

Health problem due to consumption of polluted water : A survey of Supaul District, Bihar

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Abstract : A survey of health problem due to direct consumption of well and tube well water of the people belonging to Supaul District, Bihar was made and are being reported in the present paper. Several people of the different revenue villages of the different block of both the sub-division of Supaul district were personally contacted physically and on the basis of information gathered from this survey and complemented from selective literature review, it was concluded that most of the people are suffering from health problems like Typhoid, Giardiasis, Amoebiasis, Ascariasis, Hookworm, Cholera, Gastroenteritis, Diarrhea, Encephalitis, Stomach cramps and aches, Vomiting, Hepatitis, Respiratory infections etc. Beside these problems several other problem like Liver damage, Kidney damage, Neurological problems, Thyroid system disorders etc are also the water borne diseases.

(Keywords : Health problem; water born disease)

Introduction

Water pollution is a significant determinant of human health¹. Health problems like Typhoid, Giardiasis, Amoebiasis, Ascariasis, Hookworm, Cholera, Gastroenteritis, Diarrhea, Encephalitis, Stomach cramps and aches, Vomiting, Hepatitis, Respiratory infections etc. are related with the direct consumption of well or tube-well water i.e. polluted water because untreated well or tube-well waters are at the high risk of pollution due to environmental effect. Present paper describes the survey of health problem due to direct consumption of well and tube well water of the people belonging to Supaul District, Bihar. The paper is also complemented with selective literature survey.

Study area: Supaul district is chosen as study area because maximum part of this district remains covered with flood water for up to six months in a year which may be the cause of several water diseases in human beings and animals. It is thirty sixth districts out of thirty-eight districts of Bihar. It is a part of Koshi division. Supaul was accorded the status of a sub-division in 1862 and was given the status of district on 14 March 1991 carving out from the erstwhile Saharsa district. Supaul district is bounded by Nepal in the north, Madhepura and Saharsa district in the south, Araria district in the east and Madhubani district in the west. The district has an international border with Nepal. The river flowing through this district is Koshi called “Sorrow of Bihar”.

Location, Area and Administrative Details²

Supaul is situated at 25° 37' – 26° 25' North Latitude and 86° 22' – 87° 10' East Longitude. The district is a part of the Koshi division and covers an area of 2420 sq.km. Supaul town is administrative headquarters of the district. The district comprises 4-sub divisions: Supaul, Birpur, Triveniganj and Nirmali. Supaul sub-division consists 4 blocks: Supaul, Kishanpur, Saraigadh-Bhaptiyahi and Pipra. Birpur Sub-division consists of 3 blocks: Basantpur, Raghobpur and Pratapganj. Triveniganj Sub-division has 2 blocks: Triveniganj and Chhatapur, and Nirmali Sub-division comprises 2 blocks: Nirmali and Marauna.

Water use habits

The People in the villages of Supaul district depend upon ground water for their domestic

supply, including drinking water. Since water in the district lies very close to ground surface, this was a convenient way of getting potable water by digging and setting a ring well of hardly 7m deep. In last decade and half, people have to get more easier a way to excess the ground water by auguring a hole up to 5-7m (usually one length pipe) and putting a locally designed hand pump assembly into that. In many cases bamboo is also used as the hand pump assembly pipe. The ground water level remains usually shallow. Hand boring with one length of pipe is sufficient to give adequate discharge to a 5 HP diesel pump set.

Sampling Sites

For the purpose of analysis of water quality of the district water samples were collected from all the eleven community development blocks namely- Pipra, Tribeniganj, Chhatapur, Pratapganj, Basantpur, Raghobpur, Supaul, Kishanpur, Saraygarhbhaptiyahi, Nirmali and Marauna and the result of the analysis was reported in previous paper³.

Health problem due to consumption of polluted water: Following are some of the important health problems associated with consumption of polluted water.

Typhoid:

Early history

Some historians believe that typhoid fever was responsible for a widespread plague in Athens in 430 BC, which proved fatal for one-third of the population, including the leader at the time, Pericles. His successor, Thucydides, also contracted the same disease, although it did not prove fatal. Jamestown, which was an English colony in Virginia, is also thought by some historians to have died out as a result of typhoid fever. In fact, the fever proved fatal for more than 6,000 settlers between 1607 and 1624, and may have been responsible for eliminating the entire colony. Military and war environments have often been subjected to the presence of typhoid fever throughout history. In excess of 80,000 soldiers

died as a result of typhoid fever or dysentery in the American Civil War. Likewise, the Spanish-American War led to infections with typhoid, both on the field and in training camps.

Mary Mallon “Typhoid Mary”

Mary Mallon, who is also commonly known as Typhoid Mary, was the most widely known carrier of typhoid fever. She was the first person in the United States to be identified as a carrier of the pathogen responsible for the disease, although she did not experience any symptoms related to the condition.

