence of intestinal helminthiasis (72 %) among schoolchildren was also reported in one of study from public institution of Maracaibo in 2008.

Venezuela and Legesse and Erko (2004) also noted a high prevalence (88.2%) among schoolchildren in rural Ethiopia.

Another similar age-related prevalence variation among schoolchildren has been reported by other investigators. For example, Ibrahim (2002) in Gaza, Palestine, showed that most positive cases were clustered in the middle age group, followed by the 8- 9-years age groups (Showkat Ahmad et, et al 2010).

A similar cross sectional survey which was conducted in Ode-Remo town of Nigeria in 2008 found that the distributions of helminth infection among age group in preschool children demonstrate a similar result that helmiths infection increases with the meanage of children increase. The peak prevalence occur in children between four to five years (48- 60 months)(Tamramat lyabo Runsewe- Abiodun et, al 2008).

Table. 6.5.1.1. Age –specific prevalence of Ascaris infestation:

Ascaris	6—11 months 8	12—17 months 9	18—23 months 11	24—35 months 12	36—47 months 14	**48—60 months** **32**	Total 80

The highest prevalence of ascariasis among this 48- 60 months age of children are due to their habit of playing on the soil and putting every thing in their mouth and even some of them have the habit of pica (Ahmad Khan et, al 2004).

6.5.2. Nutritional status:

In univariate descriptive analysis the nutritional status of children were measured by Weight for Age (Z-scrore) in table 5.3.3 chapter 5. The minimum z-score weight for age for those children who were suffering from ascariasis was -3.73 maximum 0.64 (mean= -1.85, median= -1.96, SD= 0.98) and minimium z-score weight for age was -4.77 for those children who were not suffering from ascariasis and maximum 1.91 (mean= -1.90, median= -1.93, SD= 1.00),

But when we disributed the age of children according to the category of undernutrition and normal nutrition in table 5.3.4 chapter 5 it show that 47.20% of children are undernutrition and 48.75% have ascariasis while remain 52.80% of children are normal and 51.25% have ascariasis.

But when we further analyse the nutritional status of children with ascariasis and those children without ascariasis through a bivariate (crosstabulation) which is elecit in table 5.7 .1 chapter 5, we find this result: the children who are nudernutrition and have 39(12.91 %) ascariasis and the children whose nutritional status is normal approximately also have the same percentage of ascariasis 41(12.13%). The nutritional status of children in this study do not have any influence in the occurance of ascariasis among 12—59 months of children which was shown in bivariate analysis (p= 0.875), so we exclude this variable too from analysing through a multivariate logistic regression.

A study which was conducted in 2004 among pacific Island school children result of multivariate analysis determine the association between helminthiasis and nutritional status. The majority of anthopometric indices demonstrated and association with helminthiasis and to a lesser extent anemia. Children with helminthiasis were found to be 3.6 times more likely to be stunted, 2.4 times more likely to be underweight and 2.0 times to be more likely aneamic compare to those children with no helminthiasis(R.G. HUGHES et,al 2004).

In another cross sectional study which was conducted in Ode-Remo town of Nigeria in 2008 show a relationship between nutritional status and infection. Of 116 children

with positive helminth in their stool, 86(74.1%) were under-nourished,69 (80.20%) of them were malnutrition, 16 (18.6%) moderate and 1(1.2%) severe malnutrition. There is a statistically significant relationship between infection and malnutriton (p= 0.02) (Tamramat lyabo Runsewe- Abiodun et, al 2008).

But there was no data which show the influence of nutritional status among the occurrence of ascariasis in under five years children

6.6. Source of drinking water and hand washing with soap:

6.6.1. Water source (safe and unsafe source of dirnking water):

According to univariate analysis which was shown in table 5.4 chapter 5, we categorized source of drinking water which currently used by household mother of Sikka district in tow category one those household mothers who used unsafe water are 23.44% have children which are suffering from ascarisis 20.00%, second those who use safe water are 76.56% have children which are suffering from ascariasis 80.00%.

When we further analyse this variable (unsafe water and safe water for drinking) through a bivariate analysis (crosstabulation) in table 5.5 chapter 5 we find that the mothers who use unsafe water have children with ascariasis 16(10.70%) but those mothers who use safe water conversely have high percentage of children 64 (13.06%) with ascariasis,which show no significant association between the independent variable of safe water drinking and ascariasis p= 0.526.

While here we do not found the significant difference (p= 0.526) so we do not analyse this variable further through a multivariate analysis (logistic regression).

The study which was done in Hyderabad India show that unsafe water increasing risk of ascariasis (OR= 5.3, 95%, CI= 2.0—14) (Jeroen H.J 2008).

Another study which was conducted in Gurez Valley, out of 352 children surveyed, 265 (75.28%) were positive for intestinal helminths. The Prevalence of ascariasis

was 71.87 % and water source was a significant risk factor in predicting intestinal helminthiasis (ascaris) (p=<0.05) (Showkat Ahmad et, et al 2010).

Another cohort study in 2005—2006 which was conducted in rural area of southern Ethiopia 908 mothers and 905 infant were recruited in this study. The only factor associated with soil transmittd helminth infections (STHI) in infants was household source of water. It was found the greatest risk in those household using unsafe water (river water or steam water) compare to those using safe waters(piped water, inside the compound) (p = 0.002).

One cross sectional study which was conducted in Uttar Pradesh and Jharkhand India, 926 children were recruited and 909 samples examined to estimate prevalence and risk factor of geohelminths and other intestinal helminths parasites in children aged 6—23 months, Sources of drinking water were also analyzed in this study and strong correlation were found between unsafe water intake of hand pump water (OR = 1.79, 95% CI =1.36-2.35, $P < 0.001$) and occurrence of infection. There is also found association of sources of unsafe water with infection of (ring-well water and river water)(Awasthi S et,al 2008).

It was declared in the fifty-eight world health assembly in 22 May 2010 that safe water, sanitation are essential, With repeated chemotheraphy and regular interval ensures that the level of ascaris infection kept below those associated with morbidity, and improve health and developement, especialy in children(WHO 2005).

Based on WHO data 3.1 % of deaths (1.7 million) and 3.7% of disability-adjusted-life –years (DALYs) (54.2 million) worldwide are attributed to unsafe water,sanitation and hygience. In Africa and developing country of South East Asia 4—8 % of all disease burdens are attributed to these factors. Over 99.8% of all deaths attributable to these factors occur in developing countries and 90 % are deaths of children. A study in 1986 emphasized that 77 % of studies which looked at sanitation alone 75 % of those which considered sanitation and water supply,

demonstrated positive health benefits, compared to 48% percent of those considered water supply alone (WHO 2000).

6.6.2. Washing hand with soap before meal:

Table 5.4 chapter 5 elecit that 47.34% househol mothers do not have habit to wash their hand with soap before meal and have children with ascariasis 45.00% while remain 52.66% house hold mothers have habit to wash their hand before meal and have children 55.00% which are from ascariasis.

When we further analyse the same variable throughout a bivariate analysis or (crosstabulation) which is shown in table 5.5 chapter 5, we found the result that those mothers who wash their hand before meal and have children with ascariasis 44 (13.06 %) but mothers who did not have habit to wash their hand with soap before meal and have children which are suffer ascariasis 36 (**11.88 %**). No significant difference was found (p= 0.742 which is more than <0.05). It means that in this study the habit of mothers habit in hand washing before meal do not have any influence in the occurrence of ascariasis among under five years children of Sikka district.

So we exclude the above variable from mutivariate analysis (logistic regression).

Hand washing before preparing food is important in public health hygiene because the eggs of ascaris are transmitted through a fecal-oral route and globally about 10(14) eggs of ascaris pass to the environment. Egg survival is not the same (variaty) but some can survive up to 15 years. Because the eggs are sticky they can be found on door handles, money, fruits, vegetables, furnitures, cooking utensils, finger and under fingernails. Hence in a country such is Indonesia,a developing and tropic country, eggs are likely to be ubiquitous(C.G.N .Mascie- Taylor et, al 2003).

In one of Keynesian study it was also found that household without soap had 2.6 times higher risk of being infected with Ascaris Lumbircoides compared to those household where soap was available (S Awasthi et,al 2008).

6.6.3. Hand washing with soap before breast feeding to child:

The independent variable washing hand with soap before breast feeding which is analyse in table 5.4 chapter 5 through an univariate analysis show that 93.44% mothers do not washed their hand before breast feeding and have children which are suffering from ascariasis 91.25% while those mother who wash their hand with soap before breast feeding to their children are 6.56% and have children which are suffering from ascariasis 8.75%.

But in bivariate anlysis or (crosstabulation) we found that those mothers who washed their hand before breast feeding and their children have ascariasis 7 (16.67%),but those mothers who do not wash their hands with soap and have children suffering from ascariasis in 73 (12.21%) .

But mothers who do not have habit to wash their hand before breast feeding and their children are suffering from ascariasis is a little less percentage 73 (12.20 %).

In this study hand washing with soap befere feeding to children by house hold mothers do not have any infuence in the occurrence of ascariasis among under five years old children(p value 0.546).

But conversely to this study one cross sectional survey which was conducted in Gurez Valley of Jammu and Kashmir state of India, personal hygiene was significant risk factors in predicting the intestinal helminth infection ($P<0.05$)

From public health aspect, the eggs of ascaris are very scattered every where especially in a country like indonesia where the climate of this country is feasible for high breeds of ascaris eggs. Thus household mothers are facing to these eggs everywhere in their environment. These eggs are sticky and adhere to their hands so before breast feeding mothers should wash thier hands with soap to cut the transmission of ascaris egg through the contaminated hands((C.G.N .Mascie- Taylor et, al 2003).

