# PREVALENCE OF INTESTINAL PARASITE WITH RESPECT TO SOCIO-ECONOMIC ASPECT IN DOM COMMUNITY OF JANAKPUR MUNICIPALITY, DHANUSHA

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**Submitted to**

Central Department of Zoology

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Tribhuvan University

Kirtipur, Kathmandu

Nepal

# DECLERATION

I hereby declare that the work presented in this thesis has been done by myself, and has not been submitted elsewhere for the award of any degree. All the sources of information have been specifically acknowledged by reference to the author(s) or institution(s).

**Date……..** **…….**

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# RECOMMENDATION

This is to recommend that the thesis entitled "**Prevalence of intestinal parasite in Dom community with respect to socio-economic aspect in Dom community of Janakpur Municipality, Dhanusha"** has been carried out by Praful Chandra Jha for the partial fulfillment of Master's Degree of Science in Zoology with special paper Parasitology. This is his original work and has been carried out under my supervision. To the best of my knowledge, this thesis work has not been submitted for any other degree in any institutions.

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# LETTER OF APPROVAL

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# CERTIFICATE OF ACCEPATANCE

This thesis work submitted by Praful Chandra Jha entitled "Prevalence of Intestinal Parasites with respect to socio-economic aspect in Dom Community of Janakpur Municipality, Dhanusha" have been accepted as partial fulfilment for the requirement of Master Degree of Science in Zoology with special paper Parasitology.

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# ABSTRACT

The Dom is considered the lowest untouchable caste groups of the Terai. They are not allowed to fetch water either from the private or public tube-wells. They have separate tube-wells for their own use or go to the nearby stream/pond to fetch water. Making a variety of baskets from the bamboo is their traditional caste occupation. In addition, grave-digging and cremating dead bodies are also considered their traditional occupation. These are their main source of earning a livelihood (Sah 2005). The present study was carried out to analyze the prevalence rate of gastrointestinal parasite infection among people of Dom community. A group of 210 people were enrolled in the study out of which 80 were females and 130 were males. Stool smear examination was performed on each individual to identify the parasites. The overall frequency of intestinal parasites observed in the study were 33% protozoa and 4% helminths respectively. The observed protozoan parasites include *E. histolytica* and *G. lamblia*, which is present in both the sexes. Similarly the helminth parasites observed were Hookworm and *A. lumbricoides*. But *A. lumbricoides* is present only in female, not in male. The overall prevalence indicated that males were more infected with parasite infection than female. The age wise prevalence indicated maximum parasitic infection in 5-20 years of age group. The conclusion from KAP survey indicated that poor sanitary condition, lack of knowledge of parasitic diseases and its transmission, poor economic status and compulsions of the culture enhanced the percentage of parasitic infection in the Dom community of Janakpur.

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# LIST OF ABBREVIATIONS

| Abbreviated form | Details of abbreviations |
|---|---|
| +ve | Positive |
| CBS | Central Bureau of Statistics |
| Yrs. | Years |
| AD | After the death of Jesus Christ |
| WHO | World Health Organizations |
| CC | Cubic Centimeter |

# 1. INTRODUCTION

## 1.1 Background

Nepal is a multilingual, multi-cultural and multiethnic country. The way of life, dress, language, socio-economic and cultural identities of the people are apparently different followed by geographical variation. Therefore, each group of people has their own identities; they do their own numerous characteristics. Geographically, the country is divided into three broad ecological regions stretching from the east to the west. On the high Himalayan region snow covers all the year round; the hills consists of Mahabharat and Churiya ranges and the Terai is plain which is supposed to be a granary of food grains. The Himalayan region, which is to the north of the Mahabharat range is largely an Archic Wasteland and been a marginal area for human settlement. Sherpas, Lomis, Topkes, Golas, generally known as Bhotiyas, are the dwellers of this region. The population is still sparse and the main economic activities are barter, trade, pastoralism and shifting cultivation (Sah 2005).

The Hill region is also known as mid land lies between the Mahabharat and the Churiya range. It is a sub-tropical belt and has been the traditional population zone of Brahmins, Chhetris, occupational caste groups, Newars, Rais, Limbus, Gurungs, Magars and Tamangs. Subsistence agriculture is the basis for the hill economy. The Terai region is divided into two regions i.e. outer Terai and inner Terai, where Rajputs, Danuwars, Tharus, Majhis, Satars, Yadavs, Brahmins, Chhetris, Muslims, Chamars, Doms, Musahars, Halkhors, etc. dwell. The Terai consists of forest and was once unhabituated due to malaria. Now it has acquired greater economic importance with new shelters and reclamation of agricultural by clearing forest. As the people of Nepal mentioned above live in different physical conditions, naturally, they have developed in course of time different types of customs and manners. Their food habits vary from region to region. They differ from one another in language. They differ tribe-wise and pace-wise. For instance, the Newars of Kathmandu valley differ from the Newars of the rest of country in their culture, language and so on (Sah 2005).

It is needed to identify the community to which Dalit group belong to caste system; and refers to an occupationally segregated, hierarchically and ritually discriminatory

social system based on heredity of an individual or group of individuals. They are economically exploited, politically voiceless, socially humiliated and treated as "Untouchables". In essence, the victim of caste-based discrimination and untouchability can be considered as Dalits. The Dalits have been placed at bottom in the Hindu caste system. The major Dalit caste groups in the Terai are Musahar, Chamar, Dom, Tatma, Dusadh, Khatwe, Bantar, Dhobi, Chidimar, Patharkatta/Kushwadia and Halkhor while such caste groups in the Hills are Damai, Kami and Sarki. In the Kathmandu valley, the major Dalit castes include Pode and Chyame (Sah 2005).

The Dom is concentrated more in districts like Morang, Jhapa, Sunsari, Siraha, Saptari, Dhnusha, Mahottari, Sarlahi, Bara, Parsa, Rautahat, Rupandehi, Kapilbastu, Nawalparasi, Banke and Bardia. The total population of Dom in Nepal is 8,931 (0.04%) where the total number of male is 4631 and female is 4300. (Population Census, 2001). The Dom is considered the lowest untouchable caste groups of the Terai. They are not allowed to fetch water either from the private or public tube-wells. They have separate tube-wells for their own use or go to the nearby stream/pond to fetch water. Making a variety of baskets from the bamboo is their traditional caste occupation. In addition, grave-digging and cremating dead bodies are also considered their traditional occupation. These are their main source of earning a livelihood (Sah 2005).