Mary Mallon worked as a cook and throughout her career and is thought to have infected 51 people, of which 3 cases proved fatal. She was forcibly isolated for quarantine purposes twice in her life, once in 1907 and again in 1915. The second time she was not released and later died in isolation at the age of 69.

Prevention and vaccine development

William Budd was an English doctor responsible for treating an outbreak of typhoid in 1838 when he noted that the poison, as he then called it, was present in the excretions of the infected and could be transmitted to healthy people through consumption of contaminated water. Upon realizing this association, Budd suggested isolating excrement to help control future outbreaks.

Karl Joseph Eberth was the first to describe the bacillus that was suspected to cause typhoid fever in 1880. Four years later, pathologist George Gaffky confirmed this link, naming the bacillus Eberthella typhi, which is known today as *Salmonella enterica*.

The first effective vaccine for typhoid was developed by Almroth Edward Wright and was introduced for military use in 1896. The development and distribution of this vaccine made a significant improvement to the health of soldiers.

Hookworm:

Hookworm is most likely to occur in a moist, hot climate. However, they occur in many locations around the world, including the United States. According to the Centers for Disease Control and Prevention (CDC) Trusted Source, between 576 and 740 million people worldwide have hookworm infections.⁴ It was once common in the southeastern parts of the US, but improvements in living conditions have reduced its occurrence. However, wherever humans and animals live together, including pets, infection⁵ is possible. There are different species of hookworm. The ones that infect humans include the *Ancylostoma duodenale* and *Necator americanus*.

Transmission: Hookworm can spread when a person who has the infection defecates in the soil or when people use human feces on the soil as a fertilizer. Hookworms can enter the skin when a person comes into contact with contaminated soil. If eggs are present in the feces, they can hatch after 1 to 2 days under the right conditions. After hatching, the larvae can survive for 3 to 4 weeks in the soil, according to the Merck Manuals. They take 5 to 10 days to mature in the soil. When a person comes into contact with this soil, hookworm larvae can pass through their skin. This can happen if the person:

- walks barefoot on soil that contains the larvae
- swallows soil particles, for example on unwashed salad leaves

After entering the body, the hookworm larvae make their way into the body's bloodstream and lymphatic vessels. These systems carry the larvae to the lungs. From there, the person can cough them up and swallow them. If a person digests mature hookworms, the worms attach to the small intestine and gain nutrients through human blood. In some cases, the person may develop anaemia⁶ as they lose blood to the hookworms. Worms may live for over 2 years. Mating also occurs in the small intestine. From here, thousands of eggs can enter the human feces. Hookworms cannot pass to another

individual through personal contact. Infection can only happen when the eggs mature into larvae in soil.

Hepatitis

Hepatitis is inflammation of the liver tissue^{7&8}. Some people or animals have no symptoms, whereas others develop yellow discoloration of the skin and whites of the eyes (jaundice), poor appetite, vomiting, tiredness, abdominal pain, and diarrhea^{9&10}. Hepatitis is acute if it resolves within six months, and chronic if it lasts longer than six months. Acute hepatitis can resolve on its own, progress to chronic hepatitis, or (rarely) result in acute liver failure¹¹. Chronic hepatitis may progress to scarring of the liver (cirrhosis), liver failure, and liver cancer⁸. Hepatitis is most commonly caused by the viruses' hepatitis A, B, C, D and E^{8&10}. Other causes include heavy alcohol use, certain medications, toxins, other infections, autoimmune diseases, and non-alcoholicsteatohepatitis (NASH)¹². Hepatitis A and E are mainly spread by contaminated food and water. Hepatitis B is mainly sexually transmitted, but may also be passed from mother to baby during pregnancy or childbirth and spread through infected blood. Hepatitis C is commonly spread through infected blood such as may occur during needle sharing by intravenous drug users. Hepatitis D can only infect people already infected with hepatitis B. Hepatitis A, B, and D are preventable with immunization. Medications may be used to treat chronic viral hepatitis. Antiviral medications are recommended in all with chronic hepatitis C, except those with conditions that limit their life expectancy¹³. There is no specific treatment for NASH; however, physical activity, a healthy diet, and weight loss are recommended. Autoimmune hepatitis may be treated with medications to suppress the immune system¹⁴. A liver transplant may be an option in both acute and chronic liver failure¹⁵. Worldwide in 2015, hepatitis A occurred in about 114 million people, chronic hepatitis B affected about 343 million people and chronic hepatitis C about 142 million people. In the United States, NASH affects

about 11 million people and alcoholic hepatitis affects about 5 million people. Hepatitis results in more than a million deaths a year, most of which occur indirectly from liver scarring or liver cancer. In the United States, hepatitis A is estimated to occur in about 2,500 people a year and results in about 75 deaths. The word is derived from the Greek *hêpar*, meaning “liver”, and *-itis*, meaning “inflammation”.