While we can't find the significant difference (p=0.546) here through a bivariate analysis (crosstabulation) we did not include this variable into the multivariate (logistic regression) analysis process to this mention variable.

6.6.4. Hand washing with soap before feeding the child:

As we conduct univariate analyse that 91.40% mothers do not wash their hands with soap before feeding the child and their children have ascariasis 92.50%, while remain 8.60% mothers have habit to wash their hands with soap before feeding to their children and have children with ascarariasis 7.50%.

According to bivariate analysis (cross tabulation) we found the result that the mothers who wash their hands with soap before feeding to their child and their children have ascariasis 6 (10.90 %), but those mothers who do not have this habit to wash their hand with soap befero feeing to thier children while their children have ascariasis 74 (12.65 %) . Those mothers who have habit to wash their hands before feeding to their children have relatively less percentage of children with ascariasis compare to those mothers who do not have this habit but in bivariate analyse we did not found the significant difference p= 0.873.

Similar study which was conducted in Butajira, Ethiopica on 2010 showed a significantly high prevalence of helminth infection among subjects who rarely washed their hands with soap compared to those who washed their hands regularly(OR = 1.40, 95 % CI 1.04 – 1.88 for infrequent users compare with daily users, p for trend = 0.018)(Yashambel Belyhum et, al 2010).

6.6.5. Hand washing with soap before preparing food:

It is elecit in chapter 5 table 5.4.1that 87.00% mothers do not wash their hands with soap before preparing food and have chidren with ascariasis 88.75% while 13.00% mothers wash their hand with soap befere to prepare the food and have children 11.25% with ascariasis.

In bivariate analysis table 5.5 chapter 5 we found the result that those mothers who wash their hands with soap before preparing food and have children with ascariasis 9 (10.84 %) but those mothers who do not wash their hands with soap before preparing food and have children with ascariasis 71 (12.75 %) . Here also those mothers who do not have habit to wash their hands with soap before preparing food have a little high percentage of children with ascariasis compare to those mothers who have this habit but the significant difference was not found p=0.756.

In one of the cohort study in 2005—2006 which was conduct in rural area of southern Ethiopia 908 mothers and 905 infant were recruited in this study. The prevalence of Soil transmitted helmith infections was 43.5 % (95% confidence interval(CI) 40.2—46.8) in mothers and 4.9% (95% CI 3.3—6.5%) in children. In the fully adjusted regression model, infrequent use of soap by the mothers was associated with increase risk of soil transmitted helminth infections (OR 0.45, 95% CI 0.28-0.73, p = 0.001) in their child(Yeshambel Belyhum et, al 2010).

While from public health aspect the eggs of ascaris are ubiquitous in the environment; these eggs are sticky and make adhesion with hands so before preparing foods the household mother should wash hand with soap to cut the transmission of ascaris egg through contaminated hands to their children.(C.G.N .Mascie- Taylor et, al 2003).

6.6.6. Hand washing with soap after defecation:

According to table 5.4 chapter 5 in univariate analysis show that 72.65% mothers do not wash their hand with soap after their visit to latrine and have children with ascariasis 60.00% while 27.35% mothers have this habit to wash their hands with soap after each defecation and have children 40.00% who are suffering from ascariasis.

Throughout a bivariate analyse (crosstabulation) which is shown in table 5.5 chapter 5 we found that those mothers who wash their hands with soap after their own

defecation and have children suffering from ascariasis 32 (18.30 %) , but the mothers who do not have this habit to wash their hands after defecation and have children with ascariasis 48 (10.32%). So the interpretation of this variable in this study is contradiction to the expectation and idea of researcher meaning that those mothers who have the habit to wash their hands with soap after their own defecation have high percentage of children(18.30%) with ascariasis compare to those mothers who do not have to wash their hands with soap after the defecation and have children with ascariasis (10.32 %),as we found the significant difference(p= 0.010) in this bivariate analyse we further analyse it through a multivariate (logictic regression).

In a cross sectional discreptive study which was conducted in Luweero district, Uganda 2008 showed that hand washing with soap after each visit of mothers to latrines have a significant association (P = 0.006) with helminth infections (Rubinah Dumbah et, al 2008).

In one other cross sectional study which was conducted in Uttar Pradesh and Jharkhand, India 926 children were recruited and 909 samples examined to estimate the risk factor hand washing with soap after the latrin visit with geohelminths (ascariasis) and other intestinal helminths parasites in children age 6—23 months showed that an exclusive use of soap and water practice after defecation was protective for any geohelminths infection (OR = 0.54, CI = 0.40—0.73, p= 0.001) (Awasthi S et,al 2008).

6.6.7. Hands washing with soap after cleaning child defecation:

As it was previously elecit in univariate analyse table 5.4 chapter 5 that 75.75% mothers do not wash their hands with soap after cleaning the child defecation and have children with ascariasis 58.75% while 24.22% mothers have this habit to wash their hands with soap after cleaning the child defecation and have children 41.25% with ascariasis.

But when we further analyse this independent variable throughout a bivariate analyse (cross tabulation) table 5.5 chapter 5 we get the result that those mothers who wash their hands with soap after cleaning the child defecation and have children with ascariasis 33 (21.30 %), but those mothers who do not have this habit to wash their hands with soap after cleaning the child defecation and their children have ascariasis 47 (9.70 %). It means that the mothers who have this habit to wash their hand with soap after cleaning the child defecation but they have high percentage (21.30 %) of children with ascariasis compare to those mothers who have less percentage of children with ascariasis (9.70 %) although they do not wash their hands with soap after cleaning the child defecation , but in bivariate analyse (cross tabulation) we found the significant difference so we push this variable for further analysis through a multivarite (logistic regression) analysis.

Through multivariate analysis it was found that handwashing with soap after cleaning child defecation is the dominant variable in this study. This result is in line with the Ministry of Health;s nutrition program priorities in dealing with maternal and child undernutrition that is: Behavior changed intervention which consist of 3 activities: 1. Breastfeeding promotion and support 2.Complementary feeding promotion and 3. **Hand washing with soap** and promotion of hygiene (Men kes RI, 2010 ministry of public health republic of Indonesia).

With OR 0.40(protective) mean mother who do not wash hands with soap have 0.4 times chance to have ascariasis. In the primary data it was not stated the validity and reliability of the questionier. Is it due to the quality of data? Other reason may be due to how washing hand with soap was detected in the original research: based only on observation whether soap can be found or not at location and can directly show in one minute(page 14 question G106),further question about washing hand will be succesively asked. Proper hygienic method of handwashing with soap has steps: 1. Washing of hands with soap in the flash water 2. Clean the palm, wrist hand, between the fingers and back of hand for at least 20 second 3. After that dry it with

the towel (Center of Health Promotion Ministry of Health Republic of Indonesia 2010) that should be followed. Could this also be another reason?

One cross sectional disrcriptive study which was conducted in Luweero district, Uganda 2008 to investigate risk factors that promote helminth infections among under five years of age in mention district the factor which is significantly associated (P = 0.006)with helminth infections after being adjusted is hand washing with soap ; those mothers who did not wash their hand with soap after handling children's faeces were significantly more likely to be infected with intestinal infections than those whose mothers washed using soap (Adj. OR = 1.79; 95% CI = 1.03–3.11). Evidently, the mothers who did not wash hands or washed without soap after cleaning the child defecation could have contaminated the food children were eating (Rubinah Dumbah et, al 2008).

CHAPTER 7

CONCLUSION AND RECOMMENDATION:

7.1. Conclusion:

This study is aimed to assess sanitation and hygienic status in house hold mothers and it's association to Ascariasis in their under five years old children of Sikka district Nusa Tenggara Timor (NTT) province by using of secondary data which was previously collected by Center of Health Research University of Indonesia (CHR-UI) and coordination of UNICEF.

1: The prevalence of ascariasis in NTT Province district of Sikka is 12.5% in under five years old of children in this cross sectional study.

2: There is no significance difference between characteristics of mothers (age, activity/occupation and education) with ascariasis among their under five years old children of Sikka district.

3: There is no significance difference between characteristics of children (age and nutritional status) with ascariasis among their under five years old children.

4: There is no significant difference between the house hold mothers source of water drinking (unsafe and safe) with ascariasis among their under five years old children of Sikka district.

5: There is no significant difference between the activities of hand washing with soap by mothers (before meal, before breast feeding, before preparing food, before feeding to child) with ascariasis among their under five years old children of Sikka district.

6: There is a **significant difference** between the activity of hand washing with soap after each visit of mothers to latrine and ascariasis among their under five years old children of Sikka district.

7: There is a **significant difference** between the activity of hand washing with soap by mothers and ascariasis among their under five year old children of Sikka district.

8: The dominant factor related to ascariasis is the activity of hand washing with soap by mothers after cleaning the child defecation with (OR 0.40) the mothers who wash their hands after cleaning their child defecation have 0.4 greater chance that their children get ascariasis compare to those who do not wash their hands with soap.

7.2. Recommendation:

The result of this study shown that sanitation and hygiene do not have significant association with ascariasis in household mothers in Nusa Tengara Timor (NTT) district of Sikka who have under five years children. But we find much health survey which had mentioned in discussion chapter 6, that sanitation and hygiene are the most dominant factors which have significant association to ascariasis, so we suggest the following recommondation points:

1: Although the prevalence of ascariasis in Sikka district is only 12.50% but we suggest to the local government of NTT District of Sikka to consider the deworming of population in their public health policy to prevent the transmission of ascariasis from infected host to non infected host.