## 1.2 IntestinalParasites

Intestinal parasites are microorganisms that live in the intestine. Some are pathogenic which cause problems while some are non-pathogenic can live for long periods in the bowel without causing symptoms or requiring treatment. Infection by intestinal parasitic worms is wide spread throughout the world affecting hundreds of millions of people (WHO 2002).

Parasites are the organism that lives in another organism (host), consumed host nutrients and leave toxic waste inside the host. There are different types of parasites but the important one fall under four different groups. They are protozoa, Trematoda (flukes), Cestoda (tapeworms) and Nematodes. Intestinal parasitic infections such as Amoebiasis, Ascariasis, Hookworm infection and Trichuriasis are among the 10 most common infections in the world (WHO 1987).

## 1.3 ParasiticInfections

Parasitic infections are governed by behavioral, biological, environmental, socio economic and health system factors. Local conditions such as quality of domestic and village infrastructure, economic factors such as monthly income, employment and social factors such as education influence the risk of infection disease transmission and associated morbidity and mortality (Yakubu et al. 2003).

Apart from causing morbidity and mortality, infections with intestinal parasites have been associated with stunning, physical weakness and commonly slow mental progress especially in the case of children (Nokes and Bundy 1994).

WHO estimated that nearly one fourth of world's population harbor one or more intestinal parasite in their gastro-intestinal tract intestinal parasitic is a major cause of morbidity and mortality among school aged children in developing countries (WHO 1987).

Poverty is deeply rooted in Nepalese society; especially in rural areas with per capita income of less than 45 & 244 up to 2001, and 42% of the Nepal's population were below poverty line (CBS 2001). The health status of the population is a reflection of the socio-economic development of the country and is shaped by a variety of factors, the level of income and standard of living, housing, water supply, education, sanitation, including work place environment, employment, consciousness, the coverage accessibility and affordability of health care delivery services, social security, participation in the socio-political activities of the community recreation and human rights (KECPHEC, 1997).

Low economic status is not the sole factor for parasitic infections but also the increased water pollution is one of the major public health in issues in Nepal. Parasitic infection diarrhea of gastro-intestinal diseases are the result of environmental particularly, the water pollution. In Kathmandu, 78% of solid waste is bio degradable and 22% non-biodegradable that lead to water pollution (CEDA, 1989). Diarrhea

(10%) is the disease caused by contaminated water in Nepal (DOHS 1998 and SAEHN 2002).

Roundworms linked to food borne illness human *include A.lumbricoides, T.trichiura, E.vermicularis*. Among food borne cestodes*H.nana* is also a major problem. Protozoa like *E. histolytica, C.parvum*and*G.lamblia* causes large number of food borne outbreak each ear leading to dysentery like illness that can be fatal. Those foods that contacted faeces or contaminated water are common vehicle for intestinal parasites (Wallace &Doebbeling 1998).

Prevalence of parasites *A.lumbricoides* for instance has remained unchanged (Rogers 1987 and Rai et al. 1995). In some tropical areas, the prevalence reaches nearby 100%. Twenty five percent of world's population estimated to have been infected with one or more species of soil-transmitted helminthes alone (Pawloski, 1984). The reported prevalence of intestinal parasites in Nepal varies considerably from one study to another (Rai et al. 1980 &1995) with over 90% prevalence in some areas (Rai&Gurung 1986 and Reily 1980). High prevalence of the parasites has been due to the contamination of the soil and water (Rai et al. 2000 and Ono et al. 2001).

Moreover, emerging new parasites also have been reported from Nepal (Sherchand et al. 1986 and 1999). A very high percentage of faecal contamination of drinking water in Kathmandu (Adhikari et al. 1986) and the seasonal changes influence greatly in the parasitic infection rate (Ono et al. 2001).

There was a strong association between giardial infection and under nutrition of many primary school children (Adhikari et al. 1986). Malnourished children have increased morbidity and mortality with diarrhea suffering linger and by more severe attacks (Cutting, 1988). Similarly, the soil contamination with helminth eggs in Nepal is higher in wet season than in the dry season. Intestinal infections like giardiasis, amoebiasis, ascariasis, ancylostomsiasis, fascioliasis and taeniasis are common in Nepal (Acharya1979). It is because of the dirty fingers and nails which might play an important role in the transmission of intestinal parasites (Soulsa 1975).

## 1.4 IntestinalParasiticDiseases

Most of the intestinal parasitic diseases are related to hygiene and sanitation of the community people. Most of them are transmitted through contaminated foods and drinks and some are transmitted through skin penetration mainly from contaminated soil.

### 1.4.1 Ascariasis

Ascariasis is an infection caused by a parasitic worm *Ascarislumbricoides*. It is found throughout temperate and tropic regions. The adult worm lives in the small intestine of man and gravid female starts laying eggs. The eggs are passed in human faeces contaminating the soil and allowing transmission to the mouth of others through hands, water or food.

After hatching in small intestine, then they are carried by lymphatic and blood to the lungs. Early respiratory symptoms of coughing, fever, etc are caused by passage through the respiratory tract. The larvae are swallowed, they mature in the jejunum, where they release eggs and the cycle is repeated. Intestinal infection may result in abdominal cramps and obstruction. In children, migration of adult worms into the live, gall bladder or peritoneal cavity may cause death. The infective eggs are identified in the faeces.

### 1.4.2 Taeniasis

Taeniasis is a parasitic disease caused by the cestode parasite. *Taeniasolium*or*Taeniasaginata*. Infection is acquired through eating pork or buff which are common meats among these community people. In buff and pork, the larvae stage of the parasite exists. If such measly meat is eaten without cooking properly, the parasite hatches in the intestine and mature, causing intestinal discomfort. Auto infection is common in this case. If eggs of parasite are swallowed by human, accidently, it may cause cysticircosis.

### 1.4.3 Trichuriasis (whipworm infection)

The infection caused by *Trichuristrichiura* is called trichuriasis. The adult worm lives in the large intestine, particularly in caecum, also in the vermiform appendix.

Man is infected when the embryonated eggs are swallowed with water or food. It passes down the caecum and become adult. It passes down the caecum and become adult.

In heavy infection, abdominal pain, loss of weight is seen in patient.