Acute hepatitis

Acute viral hepatitis follows three distinct phases:

1. The initial prodromal phase (preceding symptoms) involves non-specific and flu-like symptoms common to many acute viral infections. These include fatigue, nausea, vomiting, poor appetite, joint pain, and headaches. Fever, when present, is most common in cases of hepatitis A and E. Late in this phase, people can experience liver-specific symptoms, including choloria (dark urine) and clay-colored stools.
2. Yellowing of the skin and whites of the eyes follow the prodrome after about 1-2 weeks and can last for up to 4 weeks. The non-specific symptoms seen in the prodromal typically resolve by this time, but people will develop an enlarged liver and right upper abdominal pain or discomfort. 10-20% of people will also experience an enlarged spleen, while some people will also experience a mild unintentional weight loss.
3. The recovery phase is characterized by resolution of the clinical symptoms of hepatitis with persistent elevations in liver lab values and potentially a persistently enlarged liver. All cases of hepatitis A and E are expected to fully resolve after 1-2 months. Most hepatitis B cases are also self-limiting and will resolve in 3-4 months. Few cases of hepatitis C will resolve completely.

Both drug-induced hepatitis and autoimmune hepatitis can present very similarly

to acute viral hepatitis, with slight variations in symptoms depending on the cause. Cases of drug-induced hepatitis can manifest with systemic signs of an allergic reaction including rash, fever, serositis (inflammation of membranes lining certain organs), elevated eosinophils (a type of white blood cell), and suppression of bone marrow activity.

Fulminant hepatitis

Fulminant hepatitis, or massive hepatic cell death, is a rare and life-threatening complication of acute hepatitis that can occur in cases of hepatitis B, D, and E, in addition to drug-induced and autoimmune hepatitis. The complication more frequently occurs in instances of hepatitis B and D co-infection at a rate of 2–20% and in pregnant women with hepatitis E at a rate of 15–20% of cases. In addition to the signs of acute hepatitis, people can also demonstrate signs of coagulopathy (abnormal coagulation studies with easy bruising and bleeding) and encephalopathy (confusion, disorientation, and sleepiness). Mortality due to fulminant hepatitis is typically the result of various complications including cerebral oedema, gastrointestinal bleeding, sepsis, respiratory failure, or kidney failure.

Chronic hepatitis

Acute cases of hepatitis are seen to be resolved well within a six-month period. When hepatitis is continued for more than six months it is termed chronic hepatitis. Chronic hepatitis is often asymptomatic early in its course and is detected only by liver laboratory studies for screening purposes or to evaluate non-specific symptoms. As the inflammation progresses, patients can develop constitutional symptoms similar to acute hepatitis, including fatigue, nausea, vomiting, poor appetite, and joint pain. Jaundice can occur as well, but much later in the disease process and is typically a sign of advanced disease. Chronic hepatitis interferes

with hormonal functions of the liver which can result in acne, hirsutism (abnormal hair growth), and amenorrhea (lack of menstrual period) in women. Extensive damage and scarring of the liver over time defines cirrhosis, a condition in which the liver's ability to function is permanently impeded. This results in jaundice, weight loss, coagulopathy, ascites (abdominal fluid collection), and peripheral oedema (leg swelling). Cirrhosis can lead to other life-threatening complications such as hepatic encephalopathy, esophageal varices, hepatorenal syndrome, and liver cancer.

Thyroid

The **thyroid**, or **thyroidgland**, is an endocrine gland in vertebrates. In humans it is in the neck and consists of two connected lobes. The lower two thirds of the lobes are connected by a thin band of tissue called the thyroid isthmus. The thyroid is located at the front of the neck, below the Adam's apple. Microscopically, the functional unit of the thyroid gland is the spherical thyroid follicle, lined with follicular cells (thyrocytes), and occasional parafollicular cells that surround a lumen containing colloid. The thyroid gland secretes three hormones: the two thyroid hormones – triiodothyronine (T_3 -) and thyroxine (T_4) – and a peptide hormone, calcitonin. The thyroid hormones influence the metabolic rate and protein synthesis, and in children, growth and development. Calcitonin plays a role in calcium homeostasis. [1] Secretion of the two thyroid hormones is regulated by thyroid-stimulating hormone (TSH), which is secreted from the anterior pituitary gland. TSH is regulated by thyrotropin-releasing hormone (TRH), which is produced by the hypothalamus¹⁶.

The thyroid gland develops in the floor of the pharynx at the base of the tongue at 3–4 weeks gestation; it then descends in front of the pharyngeal gut, and ultimately over the next few weeks, it migrates to the base of the neck. During migration, the thyroid remains connected to the tongue by a narrow canal, the thyroglossal duct. At the end of the fifth week the thyroglossal duct

degenerates, and over the following two weeks the detached thyroid migrates to its final position. Euthyroid is the term used to describe a state of normal thyroid function in the body.