2: Although there is no significatn difference between the education of mothers and ascariasis in this cross sectional study but the characteristic of mothers education have closed association to ascariasis among their under five years old children which is mentioned in discussion chapter5. So we kindly suggest to local government of NTT province to give more attention about the education of mothers because educated motheres are more conscious about their and their children hygienc and sanitation who can easily get information from public media (radio, TV, newspapers, magazine) and etc.

3: The result of this study showed that there is no significant difference between house hold mothers sanitation and hygiene with ascariasis. As the eggs of ascaris are ubiquitous in Indonesia and sticky which were adhere with hands, so the most feasible and sustainable option for improving public health in developing countries is proper hygiene system to decrease the prevalence and transmission of intestinal ascariasis. We also suggest to the government of NTT to promote the house hold hygiene systems.

4: Although in this cross sectional research study we do not study further about toilets and it association to ascariasis while the proper storage of human feces is also one of the important activities through a public health aspect, so we suggest to the local government of Sikka District to built flash system toilets with appropriate tanks to population.

5: In this research study we also do not have data about the personal hygiene fo children but washing hand with soap have a particular method so we also suggest to center of health promotion ministry of health that educate and informed all of house hold mothrs and school children about this procedure to eliminate the parasite.

6: After the analzing of this secondary data we are not sure about the quality of this data, so we kindly suggest to the Center of Health Research University of Indonesia (CHR-UI) and Ministry of Public Health Republic of Indonesia to conduct other survey to know the potential confounder.

REFERENCES

1. Showkat Ahmad wani, Fayaz Ahmad, Shoukat Ali Zargar, Ayesha amin, Zubair Ahmad Dar & Pervaiz Ahmad Dar 2010 Clinical epidemiology

   PG department of Zoology the University of Kashmir and, Department of Gasteroenterology, SK Institute of Medical Science, Sarinagar Kashmir

   http://www.jgid.org

2. Jeffrey Bethony, Simon Broker, Marco Albonico, Stefan M Geiger, Alex Loukas, David Diemert, Peter j Hoterz 2006
   Soil Transmitted Helminth Infection: Ascariasis, Trichuriasis and Hook worm
   Cited Lancet 2006; 367: 1521- 32
   Department of Microbiology, Immunology and Tropical Medicine the George Washington University Washington DC 20037 USA .
3. David R Haburchak MD, 2008 " Overview of Ascariasis differential Diagnosis & work up, Treatment & Medication, Follow up & Multimedia of Ascariasis
   Prefece Department of Internal medicine, Division of infection disease, Medical College of Georgia
   http:// emedicine.medscape.com/article/175667, Overview.
4. Haburchak, D. R. (2010, May 24). Retrieved July 09, 2010, from http://en.Wikipedia.org/Wiki/ Ascaris.
5. William H. Shoff MD, DMM &H, Suzzane Moore Shepherd, Micheale E Greenberg.

   Director PEEN Travel Medicine Associate Professor, Department of emergency Medicine Hospital of the University of Pensylvania

   [pubmed Index for copy right©]

   http:// emedicine.medscape.com/article/996482 follow up.

6. Peter Njsum, E. Davis, Parker, Jr jane, Frydenbert 2005 Journal of clinical Ascariasis is a Zoonosis in Denmark

   http:// jcim.asm.org/ cgi/ content/ full/143/3/1142

7. Introduction of Ascaris lumbricoide
   http://www.stanford.edu/class/humbio103/ParaSites2005/Ascaris/JLora_ParaSite.htm
8. Peter j, Nilanthi de Silva, Simoon Brooker & Jeffery Bethony (2003) Soil Transmitted Helminth Helminths
   Condition: Disease control Priorities Project Working paper No.3
   Department of Microbiology and Tropical Medicine The George Washington University Washington DC 20037
   http://www.fic.nih.gov/dcpp
9. Round worm Ascariasis Hubpage 2010 respective owner
   http://Hubpage.com/hub/Basic -information-about-Ascariasis
10. Wani, Mudasir, Ghulam Nika, Abid Amin, Syed Mushtaq & Mir Nazir 2010 intestinal Ascariasis in children
    World Journal of Surgery D 0110.1007/500268-010-0450-3(pp-2-6).
11. Richard K Giliary, Sandeep Mukhar jee, Jean Fredrick Botha 2009
    Associate Professor, Medical Director of Liver Transplantation and Hepatology, Department of Internal Medicine, Kanan University Manchester
    [pop.Med.Index for MIDLINE]
    http:// emedicine.medscape.com/article/171265-Treatment
12. Marc D Basson July 30 2008
    Professor Chair, Department of Surgery Michigan University
    [pop.Med.Index for MEDLINE]
    http:// emedicine.medscape.com/article/172774-overview
13. Timothy B Gardner, Brang Berk 2010 Acute Panceatitis
    Darmuth Hitchock Medical center
    [pop.Med.Index for MEDLINE]

http://emedicine.medscape.com/article/181364-overview

14. Burka A cunha, MD 2010 " Pneoumonia community –acquired"
    Professor of Medicine, State univesity of New York school of Medicine at Stony Brook, Chief infection Disease Division, Winthrop-University Hospital
    [pop.Med.Index for MEDLINE]
    http://emedicine.med.com/article/234240-overview
15. Unicef joint state with world health orgonization about "worms prevention"
    http://www.who.int/worm control/documents/joint-statement/en/ppc-uincef-Final report.pdf
16. World Health Orgonization"Prevention of Ascariasis"
    http://www.who.int/trs/who-TRS-749pfd
17. A Montresor, D.W.T. Crompton TW. Gyorkos, L. Savloli 2002
    World Health Orgonization, Genewa, Switzerland
    Health controle in School-age children
    Aquide for manager of controle programmines
    http://who.int/worm control/docoment/en/itoviii.pdf
18. D.W.T. Crompton, A. Montresor, M.C.Neshelim, L.savioll 2003
    Controlling disease due to helminth infections
    World Health Orgonization, Genewa
    http://www.who.int/worm control/documents/en/controlling Helminth.pdf
19. Peter J, Hotez, Nilanthide Silva, Simon Broker, Jeffery Bothony
    Soil Transmitted Helminth infection:
    The Nature, Causes, and Burden of the condition
    DCPP Working.paper, No3 March 2003
    http://www.dcp2.org/File/19/wp2.pdf
20. Macro Albonico 2008
    Controlling Soil Transmitted Helminthiasis in Pre school-age children through preventive chemotheraphy
    http://journal.cambrige.org/production/action/cjo Getfull text? fulltext...

21. DISEASE CONTROLE PRIORITIES PROJECT May 2007
Water, Sanitation and Hyiegene:
Simple effective solution save lives
www.dcp2.org/file/81/DCPP.Water.pdf
22. WHO SANITATION AND HYGIENE PROMOTION –GENERAL-PRINCIPLES 2000
http://www.who.int/Water-Sanitation -health/ Hygiene/ san hug promo 1.pdf
23. Ahmad Khan, Abida Sultana, Abdul Majid Khan, Dar Haroon Rashid and Syed Abdul Ahad Najmi
AStudy of Prevalence, Distribution and Risk factors of Intestinal Helminthic infection in District Bash (AZAD KASHMIR).
Pakistan Armed forces Medical Journal A Journal of Medical Corporation.
htt://www.Paf mj.org/show detail php 3rd = 4&t= f
24. Yashambel Belyhum, Girmay Medhin, Alemayehu, and Amberbir 2010
Prevalence and risk factors for Soil- Transmitted Helminth infection in mother and their infants in Butjira, Ethiopica a population based study PMCID: PMC 2835680 BMC Public Health 2010; 10: 21.
Copy right © 2010 Belheun et, al : Liniensec Bio Med Central LTD.
http:// www.ncbi.nim.nih.gov/pmc/article/PMC 28355680
25. Awasti. S, Vermat, Kotecha pv, Venkatesh v, Joshiv & Roys, 20 December 2008
Prevalence and Risk factors associated with worm infectation in Pre-school Children (6-23 months) in selected blockof Uttar Pradish and jharkhand, India
Indian Journal of Medical Science vol 62, No 12, December 2008, PP. 484-491
http:// www.bioline.org.br/ reques? Mso8088
26. Disease and disability Id 21 health highlight to 23
Research finding for development policymakers& productioner
Id 21 Institute of development Studies University of Sussex Brighton, BNI 9RE 4K E id 21 @ids.ac.uk
http://www.dfid.org.uk/rud/PDF/outputs/IDS/disease disability 23.pdf
27. D.W.T Crompton, A. Montresor, M.C. Nesheim & L. Savioli 2003

Controlling Disease due to helminth infection WORLD HEALTH ORGONIZATION GENEWA
http://whqlibdoc.who.int/publications/2003/9241562390.pdf