### 1.4.4 Ancylostomiasis

The infection caused by *Ancylostomaduodenale* is called *ancylostomiasis. Ancylostomaduodenale* is commonly called Hookworm. The adult worm lives in jejunum and less often in duodenum. No intermediate host is required. Man is the only definite host. The eggs are passed out in the faeces. The egg hatches out in the soil. The filariformlarvae infects man by penetrating the skin. The larvae enter into the lymphatics or small venules and then into the venous circulation from the heart it enters pulmonary capillaries and reach the alveolar spaces. They migrate or to the bronchi, trachea and larynx and finally swallowed.

Ancylostomiasis is chiefly characterized by anaemia. This occurs when a man walks bare food on the faecally contaminated soil. The larvae can penetrate any part of the skin which sufficiently thin larvae of hook worm cause lesions in the skin and in the lungs. The adult worm causes anaemia.

### 1.4.5 Amoebiasis

Infection of *Entamoebahistolytica* commonly causes amoebiasis. In developing world, amoebiasis causes some 450 million infection per annum, about 50 million incidents and about100000 deaths (Ravdin, 1988). After ingestion by a man excystment in the small intestine takes place. The amoebae may either invade the mucous membrane of the colon and caecum and multiply or may remain in the intestinal lumen.

Trophozoites if invade the tissue feed on blood, forming abscesses in mucosa and sub-mucosa. Some may be carried by the portal blood stream to the liver (Smytn 1996) stool of a patient of amoebic dysentery is offensive dark brown and semi fluid, acid in reaction admitted with blood and mucus (chatterjee 2002).

### 1.4.6 Giardiasis

*Giardia lamblia* causes giardiasis. Giardia is found in duodenum and upper part of the jejunum of a man and exists in two phasestrophozoites and cyst.

Giardia attaches itself on the convex surface of the epithelial cells in the intestine and may cause a disturbance in intestinal function leading to mal absorption of fat. Consequently the patient may complain persistent looseness of bowels and passage of yellowish and greasy stools in which there is excars of fat. The parasite may harm by its toxic effects. Chronic enteritis and acute enterocolitis may occur. Fever, anaemia and allergic manifestation may be seen.

## 1.5 Objectives of the Study

The objectives of the study are categorized as general objectives and specific objectives.

### 1.5.1 General Objectives

To study the prevalence of intestinal parasites among the Dom community people of Janakpur Municipality in relation to socio-economic aspects.

### 1.5.2 Specific Objectives

- To find out the age and sex wise prevalence of intestinal parasites among the Dom Community people of Janakpur Municipality.
- To determine educational and economic status of Dom Community people.
- To find out the co-relation between hygiene, sanitation and food habit with intestinal parasitic infection.

## 1.6 Significance of Study

The present study was carried out to find the prevalence rate of intestinal parasitic infection in people of Dom community of Janakpur Municipality. This prospective study was focused to evaluate the relation between parasitic infection and unhygienic condition of people of this community.

# Map of Dhanusha District

# 2.LITERATURE REVIEW

## 2.1 World-wide Literature review for intestinal parasites

To study the influence of intestinal parasitic infection, stools were collected from 197 normal adult males 6-60 years of age were studied and eggs of hookworm or *Ascaris* were counted. The helminthic infection rate was 65.04% hook worm 83.9% and *Ascaris* 10.4%. The average no of hookworm eggs found were 784.5 /cc of stool, the minimum being 100 and the maximum 3400. The average no. of eggs/cc of stool was 2492.8, the minimum being 300 and maximum 16200 (Bhaduri1959).

The prevalence of intestinal parasites in hospitals inpatients and out patients by examining 2500 consecutive fecal specimen submitted to the laboratory over 2 years period (1955-57). The result obtained from the study indicated that intestinal parasites were found in about 29% of specimen. Approximately 50% of the positive specimen contained more than 1 species of parasite. *G. lamblia* was the most common protozoan. *E.histolytica* was present in about 4%. The most common helminthes were *T.trichuria* and hookworm (Cosgrove (1960). This study supported the presence of intestinal parasites in adult males which showed helminthic infection about 65.04% (Bhaduri 1959).

Dom community is regarded as the socially marginalized group which were deprived of sanitary and hygienic conditions in their living standard (Sah 2005). So, they are considered as risk group for parasitic infection. It is supported by the comparative study of the incidence of parasites in three different population groups and found 86% positive cases among them. While the percentage was almost equal in children and office employees (82% and 81% respectively) in crafts men it was much higher (95%) due to deficient sanitary and hygiene conditions of their living conditions. The parasitic incidence in the 258 positive cases were *E. coli*, 51.55% *G.lamblia*, 20.92% *E. histolytica*, 20.15% and *A.lumbricoides*10.85% (Peroz and Felix 1965).

Similar study was carried about causation and the practices with regard to treatment and prevention of ascariasis of a rural Dom community. The most common belief was thus children eating a side dish, lauk containing fish the milk of mature coconut, peanuts and eggs cause ascarsiasis, the vast majority (92.2%) of households used piperazine or sanitation preparation for treatment, some (38.5%) combining this with

traditional treatments village herbs and talismans. The use of talismans and food taboos against children constituted the main steps at prevention. The whole community indiscrimination disposed of human excrete behind bushes close to human dwellings. None of the households encouraged hygienic habits on the part of their children such as washing of hands before handling of food(Chen1970).

The unhygienic practices of sanitary condition in Dom community is another most important factor for parasitic contamination, which was supported by the study that recognized the threadworm infestation as cause of anal discomfort. They are usually spread by autoinfection and fecal contamination. Contamination via the fingers, lips and genitals in sexual play was also possible means of infection in these homosexual cases( Waugh 1973).

In addition to it, the unawareness about sex education creates the possible situation of parasitic infection which were studied by the prevalence of intestinal parasites in homosexual men attending a sexually transmitted disease clinic in Glasgow(Scotland, U.K) was undertaken of 118 men examined over 8, 4 were infected with *E.histolytica*, cyst of *I.bustchilli* were found in the stool of 2 man. Two patients had giardiasis and 11 had enterobiasis (McMillan1980).