Thyroid disorders include hyperthyroidism, hypothyroidism, thyroid inflammation (thyroiditis), thyroid enlargement (goiter), thyroid nodules, and thyroid cancer. Hyperthyroidism is characterized by excessive secretion of thyroid hormones: the most common cause is the autoimmune disorder Graves' disease. Hypothyroidism is characterized by a deficient secretion of thyroid hormones: the most common cause is iodine deficiency. In iodine-deficient regions, hypothyroidism secondary to iodine deficiency is the leading cause of preventable intellectual disability in children¹⁷. In iodine-sufficient regions, the most common cause of hypothyroidism is the autoimmune disorder Hashimoto's thyroiditis. The presence of the thyroid and its various diseases have been noted and treated for centuries, although the gland itself has only been described and named since the Renaissance¹⁸. Knowledge of the thyroid, its biochemistry, and its disorders developed throughout the late nineteenth and twentieth centuries. Many modern treatments and investigative modalities evolved throughout the mid-twentieth century, including refinement of surgical techniques for thyroid removal (thyroidectomy) for the treatment of goitre¹⁹⁻³⁰; the use of radioactive iodine and thiouracil for the treatment of Graves' disease; and fine needle aspiration for diagnosis of thyroid nodules.

Cholera

Cholera is an infection of the small intestine by some strains of the bacterium *Vibrio cholerae*^{31&32}. Symptoms may range from none, to mild, to severe. The classic symptom is large amounts of watery diarrhea that lasts a few days³³. Vomiting and muscle cramps may also occur. Diarrhea can be so severe that it leads within hours to severe dehydration and electrolyte imbalance. This may result in sunken eyes, cold skin,

decreased skin elasticity, and wrinkling of the hands and feet³⁴. Dehydration can cause the skin to turn bluish³⁵. Symptoms start two hours to five days after exposure. Cholera is caused by a number of types of *Vibrio cholera*, with some types producing more severe diseases than others. It is spread mostly by unsafe water and unsafe food that has been contaminated with human feces containing the bacteria. Under cooked seafood is a common source³⁶. Humans are the only animal affected³⁷. Risk factors for the disease include poor sanitation, not enough clean drinking water, and poverty. There are concerns that rising sea levels will increase rates of disease. Cholera can be diagnosed by a stool test. A rapid dipstick test is available but is not as accurate³⁸.

Prevention methods against cholera include improved sanitation and access to clean water³⁹. Cholera vaccines that are given by mouth provide reasonable protection for about six months. They have the added benefit of protecting against another type of diarrhea caused by *E. coli*. The primary treatment is oral rehydration therapy—the replacement of fluids with slightly sweet and salty solutions. Rice-based solutions are preferred. Zinc supplementation is useful in children⁴⁰. In severe cases, intravenous fluids, such as Ringer's lactate, may be required, and antibiotics may be beneficial. Testing to see which antibiotic the cholera is susceptible to can help guide the choice^{41–45}.

Cholera affects an estimated 3–5 million people worldwide and causes 28,800–130,000 deaths a year. Although it is classified as a pandemic as of 2010, it is rare in high income countries. Children are mostly affected⁴⁶. Cholera occurs as both outbreaks and chronically in certain areas. Areas with an ongoing risk of disease include Africa and Southeast Asia. The risk of death among those affected is usually less than 5% but maybe as high as 50%. No access to treatment results in a higher death rate. Descriptions of cholera are found as early as the 5th century BC in Sanskrit. The study of cholera

in England by John Snow between 1849 and 1854 led to significant advances in the field of epidemiology. Seven large outbreaks have occurred over the last 200 years with millions of deaths⁴⁷.

Polio:

History of polio:

The history of polio (poliomyelitis) infections began during prehistory. Although major polio epidemics were known before the 20th century⁴⁸, the disease has caused paralysis and death for much of human history. Over millennia, polio survived quietly as an endemic pathogen until the 1900s when major epidemics began to occur in Europe. Soon after, widespread epidemics appeared in the United States. By 1910, frequent epidemics became regular events throughout the developed world primarily in cities during the summer months. At its peak in the 1940s and 1950s, polio would paralyze or kill over half a million people worldwide every year⁴⁹.

The fear and the collective response to these epidemics would give rise to extraordinary public reaction and mobilization spurring the development of new methods to prevent and treat the disease and revolutionizing medical philanthropy. Although the development of two polio vaccines has eliminated wild poliomyelitis in all but two countries (Afghanistan and Pakistan)^{50&51}, the legacy of poliomyelitis remains in the development of modern rehabilitation therapy and in the rise of disability rights movements worldwide

Ancient Egyptian paintings and carvings depict otherwise healthy people with withered limbs, and children walking with canes at a young age⁵². It is theorized that the Roman Emperor Claudius was stricken as a child, and this caused him to walk with a limp for the rest of his life⁵³. Perhaps the earliest recorded cases of poliomyelitis are that of Sir Walter Scott. In 1773, Scott was said to have developed “a severe teething fever which deprived him of the power

of his right leg⁵⁴. At the time polio was not known to medicine. A retrospective diagnosis of polio is considered to be strong due to the detailed account Scott later made⁵⁵, and the resultant lameness of his right leg had an important effect on his life and writing⁵⁶.