28. Rubinah Dumbah, John B Kaddu and Fred Wabwire Mangen 2008
Intestinal Helminth in Luweero district, Uganda
African Health Science Makerere Medical School
Pub Med Central Journal PMCID: PMC 2584320
http://www.ncbi.nlm.nih.gov/Article/PMC2584320
29. Tamramat Lyabo Runsewe. Abiodun and Olowu Adebiyi 2008
"Study on prevalence and Nutrition effect of Helminth infection in pre school Rural children in Nigeria
Nigerian Medical Practitioners vol-54 No1, 2008 (16-20)
http://www.ajol.info/index.php/nmp/article/viewfile/28944138082
30. R.G.HUGHES,D.S.SHARP,M.C.HUGHES 2004
"Environmental Influence on helminthiasis and Nutritional status among pacific School children
International Journal of Environmental Health Research 14 (3), 163-177 (June 2004)
http://www.pdfserve.informaworld.com/513445-713682540.pdf
31. C.G.N.Mascie-Taylor, R Karim.E Karim.S Akhtar, T Ahmad & K.M Montmari 2003
" The cost effectiveness of Health education in improving knowledge and awarness about intestinal parasite in rural Bangladish Economic & Human Biology (2003) 321-330
http://www.sciencedirect.com/science
32. WHO SANITATION AND HYGIENE PROMOTION GENERAL PRINCIPLES 2000
http://www.apps.who.int/gb/archive/pdf_files/WHA54/ea54r19.pdf
33. FIFY-EIGHT WORLD HEALTH ASSEMBLY GENNEVA, 16-25 MAY 2005 RESOLUTION AND DECISION ANNEX
http://apps.who.int/gb/ebwha/pdf_files/WHA58-REC1/A58_2005_REC1-en.pdf

34. Pinardi Hadidjaja, Engelina Bonang, M. Arifin Suyardi, S. Alisa N, Abidin, Is Suhariah Ismid and Sri S. Margono 1998
"the effect of intervention methods on Nutritional status and Cognitive function of Primary School children infected with Ascaris Lumbricoides"
Department of Parasitology and Department of Nutrition, Faculty of Medicine and Department of Experimental Psychology, Faculty of Psychology, Unviersity of Indonesia
http://www.ajtmh.org/cgi/reprint/59/5/791.pdf
35. Jessika Lora, Karin leder and Peter F. Waller's 2005
Up To Date review of Ascariasis.
http://www.stanford.edu/class/humbio103/ParaSites2005/Ascaris/JLora_ParaSite.htm
36. Men kes RI, 2010
Nutrition Program Prioties in dealing with Maternal and child Undernutrition in Idnonesia
FORUM PAKARE RE.3 18 NOVEMBER 2010 ACACIA HOTEL JAKARTA
37. CENTER OF HEALTH PROMOTION 2010
Hand washing with soap with a clean running water
CENTER FOR HEALTH PROMOTION MINISTRY OF HEALTH RUPUBLIC OF INDONESIA
38. WHO, 2002 World Health Report 2002
WATER, SANITATION AND HYGIENE DETERMINANTS OF HEALTH IN THE SOUTH-EAST ASIA REGION-SITUATION ANALYSIS AND ROLE OF THE HEALTH
http://www.searo.who.int/LinkFiles/RC_56_Documents_RC56-8.pdf

prov –district –sub-dist-village---no responden

BASIC HUMAN SERVICES BASELINE HOUSEHOLD SURVEY
LOMBOK TENGAH DISTRICT (NTB) AND SIKKA DISTRICT (NTT)
2007

I. RESPONDENT'S IDENTITY	**CODE/ENTRY NO**
1. PROVINCE: _____	
2. DISTRICT: _____	
3. SUB-DISTRICT: _____	
4. VILLAGE: _____	
5. NEIGHBOURHOOD ASSOCIATION:	
6. HEAD OF FAMILY: ..... (M / F)	
7. RESPONDENT'S NAME:	
8. FAMILY ENTRY NO:	
9. CONFIRM THAT THE MOTHER :	
HAS CHILDREN AGED 0-5 MONTHS, NO OF CHILDREN.....	
HAS CHILDREN AGED 6-11 MONTHS, NO OF CHILDREN	
HAS CHILDREN AGED 12-23 MONTHS, NO OF CHILDREN	
HAS CHILDREN AGED 24-59 MONTHS, NO OF CHILDREN.....	

II. INTERVIEWER'S IDENTITY AND DAN VERIFICATION

	I	II	III		
INTERVIEW DATE	.....	.....	.....	DATE OF VERIFICATION	.....
TIME (HOURS) START	.....	.....	.....	(*cross check*)	
ENDE	.....	.....	.....	VERIFIERS NAME (INTERVIEWER 2)	.....
INTERVIEWER'S NAME	.....	.....	.....		
SIGNATURE	.....	.....	.....	SIGNATURE	.....

	DISTRICT FIELD COORDINATOR (DFC)	DATA ENTRY OFFICIAL
NAME/SIGNATURE	_____	_____
DATE	_____	_____

INFORMED CONSENT

Good day/afternoon, my name is... ... and I am working with the Health Research Center of the University of Indonesia. We are conducting a survey of households. We will ask you about mother and child health in your household. This information will help the government in planning healthcare services. The interview will take about 1 hour. Information that you give will be kept confident and will not be shown to anyone else. Participation in this survey is voluntary and you may refuse to answer questions or to discontinue the interview. We hope you will participate because your opinion is very important

At the moment, are you willing to participate in this survey? May I begin the interview?

IF THE RESPONDENT IS WILLING TO BE INTERVIEWED THE INTERVIEW BEGINS.
IF THE RESPONDENT IS NOT WILLING TO BE INTERVIEWED → END AND LOOK FOR ANOTHER RESPONDENT ACCORDING TO SAMPLING METHOD

SIGNATURE OF RESPONDENT (IF POSSIBLE): .....

Interviewer does not read out the choices except where indicated.

A. SOCIAL ECONOMIC CHARACTERISTICS

NO	QUESTION	ANSWER AND CATEGORY CODE	SKIP
A101	Right now what is your status? Married, widowed or widowed by death?	NOT MARRIED ..... 01 MARRIED ..... 02 DIVORCED WIDOW ..... 03 WIDOWED BY DEATH 04	
A102	On what month and year were you born in?	MONTH ..... |____|____| DON'T KNOW ..... 98 YEAR ..... |____|____|____|____| DON'T KNOW 9998	
A103	What was your last formal education?	UNSCHOOLED ..... 01 NOT GRADUATE ELEMENTARY SCHOOL ..... 02 GRADUATE ELEMENTARY SCHOOL ..... 03 NOT GRADUATE MIDDLE SCHOOL ..... 04 GRADUATE MIDDLE SCHOOL ..... 05 NOT GRADUATE HIGH SCHOOL ..... 06 GRADUATE HIGH SCHOOL ..... 07 NOT GRADUATE ACADEMY/COLLEGE ..... 08 GRADUATE ACADEMY/COLLEGE ..... 09 OTHER_____ 96	
A104	What is your main occupation now?? OCCUPATION HERE MEANS A JOB THAT CONSUMES YOUR TIME AND PRODUCES MONEY	UNEMPLOYED/HOUSEWIFE ..... 01 FARMER/FISHERMAN ..... 02 CRAFTSMAN ..... 03 TRADE ..... 04 HOME INDUSTRY ..... 05 CIVIL SERVANT ..... 06 ARMED FORCES/POLICE ..... 07 PRIVATE SECTOR EMPLOYEE ..... 08 LABORER ..... 09 SERVICES ..... 10 ENTREPRENEUR ..... 11 INDONESIAN OVERSEAS WORKER ..... 12 OTHER_____ 96	
A105	What is the ownership status of the house in which you live in? [ONLY ONE ANSWER]	PERSONAL PROPERTY ..... 1 PROPERTY OF PARENTS/FAMILY ..... 2 PAYING INSTALLMENTS ..... 3 RENTED ..... 4 OFFICIAL RESIDENCE ..... 5 OTHER_____ 6	
A106	Does your family have…..? USE ASSISSTING CARDS THIS QUESTION HAS THE PURPOSE OF KNOWING THE FAMILY'S SOCIAL-ECONOMIC STATUS	ELECTRICITY ..... A MATTRESS' ..... B BEDS ..... C CHAIRS ..... D TABLES ..... E CLOCKS/WATCHES ..... F FANS ..... G RADIOS/ TRANSISTORS ..... H TELEVISION ..... I SATELLITE DISH ..... J TELEPHONE/MOBILE PHONE ..... K REFRIDGERATOR ..... L WATER PUMP (HAND OR MACHINE) ..... M BICYCLE ..... N MOTORCYCLE/SCOOTER ..... O CAR ..... P TRUCK ..... Q TRACTOR ..... R ROW BOAT ..... S MOTORBOAT ..... T	

A107	What is the name of your last/youngest child? What is his/her sex? When was he/she born?	Name of Last Child Name ..... (**HEREAFTER ALWAYS MENTION THE NAME OF THIS CHILD FOR THE QUESTIONS CONCERENED IN SECTION B, C, E, H, I, AND J**) Sex Male ..... 1 Female ..... 2 Date of Birth DATE ..... |____|____| DON'T KNOW ..... 98 MONTH ..... |____|____| DON'T KNOW ..... 98 YEAR ..... |____|____|____|____| DON'T KNOW 9998	
A108	At birth was (NAME) weighed? How many grams did he/she weigh then? IF ANSWERED IN KILOGRAMS, CONVERT TO GRAMS	YES, WEIGHT AT BIRTH |____|____|____|____| gram ..... 1 NO ..... 2 DON'T KNOW/REMEMBER 8	
A109	Does (NAME) have a birth certificate? IF NOT, ASK REASON WHY	YES, CAN SEEN BY INTERVIEWER ..... 1 YES, CANNOT BE SEEN BY INTERVIEWER ..... 2 UNFINISHED (HASN'T BEEN MADE/NOT HELD BY RESP) ..... 3 NO, REASON ..... 4 OTHER ..... 6 DON'T KNOW/REMEMBER 8	
A110	How many family members have a birth certificate?	|___|___| PEOPLE 98. DON'T KNOW/REMEMBER	