Due to the inadequate health education, the children of Dom community were not provided with proper care of their health, which means that they are subjected to parasitic contamination due to their unhealthy habit, which was supported by the study which showed most of the children were overloaded with parasitic infections which included malaria (37.7%), hookworm(29%) and tugiasis (49.5%). Multiple infections were observed with about 16.2% harboring all the causative organism of the parasitic disease. The prevalence of parasitic infection was among children is an index of the community's low level of health and also of inadequate health education(Ejezie1981).

Similar study was conducted in metropolitan lagas and showed 71.9% and 68.3% infection with *I.trichuria*and*A.lumbricoides* respectively. While the infection rate with hookworm was 22.5%. Infection with more than one parasite was also very common(Fagbernro - Beioku and Oyerinide1987).

The prevalence of three intestinal parasites (*G. lamblia, E.coli*and*E.nana*) in the humans of the province of Granada, Spain, according with the age and sex of the host and the season on which the samples were taken. The total parasitism rate was 9.5% and the greater parasitation belonged to *G.lamblia* (4.9%). Statically significance differences with regardly the age and sex have not been found (Diaz et al 1988).

Intestinal parasites in child population of the vega of Granada. The total 137 fecal samples were analyzed 82 from boys and 55 from girls. The direct examination, Telemann method and adhesive tape were method applied. The total parasitation rate was 17%. The parasite species found were *E.vermicularis*(8.75%), *E.coli*(1.45%), *G.lamblia*(1.45%) and *E.Hartman*(0.72%)(Garcia Lopez et al (1989).

Max (1991) up to date 30 species of protozoa, 12 species of cestodes, 28 species of trematodes, 23 species of nematodes, 2 species of gordius and 1 acanthocephalin species had been reported as parasites of man in main land China.

The brine floatation and gravity sedimentation coproscopical examinations in stool samples from 69 of the lug laualpiti Indians of the Xingu Part MatoGrosso State, Brazil, intestinal parasites were present in 89.9% of the population examined. High rate of prevalence were found for some parasite species. *Ancylostomitidae* 82.6%, *E.vermicularis* 26.1%, *A.lumbricoides* 20.3% and *E.coli* 68.1% helminthes prevelance in children age one year or less was comparatively low (33.3%) (Ferrira et.al 1991).

Similar study determined the prevalence of intestinal helminthes among student of Nigeria of the 200 students between the ages 10-20 years old examined, 86 (43%) were found infected. The most commonly found worm were hookworm, *A.lumbricoides, T.trichuira* with mean egg per gram of 4800, 2600 and 1250 respectively(Alo et al 1993).

216275 stool specimens by the state diagnostic laboratories in 1987 and found 20% positive percentages were highest for protozoan. The most commonly identified helminthes were nematodes: hookworm (1.5%), *T.trichuira*(1.2%) and *A.lumbricoides*(0.8%)(Kappus et al 1994).

The stool sample studied randomly in 2848 different study sites with about 500 people from each sites and covered total population of 1477742. By examinations of the stool using Kato-Katz thick smear and Larvae culture techniques, overall prevalence of *A.lumbricoides, T.trichuira* and hookworm infections were found 47%, 18.8% and 72.2% respectively. Higher prevalence of ascariasis and trichiuriasis were found in the age group of 5-9, 10-14 and 15-19 years and among adults for hook worm students, farmers and fisher men were the occupational groups with high infection rates (Xu et al. 1995).

Surveyed for intestinal parasites by using thin smear and floating method for faecal examinations in residents in Caazapa Departments, Paraguay. Out of 608 samples of residents in Boqueron, community Caazapa Department, 343 (56.6%) were found positive. The most prevalent parasite was *N.americanus* (27%) followed by *E.coli* (19.8%), *G.lamblia* (12.7%), *A.lumbricoides*(4.8%) and others. The infection rate with *G.lamblia*and *A.lumbricoides* were more frequent in children than in adults(Saito et at 1996).

Examined total of 250 non Saudi males over 21 years of age. A total of 143 parasites were detected in their school specimen. Twenty (13.99%) were *Blastocystitishominis* while other parasites were 123 (86.01%). The other protozoan parasites were found *G.lamblia* (16.8%), *E.histolytica* (10%), *E.coli* (6.4%), *chilomastixmesnili* (5.6%), *T.hominis* (1.2%) and *E.nana*(0.8%). The helminthes were *A.lumbricoides* (4%), *H.nana* (3.2%), *E.vermicularis* (1.2%) and *Trichocephalustrichuira* (0.8%) (Amin 1997).

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Mafiana et al. (1998) investigated the prevalence of soil transmitted helminthes parasites in children in Aveokuta, the capital city of the ogan State, Nigeria faecal examination of 1060 children revealed a prevalence of 64% for *A.lumbricoides*, 21.9% for *T.trichuira* and 14.5% for hookworm.

Needham et al (1999), studied the epidemiology of soil transmitted nematode infection in Ha Nam province Vietnam. Altogether 177 households were visited and 543 individuals with aged 1-88 years were examined. The prevalence of helminthes were found *A.lumbricoides, T.trichiura* and hookworms.

Lee et al (2000), examines stool and cello-tape and swab carried out in August 1997 on handicapped people at an institution located chorwongun, Kangwon-20, Korea. A total of 112 stool samples (78 males and 34 females) revealed 3 cases of *T.trichirura* infection and 1 case of *E.vermicularis* infection. The overall prevalence rate was 35.7%. More than two different kinds of parasites were found in 42% of the positive stool samples (17 cases). The infection rates for protozoan cysts are as follows: *E.coli* (25%), *E.histolyticas*(1.8%), *Endolimax nana* (21.4%), *I.butchili* (1.8%) and *G. lamblia* (0.9%. In cell tape anal swab examinations (165 samples), the prevalence rate of *E.vermicularis* was 20.6%.

Tom et al (2002), studied on strongyloides infection conducted by faecal examination and subsequent treatment of population on a model Island (Kume Island) in Okinawa, Japan for 5 years from 1993 to 1997. More than 1200 persons accounting for 17% to 20% of the person and subjected received faecal examinations each year. The positive rate in 1993 was found to be 9.7%.

## 2.2 Literatures review for intestinal parasites in Nepal

Sharma (1965), reported that the roundworm infection was very common in some part of the country. He studied 976 stools samples from Bhaktapur and found 40% positive.