The symptoms of poliomyelitis have been described by many names. In the early nineteenth century, the disease was known variously as: Dental Paralysis, Infantile Spinal Paralysis, Essential Paralysis of Children, Regressive Paralysis, Myelitis of the Anterior Horns, Tephromyelitis (from the Greek tephros, meaning “ash-gray”) and Paralysis of the Morning⁵⁷. In 1789 the first clinical description of poliomyelitis was provided by the British physician Michael Underwood he refers to polio as “a debility of the lower extremities”⁵⁸. The first medical report on poliomyelitis was by Jakob Heine, in 1840; he called the disease Lahmungszustande der unteren Extremitäten (“Paralysis of the lower Extremities”). Karl Oskar Medin was the first to empirically study a poliomyelitis epidemic in 1890. This work, and the prior classification by Heine, led to the disease being known as Heine Medin disease.

Survey of people regarding water pollution and health hazards:

During the ground water collection several people belonging to different panchayats of different blocks were interviewed regarding water pollution and related health hazards and the detail is tabulated in the tables 6.1 to 6.11

During the water collection period, the information regarding water borne disease was gathered from the people of the area. Almost all people accepted that the pollution of water is responsible for most of the water born diseases in the area. So, the quality of groundwater must be assessed to find out the toxic and other harmful substances present in the groundwater. As per the public opinion the common water born diseases are cholera, dysentery, Typhoid, Jaundice, polio, Hookworm, Diarrhea etc. During

the course of investigation, persons suffering from these diseases were frequently encountered.

Challenges:

Historical rates of progress would need to double for the world to achieve universal coverage with basic drinking water services by 2030. To achieve universal safely managed services, rates would need to quadruple. Climate change, increasing water scarcity, population growth, demographic changes and urbanization already pose challenges for water supply systems. Over 2 billion people live in water-stressed countries, which is expected to be exacerbated in some regions as result of climate change and population growth. Re-use of wastewater to recover water, nutrients or energy is becoming an important strategy. Increasingly countries are using wastewater for irrigation; in developing countries this represents 7% of irrigated land. While this practice if done inappropriately poses health risks, safe management of wastewater can yield multiple benefits, including increased food production.

Options for water sources used for drinking-water and irrigation will continue to evolve, with an increasing reliance on groundwater and alternative sources, including wastewater. Climate change will lead to greater fluctuations in harvested rainwater. Management of all water resources will need to be improved to ensure provision and quality.

WHO's response:

As the international authority on public health and water quality, WHO leads global efforts to prevent water-related disease, advising governments on the development of health-based targets and regulations. WHO produces a series of water quality guidelines, including on drinking-water, safe use of wastewater, and recreational water quality. The water quality guidelines are based on managing risks, and since 2004 the *Guidelines for drinking-water quality*

promote the Framework for safe drinking-water. The Framework recommends establishment of health-based targets, the development and implementation of water safety plans by water suppliers to most effectively identify and manage risks from catchment to consumer, and independent surveillance to ensure that water safety plans are effective and health-based targets are being met. The drinking-water guidelines are supported by background publications that provide the technical basis for the Guidelines recommendations. WHO also supports countries to implement the drinking-water quality guidelines through the development of practical guidance materials and provision of direct country support. This includes the development of locally relevant drinking-water quality regulations aligned to the principles in the Guidelines, the development, implementation and auditing of water safety plans and strengthening of surveillance practices. Since 2014, WHO has been testing household water treatment products against WHO health-based performance criteria through the [WHO International Scheme to Evaluate Household Water Treatment Technologies](#). The aim of the scheme is to ensure that products protect users from the pathogens that cause diarrhoeal disease

and to strengthen policy, regulatory and monitoring mechanisms at the national level to support appropriate targeting and consistent and correct use of such products.

WHO works closely with UNICEF in a number of areas concerning water and health, including on [water, sanitation, and hygiene in health care facilities](#). In 2015 the two agencies jointly developed WASH FIT (Water and Sanitation for Health Facility Improvement Tool), an adaptation of the water safety plan approach. WASH FIT aims to guide small, primary health care facilities in low- and middle-income settings through a continuous cycle of improvement through assessments, prioritization of risk, and definition of specific, targeted actions. [A 2019 report](#) describes practical steps that countries can take to improve water, sanitation and hygiene in health care facilities.

Conclusion:

Finally it was concluded that the people of Supaul district is suffering from water born diseases mainly due to consumption of polluted water. Govt. should take care on this.