B. RIWAYAT ANC DAN PEMBERIAN TTD KEPADA IBU SAAT HAMIL

NO	QUESTION	ANSWER AND CATEGORY CODE	SKIP
B101	During pregnancy did you ever have your pregancy checked up?	YES ..... 1 NO 2	➔ **B106 (If answer is "no" continue to B106)**
B102	How many months into the pregnancy did you first checkup on your pregnancy?	|____| MONTHS DON'T KNOW/REMEMBER 9	
B103	Where did you most often had your pregnancy checked up?	INDIGENOUS MEDICAL INFANT PRACTITIONER ..... 1 CHILD CLINIC(POSYANDU) ..... 2 VILLAGE CLINIC (POLINDES) ..... 3 LOCAL GOVERNMENT CLINIC (PUSKESMAS) ..... 4 MIDWIFE PRACTITION (PRAKTEK BIDAN) ..... 5 DOCTOR PRACTITION ..... 6 CLINIC ..... 7 HOSPITAL ..... 8 OTHERS_____ ..... 9 DON'T KNOW/REMEMBER X	
B104	Who most often examined your pregancy?	INDIGENOUS MEDICAL INFANT PRACTITIONER ..... 1 NURSE ..... 2 MIDWIFE/VILLAGE MIDWIFE ..... 3 DOCTOR ..... 4 OTHER_____ 5	
B105	As you recall, while pregnant with (NAME) how many times did you checkup on your pregnancy to the health force/officials?	|____| ____| TIMES DON'T KNOW/REMEMBER 9	

B106	While pregnant, did you receive/buy tablets for increasing blood?	YES,.....1 NO .....2 DON'T KNOW/REMEMBER 8	**➔ B 108** **➔ C101 (If anser is "yes" continue to B108, if answer is "don't know/ remember continue to C101)**
B107	Why didn't you receive/buy tables for increasing blood?	DON'T KNOW WHERE TO BUY .....1 INCAPABLE OF BUYING .....2 NO SUPPLY .....3 UNECESSARY/ FEEL HEALTHY.....4 SIDE AFFECTS(NAUSEA, HEADACHE, BAD DEFACATION, DLL) .....5 OTHER_____ 6	**➔ C101 Interviewer continues to question C101**
B108	Where did you obtain the tablets? .	CHILD CLINIC (POSYANDU) .....A VILLAGE CLINIC (POLINDES).....B LOCAL GOVERNMENT CLINIC (PUSKESMAS).....C PRIVATE MIDWIFE PRACTITION .....D PRIVATE DOCTOR PRACTITION .....E PRIVATE CLINIC .....F BIRTH DELIVARY HOSPITAL.....G GENERAL HOSPITAL .....H PRIVATE HOSPITAL .....I PHARMACY .....J DRUG STORE.....K VILLAGE MEDICINE POST .....L OTHER _____ .....X DON'T KNOW/REMEMBER .....y	
B109	When you received the tablets, did you receive an explanation?	YES,.....1 NO .....2 DON'T KNOW/REMEMBER 8	**➔ B111 (if answer is "no" continue to B111)**
B110	What explanation did you receive?	DOSAGE .....A POSSIBLE SIDE EFFECTS.....B BENEFITS OF THE TABLETS .....C COUNTER INDICATIONS .....D OTHER _____ .....X DON'T KNOW/REMEMBER .....Y	
B111	How many tablets for increasing blood di you buy/receive while pregnant with (NAME)? IF MENTIONED IN PACKETS, CONVERT TO TABLETS.	|___|___| ___| TABLETS 98. DON'T KNOW/REMEMBER	
B112	Did you always consumed all the tablets which you received/bought?	YES,.....1 NO .....2 DON'T KNOW/REMEMBER 8	**➔ C101 (If answer is "yes" continue to C101)**
B113	Why didn't you consume all the tablets?	FORGOT .....A LAZY.....B HARD TO DEFACATE.....C NAUSEA.....D BORED.....E TABLET WAS UNPLEASENT/SMELLY/PUTRID .....F UNNECESSARY .....G DIARRHEA.....H HEADACHE.....I FAINTNESS .....J OTHER _____ X	

C. VITAMIN A SUPPLEMENT OF MOTHER AND INFANT/ CHILD UNDER FIVE

NO	QUESTION	ANSWER AND CATEGORY CODE	SKIP
C101	In the 40 days after childbirth, did you receive a Vitamin A capsule (like this)? SHOW FOR FIRST TIME SAMPLE VITAMIN A CAPSULE COLORED BLUE. IF MOTHER ANSWERS NO/DON'T KNOW THEN SHOW A RED VITAMIN A CAPSULE.	YES, BLUE VITAMIN A CAPSULE ..... 1 YES, RED VITAMIN A CAPSULE ..... 2 YES, BOTH OF THEM BLUE AND RED ..... 3 NO/NOT YET ..... 4 DON'T KNOW/REMEMBER 8	→ **C103** → **C103** → **C103** → **C103** **(If the answer is "yes,no/ not yet/don't know /remember" continue to C103)**
C102	Why didn't you receive a vitamin A capsule?	HEALTHCARE OFFICIALS DIDN'T GIVE(CADER, MIDWIFE, DOCTOR). 1 DIDN'T GO TO POSYANDU/PUSKESMAS/MIDWIFE ..... 2 WENT TO POSYANDU/PUSKESMAS/BIDAN BUT NO VIT A ..... 3 DON'T KNOW ..... 4 DIDN'T FEEL IT WAS NECESSARY ..... 5 OTHER X	
C103	Did (NAME) ever a Vitamin A capsule (such as this)? SHOW SAMPLE CAPSULES AS BEFORE.	YES, BLUE VITAMIN A CAPSULE ..... 1 YES, RED VITAMIN A CAPSULE ..... 2 YES, BOTH OF THEM BLUE AND READ ..... 3 NO/NOT YET ..... 4 DON'T KNOW/REMEMBER 8	→ **C105** → **C105** → **C105** → **D101** **(If the answer is "yes" continue to C105), if answer is don't know/rmember continue to D101)**
C104	Why didn't (NAME) receive vitamin A?	TOO YOUNG/NOT TIME YET ..... 1 DID NOT GO TO POSYANDU/PUSKESMAS/BIDAN ..... 2 WENT TO POSYANDU/PUSKESMAS/BIDAN BUT NO VIT A ..... 3 NO ONE DISTRIBUTING VIT A ..... 4 OTHER_____ 5	→ **D101** **Interviewer continues to question D101**
C105	When did (NAME) receive his/her last vitamin A capsule?	MONTH ..... |____|____| DON'T KNOW/REMEMBER ..... 98 YEAR ..... |____|____|____|____| DON'T KNOW/REMEMBER 9998	
C106	Where did (NAME) get the vitamin A capsule?	CHILD CLINIC (POSYANDU) ..... 1 VILLAGE CLINIC (POLINDES) ..... 2 LOCAL GOVERNMENT CLINIC (PUSKESMAS) ..... 3 PRIVATE MIDWIFE PRACTITION ..... 4 PRIVATE DOCTOR PRACTITION ..... 5 PRIVATE CLINIC ..... 6 BIRTH DELIVERY HOSPITAL ..... 7 GENERAL HOSPITAL ..... 8 PRIVATE HOSPITAL ..... 9 PHARMACY ..... 10 DRUG STORE ..... 11 OTHER 12	

D. FEEDING OF INFANTS AND CHILDREN

NO	PERTANYAAN	JAWABAN DAN KODE KATEGORI	SKIP
D101	Have you ever breast fed (NAME)?	YES ..... 1 NO 2	→ **D111** **(if answer is "no" continue to D111)**
D102	After giving birth, how long until (NAME) was placed on your breast? IF LESS THAN 1 HOUR WRITE '00' INTHE HOUR SQUARE	IN HOURS ..... 1 |____|____| IN DAYS ..... 2 |____|____| NEVER ..... 3 DON'T KNOW/REMEMBER 8	