Romana&Kasprazak (1966) examined that the total incidence of protozoan infection was 54%. Among of them, *E.coli*(24%), *Lambliaintestinalis* (21%), *E.nana* (18%), *D.fragilis* (16%), *E.hartmani*(5%), *E.histolytica*, *C.mesinili* and *E.hominis* (3%) in each were found and *I.butchilii* was 2% of the 202 persons of 1 to 18 years old.

Sharma &Tuladhar (1971), examined 80 stool samples of which 70 (87.5%) different candidates were infected by at least one parasite. The commonest infestation found was roundworm. Others were hookworm, *T.trichuira, E.histolytica, G.lamblia*& threadworm (found in 1 case).

Soulsa (1975), carried out a survey of the prevalence of intestinal parasitism in Pokhara& found a very high incidence. He concluded that dirty fingernails might play an important role in the transmission of intestinal parasites.

Acharya (1979), reported that the intestinal infestations like giardiasis, amoebiasis, ascariasis, ancylostomiasis, fasciolisis&taeniasis were common in Nepal.

Bol&Roder (1981), reported soil-transmitted nematodes in Lalitpur district. The observed *A.lumbricoides, N.americanus, A.duodenale, T.trichuira*&*S.stercoralis* as the soil-transmitted nematodes.

Gurbacharya (1981), observed that the infection by soil transmitted helminthes in Bhakthapur&Panchkhal area was very high.

IFPPCP (1982), examined 4696 stool samples in Pachkhal area in which 3475 (74%) stools were positive. The infection rate of *Ascaris* was 37% followed by hookworm (47%), *T.trichuira* 254 stool samples were positive.

IFPPCP (1983), examined 1772 stool samples of school children in Pachkhal area of which 704 (75%) samples were positive of *T.trichuira* followed by 259 (37%) of hookworm & 136 (19%) of *Ascaris*. During the same period total of 810 stool samples from Bhaktapur were examined out of which 786 (97%) had worm infestations.

IFPPCP (1984), examined 416 stool sample of school children of Panchkhal. Out of which 112 (27%) cases were positive. The common intestinal helminthes were *Ascaris*, 22(20%), hookworm, 53 (47%) &*Trichuris*, 53 (47%). In Bhaktapur the project examined 412 stool samples of which 295 (72%) were positive.

IFPPCP (1986), examined 26018 stool samples of students from 116 schools, out of which 21610 (83%) were positive cases. *Ascaris* had the highest infestation rate (69.68%) followed by *Trichuris* 6838 (31.6%), *Giardia* 1663 (7.7%), hookworm 637 (2.9%), tapeworm 293 (1.3%) & others 90 (0.5%).

Cutting (1988), recurrent diarrhoea episodes lead to malnutrition & they have increased prevalence, morbidity & mortality with diarrhoea. Malnourished children suffer longer & more severe attacks of diarrhoea.

Rai et al (1991), showed the prevalence of various intestinal parasites in Kathmandu Valley, Nepal. The overall prevalence of parasites was 30.9%. There were no significant differences in the prevalence between two sexes. Intestinal parasites were more common among children (<15 years) than in adults (>15 years). *A.lumbricoides* was the common parasite followed by hookworm, *Taenia sp.*, *E.vermicularis*& others. Among protozoan parasites, *G.lamblia* was the most common followed by *E.histolytica*.

Sherchand et al. (1995), studied the intestinal parasitic infections in rural areas of Southern Nepal, Dhanusha district. Out of 604 children of aged 0-9 years examined (63.1%) were found positive for at least one intestinal parasite. Hookworm infections were found 11.6% positive followed by other common parasites. They were *A.lumbricoides*, *T.trichuira*, *Oxyurisvermicularis*&*G.lamblia*.

Navisky et al. (1998), examined faecal specimens from 292 pregnant woman (age 15 to 40 years) & 129 infants (ages 70 -140 days) for helminth eggs by the Kato-Katz method & cultured for helminthes larvae identification using modified Harad-Mori method. These stool specimens were collected from Sarlahi district in the Southern among pregnant women was found to be 78.8% hookworm, 56.2% *A.lumbricoides*& 7.9% *T.trichuira* by Kato-Katz method. But, by using modified Harada-Mori method, 66.1% hookworm & 2% *S.stercoralis* infections were found.

Nishimura (2000), interviewed 1000 mothers of the children with diarrhoea in Kanti Children Hospital. Mothers younger than 20 years, 20-30 years & more than 30 years were 4%, 75% & 21% respectively. Among them 1% never gave breast milk, 11% gave only for few days, 34% stopped breast feed before 5th month & 13% of mothers still were only breast feeding up to 7 months.

Rai et al (2001), studied the intestinal parasitic infection in rural hilly area of Western Nepal, Achham district. The stool test revealed 76.4% prevalence of intestinal parasites in the children of the district.

# 3. MATERIALS AND METHODS

## 3.1 Materials

### 3.1.1 Equipments :

Compound microscope

Glass slides

Applicator sticks

Cover slips

Measuring cylinder

Petri dishes

Vials

Electric balance

Slide holder

Paper towel

Centrifuge

Pipettes

Forceps

### 3.1.2 Chemicals :

Normal Saline

Lugol's iodine (1.0%) solution

Soap

Phenol

Potassium dichromate (2.5%) solution

## 3.2 Methods

Duration of study in the human intestinal parasitic infection was of 1 year started from March 2015 to February 2016. The prevalence rate of intestinal parasite in Dom

Community was studied in terms of their socio-economic, cultural and educational status. It was studied with the help of questionnaires and by direct observations. The rate of parasitic infections were determined by the examinations of their stool samples with compound microscope in the laboratory. The photographs of helminth larvae, eggs and tropozoids, cysts and oocysts were taken (photographs on the page).

### 3.2.1 Study Area:

Dom community resides at ward no. 7 and 14 of Janakpur Municipality, Dhanusha District, Nepal.

### 3.2.2 Study Population:

There are about 50 families in Dom community including ward no. 7 and 14 of Janakpur Municipality. 210 stool samples were studied from both ward of the municipality. The stool samples were taken of 80 of the female and 130 of the males. The lowest age of the male and female were 6-12 years and 7-13 years respectively whereas the highest age of the male and female were of 70 years and 72 years respectively.Personal hygiene, sanitary system, waste disposal system of Dom community were observed.

### 3.2.3 Sample size:

A total 210 stool samples were collected and examined microscopically.