Table - 6.1
Pipra Block

Sr. No.	Name	Address	Qualification	Age	Occupation	Hazards information
1	2	3	4	5	6	7
1	Narayan Mandal	Amha	Literate	40 y	Labor	Cholera, Hook Worm Fever
2	Lalan Kumar Pathak	Amha	Matric	50 y	Farmer	Diarrhea hook worm Jaundice
3	Rajesh Kumar	Tetrahi	I.A	22 y	Student	Jaundice Fever
4	Ajit Kumar	Jhitkiya	12 th Pass	24 y	Completion's Preparation	Cholera, Hook Worm Diarrhea
5	Manoj Roshan	Batran	B.A.	30 y	School Teacher	Cholera Diarrhea
6	VindKumar Yadav	Batran	Literate	45 y	Farmer	Fever, Stomach pain, Hookworm
7	Rabindra Sah	Pipra	Literate	40 y	Khaja seller	No any Diseases
8	Koshal Kumar	Pipra	I.Sc	22 y	Student	Hookworm Diarrhea
9	Dr. J. P. Sah	Pipra Hospital	MBBS	57 y	Doctor	Jaundice, Hookworm, Polio etc. But slowly decrease as in the society due to better water Supply Management by government.
10	Suresh Sah	Pipra	Literate	40 y	Small Business	Not any types knowledge of water disease

Table - 6.2 :
Tribeniganj Block:

Sr. No.	Name	Address	Qualification	Age	Occupation	Hazards information
1	2	3	4	5	6	7
1	Lakhan Sah	Tribeniganj	Literate	50 y	Business	Stomach pain, Headache
2	Shambhu Yadav	Tribeniganj Market	Matric	40 y	Business	Jaundice
3	Birendra Kumar	Tribeniganj	Inter	35 y	Business	Polio, Fever
4	Manoj Kumar	Tribeniganj Malhanma	M.Sc.	45 y	Cov. Service chhatapur	Jaundice Polio in decreasing order
5	Deonarayan Yadave	Daparkha	B.A	50 y	Teacher	Mainly Hook worm
6	Dr. Anil kumar Sah	Daparkha Ward No. 03	Inter	45 y	Practice	Hook Worm, indigestion
7	Dr. (Prof) Sudit Narayan Yadav	Daparkha Ward No. 03, H.O.D. , Physics, Tribeniganj College Tribeniganj	M.Sc. (Phy), Ph D	50 y	Lecturer	All water borne diseases going on in decreasing order
8	Suraj Kumar	Daparkha	Matric	40 y	Hotel	No any disease
9	Amit Kumar	Lakshminia	B.A.	35 y	Student	Stomach Pain Indigestion
10	Chandan Kumar	Pilwha	B.A.	30 y	Student	Hook Work, Stomach Pain

Table - 6.3 :
Chhatapur Block

Sr. No.	Name	Address	Qualification	Age	Occupation	Hazards information
1	2	3	4	5	6	7
1	Yogendra thakur	Chhatapur	Inter	35 y	Gold Smith	Cholera, Hookworm
2	Rabi Kumar Bhagat	Chhatapur	10 th pass	40 y	Rice Seller	Stomach Pain Hook Worm
3	Dr. Santosh Kumar	Chhatapur	C.M.S.	40 y	Practice	Liver, Kidney
4	Vivek Kumar	Chhatapur	I. Sc	25 y	Student	Hook Worm, Cholera
5	Bindeshwari Sah	Chhatapur	Literate	50 y	Sweet Seller	No any disease
6	Birendra Kr. Singh	Chhatapur	B.A.	35 y	Teacher	Carcinogenic group's diseases
7	Maheshwari Yadav	Chhatapur	Literate	40 y	Farmer	No any disease Known
8	Suraj Narayan Mandal	Chhatapur	Literate	35 y	Hotel	Stomach Pain Hook Worm
9	Kamal Kishore Mandal	Chhatapur	B.A.	27 y	Student	Polio, Cholera
10	Prawin Kumar	Chhatapur	I.A.	22 y	Student	Hook Worm Jaundice

Table - 6.4 :
Pratapganj Block:

Sr. No.	Name	Address	Qualification	Age	Occupation	Hazards information
1	2	3	4	5	6	7
1	Arjun Yadav	Pratapganj	Literato	40 y	Farmer	Stomach Pain, Skin Cancer
2	Dr. Anil kumar	Pratapganj	BDS	45 y	Practice	Hook Worm, Jaundice
3	Suresh Kumar	Partapganj	I.A.	25 y	Student	Cholera
4	Abhay Kumar Yadav	Partapganj	B.A.	27 y	Student	Hook Worm Jaundice
5	Nirmal Kumar	Partapganj Middle School	B.A	35 y	Teacher	Hook Worm Cholera
6	Arun Kumar Mandal	Partapganj Hospital	I.A.	35 y	4 th grade	Stomach Pain, Hook Worm
7	Pradeep Kumar	Partapganj High School	10 th	16 y	Student	No any disease known
8	Pawan kumar	Partapganj	B.A.	40 y	Gov. Job.	Polio, Jaundice
9	Ganesh Thakur	Pratapganj Market	Literate	40 y	Sweet Sheller	Cholera, Jaundice
10	Ramesh Kumar	Pratapganj Bazar	Literate	45 y	Hardwar shop	No any disease Known