D103	In the first 3 days, did you give the first MOTHER'S milk that came out after giving birth to (NAME)? PROBE; YELLOW BREASTMILK/ COLOSTRUM	YES.....1 NO .....2 DON'T KNOW/REMEMBER 8	
D104	In the first 3 days after birth, was (NAME) given food/drinkd other than MOTHER'S milk?	YES.....1 NO .....2 DON'T KNOW/REMEMBER 8	**➔ D109 (If answer is "no" continue to D109)**
D105	When exactly did you first give (NAME) food/drink besides MOTHER'S milk? IF LESS THAN 1 HOUR WRITE '00' IN THE HOUR BOX.	IN HOURS ..... 1 |____|____| IN DAYS .....2 |____|____| DON'T KNOW/REMEMBER 8	
D106	What kind of food/drink was given to (NAME) in the first 3 days. Minuman/makanan apa saja, yang diberikan kepada (NAMA) dalam 3 hari pertama? PROBE	JUST MOTHER'S MILK .....A FORMULA MILK .....B OTHER MILK..... C WATER..... D SWEET WATER.....E RICE WATER.....F PALM ..... G FRUIT EXTRACT ..... H TEA.....I COFFEE ..... J HONEY.....K BANANA.....L NASI PAPAK ..... M OTHER X	**➔ D 109 (If answer is "just MOTHER'S milk" continue to D109)**
D107	Who suggested that you give food/drink besides MOTHER'S milk in the first 3 days? PROBE	HUSBAND .....A PARENTS.....B OTHER FAMILY MEMBERS..... .....C NEIGHBOURS ..... D INDIGENOUSE MEDICAL INFANT PRACTITIONER.....E NURSE .....F VILLAGE MIDWIFE..... G PRIVATE MIDWIFE ..... H LOCAL GOVERNMENT CLINIC MIDWIFE .....I DOCTOR..... J SELF.....K OTHER X	
D108	What were the reasons of giving food/dring besides MOTHER'S milk in the first three days? PROBE	SICK INFANT .....A SICK MOTHER .....B BREAST PROBLEMS..... C MILK NOT PRODUCED (YET) ..... D WORKING MOTHER .....E INFANT REFUSING.....F SO BREAST WON'T CHANGE SHAPE ..... G TIME FOR WEANING ..... H INFANT KEEPS ON CRYING.....I NOT ENOUGH MILK..... J USING CONTRACEPTIVES.....K HUSBANDS ADVICE .....L DOCTOR OR NURSE'S ADVICE..... M PARENT'S ADVICE ..... N ADVICE OF OTHER FAMILY MEMBERS ..... O NEIGHBOUR'S/FRIEND'S ADVICE .....P OTHER X	
D109	Is (NAME) still breasfed?	YES.....1 NO 2	**➔ D111** **(If answer is "yes" continue to D111)**

D110	At what age did (NAME) stopped being breastfed?	IN MONTHS ..... 1 |____|____| IN YEARS ..... 2 |____|____| DON'T KNOW/REMEMBER 8	
D111	Has (NAME) been given **food/drink** other than MOTHER'S milk? FOOD/DRINK HERE MEANS EXTRA FOOD/DRINK GIVEN ON A REGULAR BASIS.	YES..... 1 NO 2	➔ **D113** **(If the answer is"no" continue to D113)**
D112	At what age didi (NAME) begin to receive the **food/**drink?	IN MONTHS ..... 1 |____|____| IN YEARS ..... 2 |____|____|	
D113	In the last 24 hours, how many times did (NAME) **drink** the following fluids from morning to night?	FREQUENCY A. MOTHER'S MILK..... |____|____| B. WATER ..... |____|____| C. INFANT FORMULA MILK..... |____|____| D. CONDENSED MILK, FULL CREAM POWDER MILK, FRESH MILK, UHT MILK ..... |____|____| E. FRUIT EXTRACT, VARIOUS FRIUT JUICES, HONEY ..... |____|____| F. FLUIDS SUCH AS VEGETABLE WATER, RICE WATER..... |____|____| G. FLUIDS SUCH AS SYROP, SOFT DRINK, TEA, COFFEE..... |____|____|	
D114	In the last 24 hours, how many times has (NAME) **eaten** the following foods from morning to night?	FREQUENCY A. FOODS FROM CARBOHYDRATES: RICE, RICE PORRIDGE, MILK PORRIDGE, BREAD, NOODLES, BISCUITS, CORN, MEATBALLS, ETC.....|____|____| B. TUBERS SUCH AS POTATOES, CASAVA, SWEET POTATOES, ETC ..... |____|____| C. VEGETABLES SUCH AS SPINACH, KANGKONG, BEANS, ETC ..... |____|____| D. FRUITS SUCH AS BANANAS, ORANGES, PAPAYA, AVOCADOES, TOMATOES, ETC..... |____|____| E BEEF, CHICKEN, LIVER, FRESH FISH, ETC..... |____|____| F. FOODS FROM BEANS, TEMPE, TOFU, FERMENTED SOYBEAN CAKE , MUNG BEANS, BLACKBEANS, KEDELE, ... |____|____| G. SNACKS CONTAINGN OIL/FAT/BUTTER, FRIED SNACKS, ETC ..... |____|____|	
D115	So, from yesterday morning to night how many times was (NAME) given a large meal? DOES NOT INCLUDE SNACKS.	FREQUENCY GIVEN..... |____|____| DON'T KNOW/REMEMBER 98	**If answers from D113 to D115, all= 0, go straight to ke E.101**
D116	Who taught the method of feeding **food/**drink to infant/child?	HUSBAND .....A PARENTS.....B OTHER FAMILY MEMBERS..... .....C NEIGHBOURS ..... D INDIGENOUSE MEDICAL INFANT PRACTITIONER.....E NURSE .....F VILLAGE MIDWIFE.....G PRIVATE MIDWIFE ..... H LOCAL GOVERNMENT CLINIC MIDWIFE .....I DOCTOR.....J SELF.....K OTHER X	

D117	If infant/child does not want to eat/drink , what efforts do you undertake?	GIVE A SNACK, MENTION _____.....A GIVE OTHER MAIN MEAL, MENTION _____.....B COAX TILL WANT TO EAT ..... C FORCE TO EAT..... .....D DO NOTHING,STOP GIVING FOOD .....E FOLLOW THE CHILD'S DESIRES.....F OTHER_____ .....E	

E. IMMUNIZATION, DIARRHEA, MALARIA AND ITS HANDLING

NO	QUESTION	ANSWER AND CATEGORY CODE	SKIP
E1. IMUNISASI			
E101	Do you have immunization records (KMS, KIA Book) for your last child(NAME)? ASK THE MOTHER TO SHOW THE RECORDS. IF CAN'T ASK THE REASONS WHY.	YES ..... 1 1. KMS 2. BUKU KIA YES, BUT CAN'T SHOW, REASON .....2 DON'T OWN ONE, REASON. 3	**➔E102 kol B** **➔E102 kol B If the answer is "yes but cannot show" atau "don't own one" continue to E102 kol B)**

E102	IF (NAME) HAS RECORDS WHICH CAN BE BORROWED, COPY THE RECORDS ACCORDING TO COLUMN (a). IF RECORDS NOT AVAILABLE ASK: "Has (NAME) received the following immunization?" READ A TO L, WRITE IN COLUMN (b). IF MOTHER DOES NOT REMEMBER, PROBE BY READING OUT THE EXPLANATION IN PARENTTHEIS. ATTENTION INTERVIEWER! COLUMN A: IMMUNIZATION FROM RECORDS KOLOM B: IMMUNIZATION BASED ON THE RECOLLECTION OF THE MOTHER		(a)	(b)	
		BCG (Injection in upper arm and usually leaves a scar) .....A	A	A	
		POLIO1 (white/red vaccination oral drops).....B	B	B	
		POLIO2..... C	C	C	
		POLIO3..... D	D	D	
		POLIO4.....E	E	E	
		DPT1 (diphtheria, whooping cough, tetanus vaccine. Injection on thigh, usually causes fever) F	F	F	
		DPT2 ..... G	G	G	
		DPT3 ..... H	H	H	
		MUMPS (Injection on upper arm) I	I	I	
		HEPATITIS1 (Injection on outer thigh) .....J	J	J	
		HEPATITIS2.....K	K	K	
		HEPATITIS3.....L	L	L	
		NEVER GIVEN A VACCINE .....Y	Y	Y	
		DOESN'T REMEMBER.....Z	Z	Z	

E2. DIARE

E201	What danger signs/health problems affecting children do you think can cause death? PROBE	UNABLE TO SUCKLE UNABLE TO DRINK OR RELUCTANT TO DRINK ALWAYS THROW UP EVERYTHING CONVULSIONS UNCONSIOUSNESS FEVER ASPHYXIA MALNURTRITION OTHERS_____ DON'T KNOW	
E202	Has (NAME) ever experienced **diarrhea 3 times or more a day** in the last 2 weeks?	YES NO	➔ **E301** **(If answer is "no" continue to E301)**
E203	Where do you seek medication to treat that illness? PROBE IF HOSPITAL OR CLINIC: PROBE, 'GOVERNMENT OR PRIVATE OWNED'?	SELF MEDICATION: CONTINUE TO GIVE MOTHER'S MILK IF STILL BREAST FEEDING GIVE MORE FLUIDS CONTINUE TO GIVE FOOD GIVE ORALIT/LGG TELL CHILD TO REST FEED CHILD WITH CONCOTION/TONIC GIVE ANTI-DIARRHEA MEDICINE (ENTEROSTOP, DIAPET, ETC).....G VISIT HEALTHCARE OFFICIALS: GOVERNMENT: HOSPITAL LOCAL GOVERNMENT CLINIC (PUSKESMAS) CLINIC MOBILE CLINIC PRIVATE: HOSPITALS CLINIC PRACTICING DOCTOR PRACTICING MIDWIFE COMMUNITY SECTOR: VILLAGE CLINIC (POLINDES) VILLAGE MIDWIFE CHILD CLINIC(POSYANDU) OTHER _____ DO NOTHING	

E3. MALARIA

E301	During pregnancy did you sleep using a net?	YES NO	➔ **E303** **(If the answer is "yes" continue to E303)**
E302	Why didn't you use a net?	TOO HOT NO MOSQUITOS AFRAID OF POISONING HADN'T HAD THE TIME TO SET ONE UP NOT AWARE NET BROKEN STUFFY/HARD TO BREATHE OTHER	