### 3.2.4 Sampling Methods:

Simple random sampling (SRS) method was used for collection of stool samples of Dom community. The samples were collected mainly in the summer season of the 2072 B.S. Questionnaires were asked with all the individuals included in the study. While all the stools were collected in the summer season of 2015, were taken into the observation.

## 3.3 Surveillance Study

The survey was conducted with the help of questionnaires among the Dom community in Janakpur Municipality. The individuals were given medicines.

## 3.4 Data and Stool Sample Collection

The primary data was collected by questionnaires method and by examining the collected stool samples from the interviewed individuals. They were given dry, clean and portable and leak proof vials for the collecting the stool samples.

## 3.5 Laboratory Works

After collecting the stool samples, they were examined routinely with help of compound microscope in the laboratory of the Janakpur Zonal Hospital, Nepal. 2.5% potassium dichromate solution was added to the stool samples.

### 3.5.1 Direct Smear Technique :

The normal saline (0.9%) and lugol's iodine (1%) solution were used for the routine examination of the stools sample to determine helminth eggs, protozoan trophozoites, oocysts and cysts.

### 3.5.2 Concentration Technique:

Formal ether concentration technique was used to get larger number of helmith eggs, protozoan trophozoites, cysts and oocysts.

## 3.6 Data Analysis :

The data was edited after its collection. It was then coded, classified, tabulated and analyzed. Analysis was done by representing with table, bar diagram, pie chart and drawing graphs of suitable data.

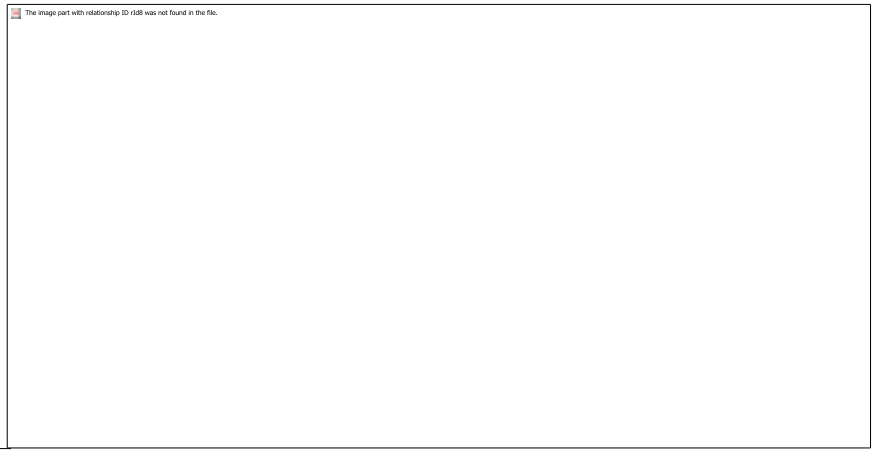
## 3.7 Limitation of the Study:

Stool samples of all the individuals of the Dom community were not observed.The study was focused only in the humans that may not be sufficient for description of possible sources of infections.

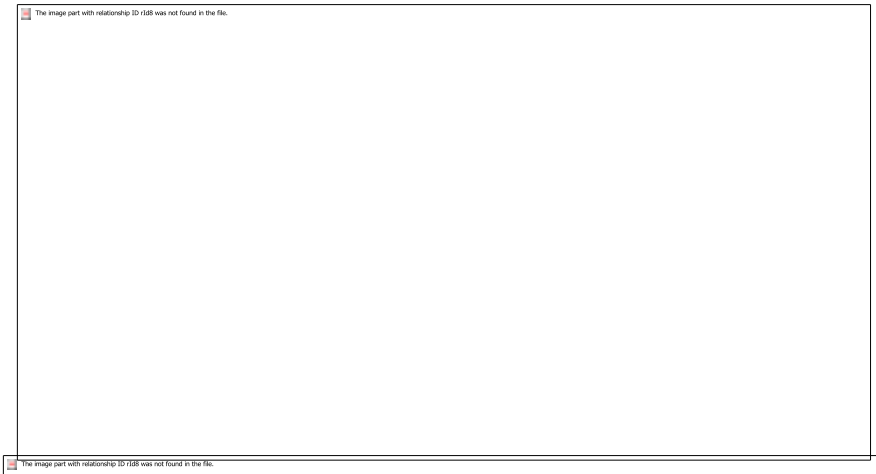
The study was done just in the summer season.

Drinking water sample were not examined for its purity.