Table - 6.5 :
Basantpur Block:

Sr. No.	Name	Address	Qualification	Age	Occupation	Hazards information
1	2	3	4	5	6	7
1	Kritnarayan Kumar	Basantpur Bazar	Matric	35 y	Kirana Shop	Skin disease Hook worm
2	Pariwesh Kumar	Basantpur Bazar	I.A.	24 y	Student	Piliya
3	Harikishore Das	Basantpur Bazar	Literate	40 y	Sweet Seller	Cancer, Liver damage
4	Devan yadav	Basantpur Market	I.A.	35 y	Metal Shop	Hook Worm, Liver Cancer
5	Krishna Kumar	Basantpur Market	I. Sc	25 y	Student	Skin disease Fever
6	Mohan Yadav	Basantpur Middle School	B.A.	35 y	Teacher	Jaundice Fever
7	Jaikrishna Kumar	Basantpur Market	Literate	30 y	Tea Seller	No any Disease Known
8	Kunal Kumar	Basantpur Market	I.A.	22 y	Student	Polio. Piliya
9	Chedilal Yadav	Gudri Hat Malik	Matric	45 y	Business	Jaundice, Hookworm

Table - 6.6 : Raghapur Block:

Sr. No.	Name	Address	Qualification	Age	Occupation	Hazards information
1	2	3	4	5	6	7
1	Sunil kumar	Raghapur Bazar	08 th pass	40 y	Bus Stand Private clerk	Piliya, Polio Jaundice
2	Mohan Mandal	Raghapur Bazar	Literate	45 y	Business	Hook worm Fever
3	Tarunkumar	Ganpat Ganj	M.Sc	40 y	Teacher in private College	Jaundice Polio, Stomach pain
4	Ramesh kumar	Ganpatganj	I.A.	40 y	Worker of Bishnu Mandir	Hook worn, Polio, Jaundice
5	Kamal Yadav	Ganpatganj	Literate	35 y	Farmer	Stomach Pain, Fever
6	Laltukumar	Dharhara	B.A.	27 y	Student	Fever, Hook Work
7	Pramod Kumar	Dharhara	B.A Stet Pass	30 y	Home Work	Jaundice, Polio
8	Khushi Yadav	Dharhara	Literate	45 y	Farmer	Head pain, Stomach Pain
9	Bishnudeo Mandal	Dharhara	Literate	40 y	Fish Seller	No any disease Known
10	Kailash Kumar	Dharhara	I.A. Stet Pass	28 y	Home Work	Jaundice, Hookworm

Table - 6.7 : Supaul Block:

Sr. No.	Name	Address	Qualification	Age	Occupation	Hazards information
1	2	3	4	5	6	7
1	Pawitra Yadav	Hardi	Literate	50 y	Farmer	Head Pain, Stomach Pain
2	Jibneshwar Pathak	Hardi	I.A	50 y	Durga Mandir Seva	No any disease due to maa Durga
3	Dr. Surajnarayan Mandal	Hardi	-	50 y	Practice	Diarrhea, Hookworm, Stomach Pain
4	Gurukripa Yadav	Koshli Patti Stet Pass	I.A	35 y	Self-home work	Hookworm stomach pain
5	Mahendra Mehta	Lakshminiya	M.A.	55 y	Private teacher	Hookworm, Jaundice Polio
6	Raghu Yadav	Lakshminiya	Literate	50 y	Farmer	Stomach Pain Hook Worm
7	Koshal Kumar	Choughara	M.A.	30 y	Competition Preparation	Jaundice, Hapatitice
8	Komal kumar	Choughara	I.A	22 y	Student	Head Pain Hookworm Polio
9	Madhusudan Kumar	Choughara	B.A.	27 y	Job aracleark	Piliya, Hookworm
10	Abhinandan Yadav	Choughara Basti	Literate	40 y	Farmer	Stomach Pain, Skin Disease