E303	Does (NAME) use a net while sleeping now?	YES NO	➔ **E305** **(If the answer is"yes" continue to E305)**
E304	Why doesn't (NAME) sleep using a net?	TOO HOT NO MOSQUITOS AFRAID OF POSIONING HADN'T HAD THE TIME TO SET ONE UP NOT AWARE NET BROKEN PENGAP/SULIT BERNAPAS LAINNYA, SEBUTKAN_____	
E305	Has (NAME) ever experienced high temperature(fever) in the last 2 weeks	YES NO	➔ **E 311** **(If answer is "no" continue to E311)**
E306	Is the high temperature accompanied with **shivering and recurring fever**?Apakah panas tersebut disertai dengan **demam menggigil dan berulang**?	YES NO	
E307	Do you seek medication to treat the fever?Apakah ibu mencari pengobatan untuk mengatasi sakit demam tersebut? PROBE IF HOSPITAL OR CLINIC: PROBE, 'GOVERNMENT OR PRIVATE OWNED'?	SELF MEDICATION: CONTINUE TO GIVE MOTHER'S MILK IF STILL BREAST FEEDING GIVE MORE FLUIDS CONTINUE TO GIVE FOOD GIVE ORALIT/LGG TELL CHILD TO REST FEED CHILD WITH CONCOTION/TONIC GIVE ANTI-DIARRHEA MEDICINE (ENTEROSTOP, DIAPET, ETC).....G VISIT HEALTHCARE OFFICIALS: GOVERNMENT: HOSPITAL LOCAL GOVERNMENT CLINIC (PUSKESMAS) CLINIC MOBILE CLINIC PRIVATE: HOSPITALS CLINIC PRACTICING DOCTOR PRACTICING MIDWIFE COMMUNITY SECTOR: VILLAGE CLINIC (POLINDES) VILLAGE MIDWIFE CHILD CLINIC(POSYANDU) OTHER _____ DO NOTHING	
E308	After symptoms, when do you seek medication? PROBE AFTER RESPONDENTS ANSWER, CONVERT TO HOURS.	IMMEDIATELY (< 24 JAM) > 24 JAM DON'T KNOW/REMEMBER	
E309	What medication was given when (NAME) was affected by the fever?	KINA SULDOX REBOQUIN ACT OTHER_____ NONE DON'T KNOW	

E310	Where is this medicine obtained?	HOSPITALS..... CHILD CLINICS (POSYANDU)..... MALARIA POSTS (POSMALDES)..... PRIVATE CLINICS ..... PRATICING DOCTOR ..... DRUG STORE..... PHARMACY ..... TRADITIONAL MEDICATION ..... OTHER ..... DON'T KNOW.....	
E311	Does the family have a net for sleep?	YES, ... NO, REASON- _____ _____..... DON'T KNOW.....	➔ **F 101** ➔**F 101 (If answer is "no/don't know" continue to F101)**
E312	Dose the family have anti-mosquito net?	YES, ... NO, REASON_____ _____..... DON'T KNOW.....	➔ **F 101 (If answer is "no/don't know" continue to F101)**
E313	Where do you obtain the anti-mosquito net?	CHILD CLINIC (POSYANDU) ..... VILLAGE CLINIC (POLINDES) ..... LOCAL GOVERNMENT CLINIC (PUSKESMAS) ..... MIDWIFE ..... DOCTOR ..... SHOP/KIOSK..... OTHER	
E314	OBSERVASI. LIHAT APAKAH KELAMBU ATAU JARING PENUTUP TERSEBUT BERLUBANG/RUSAK?	YA, ... TIDAK	

F. ACCESS TO HEALTH SERVICES

F.1. ACCESS TO HEALTH SERVICES

NO	QUESTION	CATEGORY CODE	SKIP
F101	Who mostly makes the decisions if someone is sick in the family?	RESPONDENT ..... 01 HUSBAND ..... 02 RESPONDENT AND HUSBAND TOGETHER ..... 03 HUSBAND & ANOTHER TRUSTED PERSON ..... 04 RESPONDENT & ANOTHER TRUSTED PERSON ..... 05 VILLAGE CHIEF ..... 06 PARENTS ..... 07 OTHER 96	

F102	**Usually** what is done first when a someone in the family is sick? IF HOSPITAL OR CLINIC: PROBE, 'GOVERNMENT OR PRIVATE OWNED'?	SELF MEDICATION: REST ..... A CONSUME KIOSK MEDICINE ..... B CONSUME BLESSED WATER ..... C DRINK TONIC/CONCOTION ..... D COLD WATER COMPRESS ..... E WARM WATER COMPRESS ..... F VISIT HEALTH OFFICIALS: GOVERNMENT: HOSPITAL ..... G LOCAL GOVERNMENT CLINIC (PUSKESMAS) ..... H CLINIC ..... I MOBILE CLINIC ..... J PRIVATE: HOSPITAL ..... K CLINIC ..... L PRACTICING DOCTOR ..... M PRACTICING MIDWIFE ..... N COMMUNITY: VILLAGE MIDWIFE ..... O VILLAGE CLINIC (POLINDES) ..... P CHILD CLINICPOSYANDU ..... Q HEALTHCARE EMPLOYEE ..... R INDIGENOUS MEDICAL PRACTITIONER ..... S OTHER _____ X NOTHING IS DONE ..... Y	
F103	If sickness is prolonged, where do you usually seek medication? IF HOSPITAL OR CLINIC: PROBE, 'GOVERNMENT OR PRIVATE OWNED'	VISIT HEALTH OFFICIALS: GOVERNMENT: HOSPITAL ..... A LOCAL GOVERNMENT CLINIC (PUSKESMAS) ..... B CLINIC ..... C MOBILE CLINIC ..... D PRIVATE: HOSPITAL ..... CLINIC ..... E PRACTICING DOCTOR ..... F PRACTICING MIDWIFE ..... G COMMUNITY: H VILLAGE MIDWIFE ..... VILLAGE CLINIC (POLINDES) ..... I CHILD CLINICPOSYANDU ..... J HEALTHCARE EMPLOYEE ..... K INDIGENOUS MEDICAL PRACTITIONER ..... L OTHER _____ M NOTHING IS DONE ..... X Y	
F104	**Usually** for what reason do you or familiy members of the family go to the village midwife?	PHYSICAL CHECKUP ..... A MEDICATION ..... B TREATMENT ..... C BIRTH ..... D FAMILY PLANNING SERVICES ..... E ACCIDENTS ..... F AND SO ON _____ X NEVER BEEN TO THE VILLAGE MIDWIFE ..... Y	
F105	**Usually** for what reason do you or family members go the the indigenous medical practictioner.	MASSAGE ..... A CONCOTION/TONIC ..... B RITUALS/PRAYER ..... C OTHER _____ X NEVER BEEN TO THE INDIGENOUS MEDICAL PRACTITIONER ..... Y	

F.2. POSYANDU

F201	Has (NAMA) been brought to posyandu. Pernahkah (NAMA) dibawa ke posyandu?	YES ..... 1 NO ..... 2 DON'T KNOW 8	➔**F204** ➔**G101** **(if the answer is ibu"tidak" continue to ke F204, if the answer is "no/don't know tahu" continue to G101.)**
F202	How long does it take to reach a child clinid from your house?	|___|___| MINIUITS 98. DON'T KNOW/REMEMBER	

F203	In the last 6 months (or since birth for infancts < 6 months) how many times has (NAME) been brought to the Child Clinic (Posyandu)	|___|___| TIMES 98. DON'T KNOW/REMEMBER INTERVIEWERS CHECK THE RUTINITY OF CHILD CLINIC VISITS (POSYANDU) AS FOLLOWS: IF INFANT IS >6 MONTHS AND ANSWER IS >6 TIMES, OR IF INFANT IS >= MONTHS AND ANSWER IS < 6 TIMES, OR IF INFANT IS AGED <6 MONTHS AND ANSWER LESS THAN INFANT AGE, IT MEANS THAT IT IS NOT ROUTINE FOR THE INTERVIEWER TO ASK QUESTION F204 → **IF ROUTINE JUMP TO QUESTION F205.**	
F204	Why don't you take the infant to the child clinic every month? PROBE	CHILD CLINIC (POSYANDU) NOT THERE/NOT OPEN ..... A CHILD CLINIC (POSYANDU) DISTANCE ..... B NOT TIME ..... C NOT REGISTERED ..... D MOTHER BUSY ..... E IMMUNIZATION COMPLETE ..... F UNNECESSARY ..... G INFANT SICK ..... H OTHER X	
F205	What do you think is the benefit of child clinics (posyandu)? PROBE	SO CHILD IS HEALTHE ..... A CHILD RECEIVES IMMUNIZATION ..... B CHILD IS WEIGHED/MEASURED ..... C CHILD IS GIVEN FOOD ..... D CHILD GIVEN VITAMIN A CAPSULE ..... E WEIGHING PREGNANT MOTHER ..... F PREGNANT MOTHER IS GIVEN BLOOD INCREASE TABLET ... G PREGNANT MOTHER IMMUNIZED TT ..... H AFTER GIVING BIRTH MOTHER IS GIVEN KBK SERVICE. ..... I OTHER X	