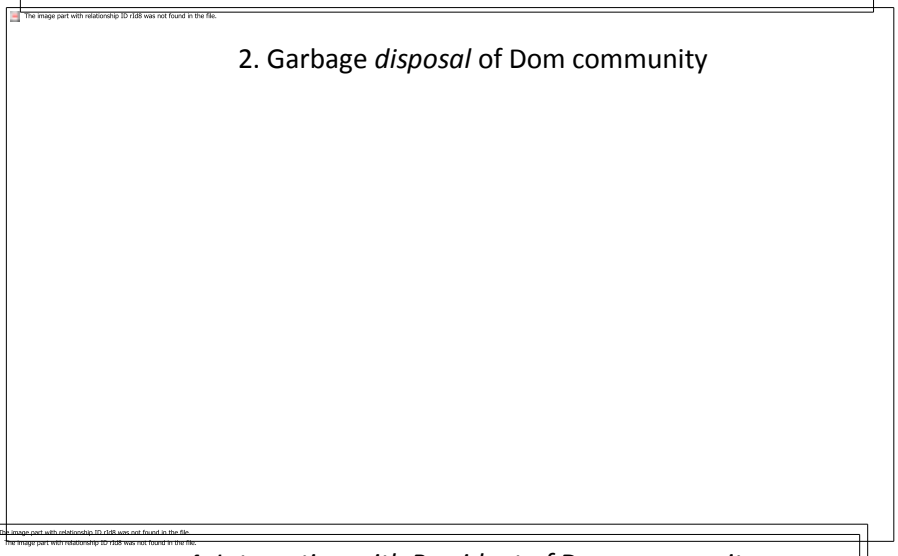
# Photographs Related to the Study



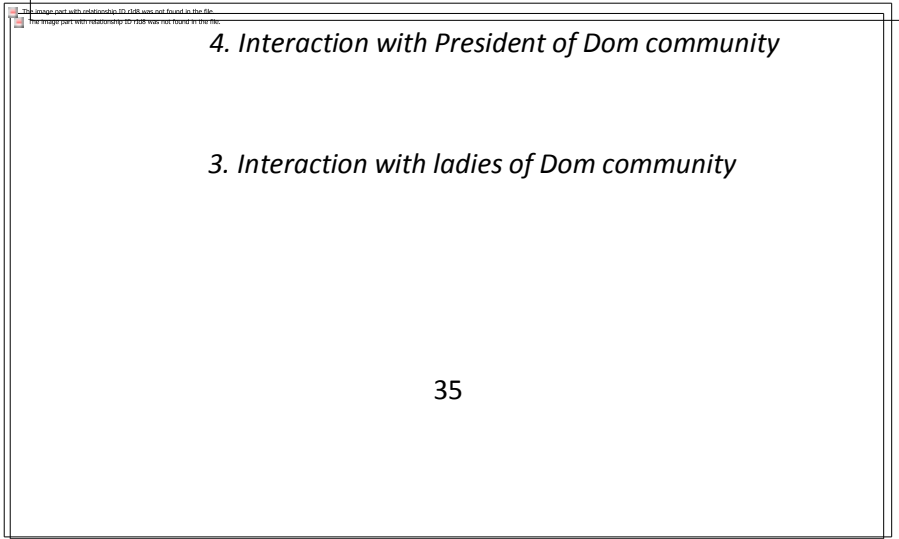
*1. Temporary office of Dom Community*



2. Garbage *disposal* of Dom community



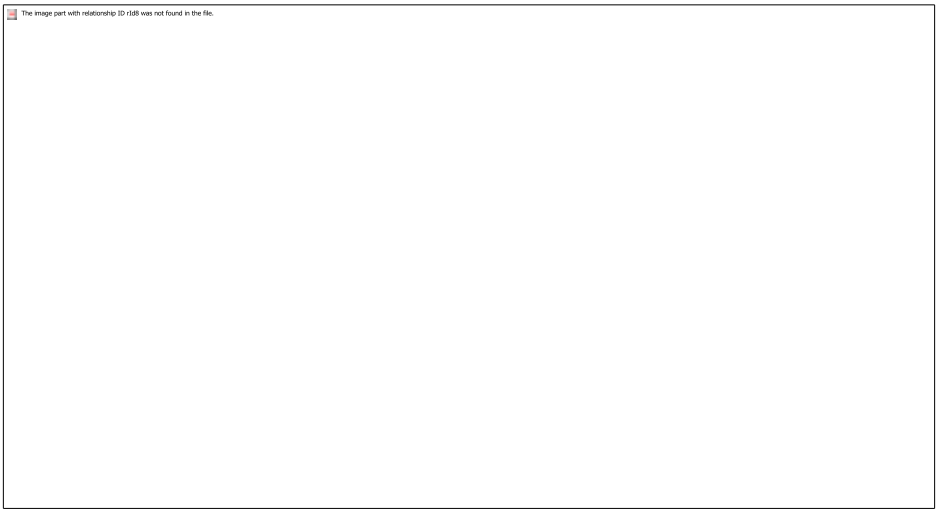
*4. Interaction with President of Dom community*



*3. Interaction with ladies of Dom community*


*7. Making of bamboo baskets*


*8. Examining stool sample of Dom community*

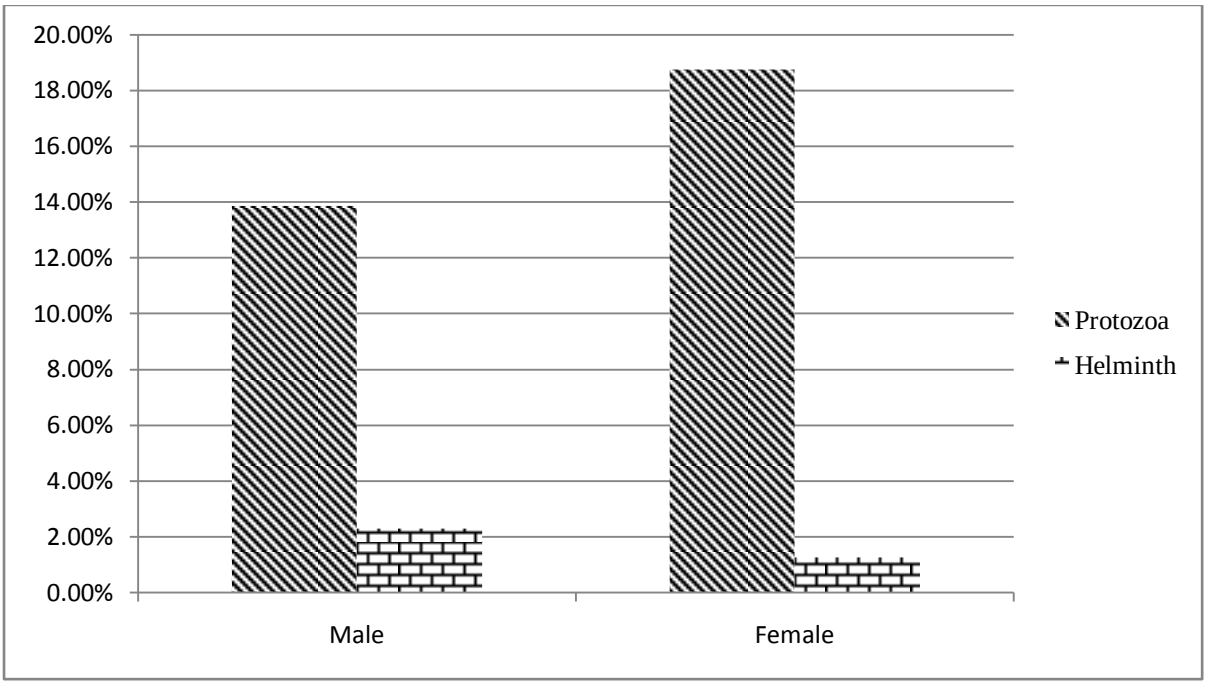



*9. Collection of stool sample*

# 4. RESULT

The study was carried out in 210 people of Dom Community in Janakpur Municipality during 2015-2016. The stool samples from 210 people were collected out of which 80 and 130 stool samples were collected from females and males respectively. The result obtained from stool examination and data obtained from surveillance study through questionnaire survey were analyzed.