Table - 6.8 :
Kishanpur Block

Sr. No.	Name	Address	Qualification	Age	Occupation	Hazards information
1	2	3	4	5	6	7
1	Kapildeo thakur	Kishanpur Bazar	Literate	35 y	Business	Respiration, Stomach Pain
2	Rajesh Raj	Kishanpur Bazar	Matric	27 y	Tea Seller	Hook worm, Head Pain
3	Rabindra Kumar	Andoli	I.A.	24 y	Business	Jaundice, Hook Worm
4	Ganesh Yadav	Andoli	Literate	35 y	Farmer	Cancer, Head pain
5	Gopi Kumar	Andoli	B.A.	24 y	Student	Stomach Pain, Head Pain Cancer
6	Prabhu Yadav	Mahipatti, Maladh	Matric	40 y	Business	Stomach Pain, Head Pain
7	Komal Kumari	Mahipatti	B.A.	35 y	School Teacher	Jaundice, Cancer, Hookworm
8	Satrugana Choudhary	Mahipatti	Literate	40 y	Business	Hookworm, Polio
9	Komal Kant Choudhary	Mahipatti	Matric	35 y	Local leader	Jaundice, Hookworm
10	Amar Kumar	MahipattiM aladh	B.A	27 y	Competition preparation	Hookworm, headache cancer

Table - 6.9 :
Bhaptiyahi Block:

Sr. No.	Name	Address	Qualification	Age	Occupation	Hazards information
1	2	3	4	5	6	7
1	Arjun Kumar Akela	Bhaptiyahi Bazar	B.A	35 y	Clerical Gov. Job	Jaundice, polio, Cancer
2	Shrimant Choudhary	Bhaptiyahi Bazar	Literate	40 y	Metal shop	Hook worm, head pain
3	Kamleshwari Yadav	Bhaptiyahi	Literate	45 y	Farmer	No any disease is in knowledge
4	Mohan Bhagat	Bhaptiyahi	10 th pass	40 y	Cloth seller	Stomach Pain, Hookworm
5	Saryug Mandal	Bhaptiyahi, Market	Kiterate	40 y	Kirana shop	Cancer, Stomach pain
6	Krishnakant Kumar	Bhaptiyahi	B.A.	27 y	Student	Hookworm, Jaundice
7	Raman Kumar	Bhaptiyahi	I.A.	22 y	Student	Head Pain, Stomach Pain, Indigestion
8	Kamal Kishore	Bhaptiyahi	Matric	30 y	Metal Shop	Cancer, Hookworm
9	Shambhu Kumar	Bhaptiyahi	Literate	35 y	Business	Head Pain, Stomach Pain, Indigestion
10	Guru Prasad	Bhaptiyahi	Matric	30 y	Business	Hookworm, Jaundice, Cancer

Table - 6.10 :
Nirmali Block:

Sr. No.	Name	Address	Qualification	Age	Occupation	Hazards information
1	2	3	4	5	6	7
1	Jawahar Kumar	Nirmali Market	Matric	35 y	Metal shop	Hookworm, Giardia, Indigestion
2	Pramod Kumar	Nirmali Market	I.A.	30 y	Cloth Seller	Jaundice Hookworm
3	Pappukumar Singh	Nirmali Bazar	B.A. Trained	26 y	Stet pass	Cancer, Head pain, Stomach pain
4	Narayan Yadav	Bela	Literate	40 y	Farmer	Hookworm, Indigestion
5	Shivdatt Yadav	Bela	Literate	45 y	Farmer	Cancer, Hookworm
6	Jibanshukumar	Bela	I.A.	22 y	Student	Head Pain, Hookworm
7	Devendra Yadav	Domahan ward no. 02	Matric	40 y	Agriculture	Hookworm, Stomach Pain Indigestion
8	Abdheshkumar	Domahan Ward No. 02	I.A.	40 y	Teacher	Cancer, Giardia
9	Hanuman Kumar	Domahan Ward No. 02	B.A.	36 y	Student	Hookworm, Cancer, Stomach Pain
10	Mohan Yadav	Bela Singar Moti	Literate	40 y	Farmer	Head Pain Stomach, Pain

Table - 6.11 :
Marauna Block:

Sr. No.	Name	Address	Qualification	Age	Occupation	Hazards information
1	2	3	4	5	6	7
1	Karuna Kumar	Marouna Bazar	Literate	40 y	Business	Hookworm, Giardia, Head Pain
2	Maheshwar pandey	Marouna Bazaar	I.A.	40 y	Business	Stomach Pain, Head, Pain Indigestion
3	Probhu Pandey	Marouna Bazaar	I.A.	35 y	Farmer	Hookworm, Jaundice
4	Nawal Kishore Das	Piperpanti	B.A	40 y	Local Leader	Hookworm, Jaundice, Indigestion
5	Mahendra Prasad	Piperpanti	I.A.	65 y	Retired Cleark	Jaundice, Giardia, Indigestion
6	Badri Ram	Piperpanti	Literate	40 y	Labour	Hookworm, Cancer
7	Anil Kumar	Barhara	B.A.	45 y	Local Leader	Hookworm, Body Pain, Skin Cancer
8	Pintu Kumar	Barhara	I.A.	22 y	Student	Cancer, Indigestion
9	Raman Kumar	Barhara	I.A.	22 y	Student	Cancer, Polio
10	Amar kumar	Barhara	B.A	26 y	Student	Hookworm, Cancer, Indigestion

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