G. WATER AND SANITATION

G101	What is the main source of drinking water for the needs of the family? **CHOOSE ONE ANSWER**	WATER COMPANY ..... 01 PROTECTED DUG WELL (WITH WELL RING) ..... 02 UNPROTECTED DUG WELL (WITHOUT WELL RING) ..... 03 DRILLED WELL ..... 04 WATER FROM TRUCKS ..... 05 PROTECTED SPRINGS ..... 06 UNPROTECTED SPRINGS ..... 07 RAIN COLLECTION ..... 08 FROM RIVER/POOL/LAKE/DAM ..... 09 SEALED PAKAGED WATER ..... 10 REFILLED PACKAGED WATER ..... 11 WATER SELLER (BY CART ETC) ..... 12 OTHER 96	
G102	Do you do anything to make the water safe for drinking?	YES ..... 1 NO 2	→ **G104 (If"no" continue to G104)**
G103	If yes, what do you usually do to make he water safe for drinking? WAIT FOR SPONTANEOUS ANSWER FROM MOTHER. (CHECK IF MORE THAN ONE ANSWER, BECAUSE SOME METHODS ARE DONE AT THE SAME TIME, FOR EXAMPLE CLOTH FILTER AND CHLORINE)	LEFT UNTIL IMPURITIES SETTLE ..... A FILTERED WITH CLOTH ..... B BOILED ..... C BLEACH OR CHLORINE ..... D FILTERED (CERAMICS, SAND, COMPOSITES) ..... E SOLAR DISINFECTION ..... F OTHER ..... X DON'T KNOW ..... Y	
G104	Can you show where you usually wash your hands? ASK OF ITS OK TO SEE?	IN/CLOSE TO WATER CLOSET/BATHROOM ..... 1 IN/CLOSE TO KITCHEN ..... 2 YARD ..... 3 OUTSIDE OF YARD ..... 4 NO PARTICULAR PLACE ..... 5 NOT PERMITTED TO SEE 8	
G105	What do you usually use to wash hands? ONLY ONE ANSWER	SOAP .. .. 1 DETERGENT ..... 2 DUST ..... 3 MUD/SAND ..... 4 NONE ..... 5 OTHER 6	

G106	**ONLY AN OBSERVATION**: IS THERE SOAP OR DETERGENT OR OTHER MATERIAL USED TO WASH HANDS? ITEMS CAN BE FOUND AT LOCATION OF RESPONDENT CAN DIRECTLY SHOW IN 1 MINUTE. IF ITEM NOT AVAILBABLE IN 1 MINUTE OR BROUGHT IN OVER 1 MINUTE, MARK AS "NONE".	SOAP ..... 1 DETERGENT ..... 2 DUST ..... 3 MUD/SAND ..... 4 NONE ..... 5 OTHER ..... 6 NOT PERMITTED TO SEE 8	
G107	Did you use soap yesterday afternoon or night?	YES ..... 1 NO 2	➔ **G109 (If "no" continue to G109)**
G108	When did you use soap yesterday afternoon or night? IF TO WASH OWN HANDS OR WASH CHILD MENTIONED, ASK AT WHAT TIMES THE MOTHER WASHES HANDS, BUT DO NOT READ OUT THE ANSWERS (**DO NOT READ OUT THE ANSWERS,** ASK "WHAT ELSE" UNTIL THERE ARE NO MORE ANSWERS AND MARK THE APPROPRIATE	BEFORE MEAL ..... A BEFORE BREASTFEADING ..... B BEFORE FEEDING CHILD ..... C BEFORE PREPARING FOOD ..... D AFTER DEFACATION ..... E AFTER CLEANING AFTER CHILD DEFACATION ..... F OTHER X	
G109	What type of lavatory is usually used by the family?	LAVATORY WITH SEPTIC TANK ..... 1 LAVATORY WITHOUT SEPTIC TANK ..... 2 DRY LAVATORY/COMPOSTED ..... 3 LAVATORY OVER FISH POOL ..... 4 NO FACILITIES (RIVER, BUSHES, PLASTIC BAGS) ..... 5 OTHER_____ 6	
G110	Do you have your own lavatory at home? OBSERVATION IS THE LAVATORY USED?	YES, USED ..... 1 YES, NOT USED ..... 2 NO ..... 3 NOT PERMITTED TO SEE 3	
G111	Have you ever defacted not in a lavatory?	YES ..... 1 NO 2	➔**G113 (If "no" continue to G113)**
G112	How often do you defacated not in a lavatory? OFTEN MEANS > 2 TIMES A WEEK. RARELY MEANS ONLY 1-2 TIMES IN A WEEK.	ALWAYS ..... 1 OFTHEN ..... 2 RARELY/SOMETIMES ..... 3 DON'T KNOW/REMEMBER 8	
G113	Is you livestock kept in a pen? OBSERVATION IS THE LIVESTOCK KEPT IN A PEN	YES ..... 1 NO ..... 2 NOT PERMITTED TO SEE ..... 3 DOES NOT OWN LIVESTOCK 4	

H. IODIZED SALT USAGE

H101	When pregnant with (NAME), did you consume a yellow iodine capsule? SHOW A SAMPLE YELLOW IODINE CAPSUL	YES ..... 1 NO ..... 2 DON'T KNOW /REMEMBER 8	
H102	Do you know about iodized salt?	YES, KNOWS ..... 1 DOESN'T KNOW 2	➔ **H104 (If answer is doesn't know go to H104)**
H103	Who do you know iodize salt from?	HUSBAND ..... A PARENTS ..... B OTHER FAMILY MEMBERS ..... C NEIGHBOURS ..... D INDIGENOUS MEDICAL INFANT PRACTITIONERS ..... E NURSES ..... F VILLAGE MIDWIFE ..... G PRIVATE MIDWIFE ..... H LOCAL GOVERNMENT CLINIC MIDWIFE I	

		DOCTOR ..... J SELF ..... K ADVERTISEMENT (SEBUTKAN..... L OTHER X	
H104	What type of salt do you always use? OFFICIALS CONDUCTS SALT TESTS THAT IS USED BY THE FAMILY USING AN IODINE TEST. IS THERE A CHANGE OF COLOR TO BLUE? PETUGAS MELAKUKAN TES GARAM KELUARGA YANG DIPAKAI DENGAN MENGGUNAKAN IODINE TEST. ADAKAH TERJADI PERUBAHAN WARNA MENJADI BIRU ?	UNREFINED ..... A BRIQUET ..... B FINE ..... C OTHER ..... Y YES ..... 1 NO 2	
H105	Where do you usually buy salt? PROBE	KIOSK ..... A MARKET ..... B PEDDLER ..... C OTHER X	
H106	What do you think is the benefits of iodizeds salt for our body?	CAUSES BODY NOT TO BECOME A MIDGET ..... A MAKE CHILDREN INTELLIGENT ..... B NOT SUFFER FROM MUMPS ..... C OTHER_____ ..... D DON'T KNOW X	
H107	What foods do you know of that contain iodine besides iodized salt?	SALT WATER FISH ..... A FRESH WATER FISH ..... B MILK ..... C TEMPE ..... D VEGETABLES ..... E OTHER ..... F DON'T KNOW X	
H108	What do you think if we were iodine defficient?	OCCURRENCES OF MUMPS ..... A MANY 'SLOW' CHILDREDN ..... B CHILDREN BECOME MIDGETS ..... C OTHERS ..... D DON'T KNOW X	
H109	What do you thinks is the proper way of storing salt?	CLOSED CONTAINER ..... 1 OPEN CONTAINER ..... 2 CONTAINER WITH PLENTY OF LIGHT ..... 3 OTHER ..... 4 DON'T KNOW X	

INTERVIEW SESSION IS FINISHED. THANK YOU

I. WEIGHT AND HEIGHT MEASUREMENT OF THE LAST CHILD

WRITE THE RESULT OF THE MEASUREMENTS IN THE TABLE BELOW.

IDENTIFICATION INFORMATION			RESULT AND METHOD OF MEASUREMENT		
NAME	DATE, MONTH AND YEAR OF BIRTH **	M	BODY HEIGHT	METHOD OF MEASURING CHILD HEIGHT	BODY WEIGHT ***
(1)	(2)	(3)	(4)	(5)	(6)
			CM	1: LYING DOWN 2: STANDING	KG
	☐☐ ☐☐ ☐☐	M F	☐☐☐,☐	1 2	☐☐,☐

* This column has to be filled based on the last two digets of the questionaire number.
** This part has to be found do conversion if using a local calendar
*** Timbangan Secca has been calibrated

J. CHILD FECES EXAMINATION

WRITE THE RESULTS OF THE EXAMINATION IN THE FOLLOWING TABLE.

IDENTIFICATION INFORMATION				RESULT OF EXAMINATION		
NAME	DATE, MONTH AND YEAR OF BIRTH	SEX				
(1)	(2)	(3)		(4)		
	|__|__| |__|__| |__|__|	L	P	Ascaris lumbricoides	POSITIVE, No of eggs….	NEGATIVE
				Trichuris trichuria	POSITIVE, No of eggs….	NEGATIVE
				Hookworm	POSITIVE, No of eggs….	NEGATIVE

* Feces sample is taken in the morning with help from health officials from the child clinic/local government clinic. Sampel is then brought to a local laboratorium to be examined on the same day. All samples are examined for the presence of parasite egg using Kato Katz technique (WHO, 1998). Each sample is examined the number of eggs per gram feces sample

THANK YOU FOR THE RESPONDENTS TIME.

Tear here

☐☐☐☐ ☐☐

Give this examination paper to the mother to be brought to the place of feces examination

CHILD FECES EXAMINATION

WRITE THE RESULTS OF THE EXAMINATION IN THE FOLLOWING TABLE.

IDENTIFICATION INFORMATION				RESULT OF EXAMINATION		
NAME	DATE, MONTH AND YEAR OF BIRTH	SEX				
(1)	(2)	(3)		(4)		
	|__|__| |__|__| |__|__|	L	P	Ascaris lumbricoides	POSITIVE, No of eggs….	NEGATIVE
				Trichuris trichuria	POSITIVE, No of eggs….	NEGATIVE
				Hookworm	POSITIVE, No of eggs….	NEGATIVE