## 4.1 Prevalence of intestinal parasites in Dom Community people.




**Graph 1 Parasitic Infection**

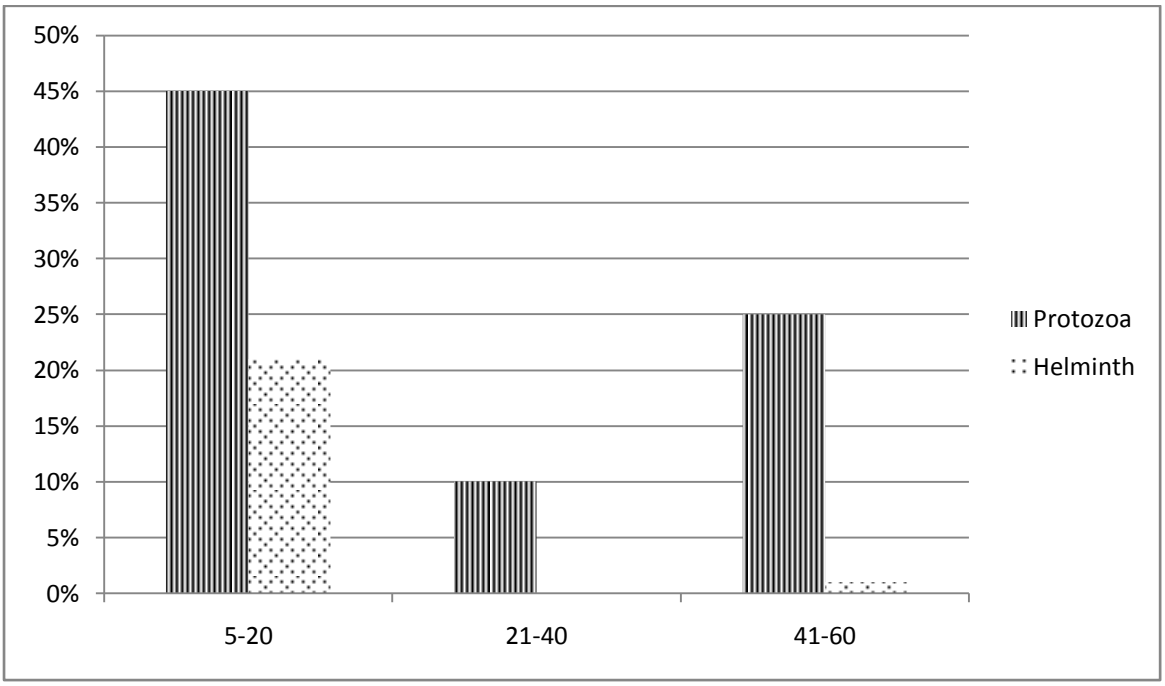
**Table 1: Sex wise prevalence of intestinal parasites in people of Dom Community**

| Group Sex | N | Protozoa | Helminth |
|---|---|---|---|
| Male | 130 | 18(13.85%) | 3(2.3%) |
| Female | 80 | 15(18.75%) | 1(1.25%) |

A total of 210 stool samples were collected and examined to assess the general prevalence of intestinal parasites. The result indicated that parasitic infection in male

(16.15%) which is slightly lower than female (20%). However in both of these groups the prevalence of protozoan parasitic infection is more than helminth infection. Stastically there was significant difference ($P<0.05$) between sex with respect to parasitic infection.

Age wise prevalence of intestinal parasites indicated maximum prevalence of parasitic infection in 5-20 years of age group. But the prevalence of protozoan parasitic infection was significantly high in all age groups compared to helminth infection.

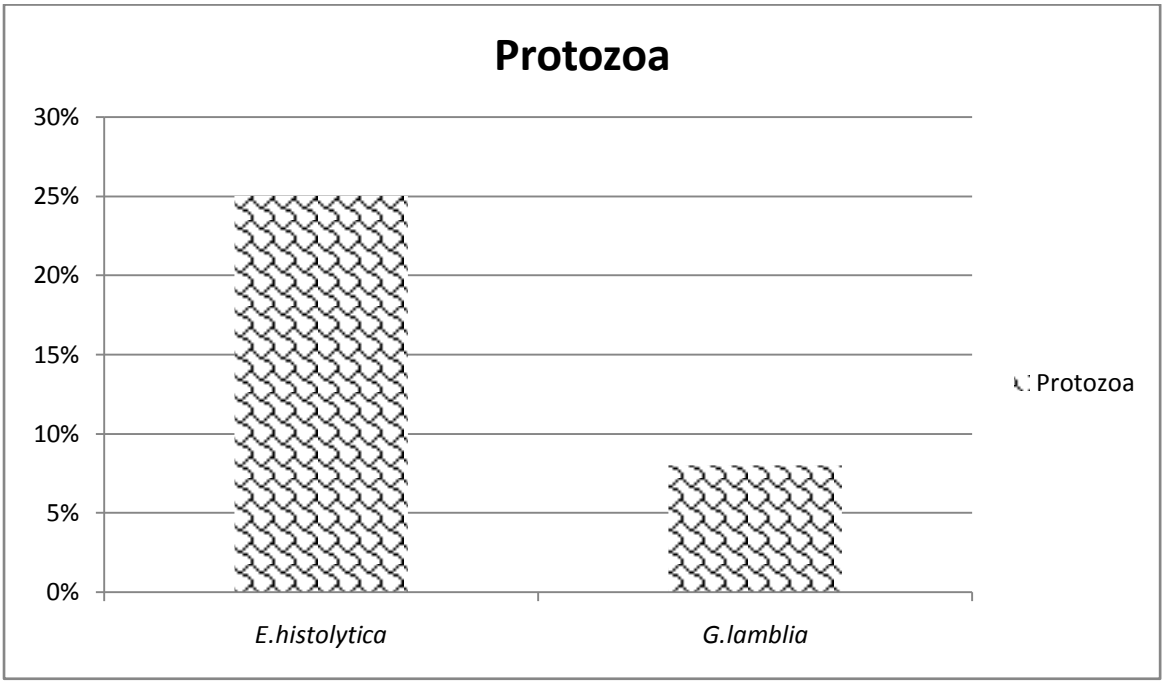



**Graph 2 Representation of age wise prevalence of intestinal parasites in people of Dom Community**

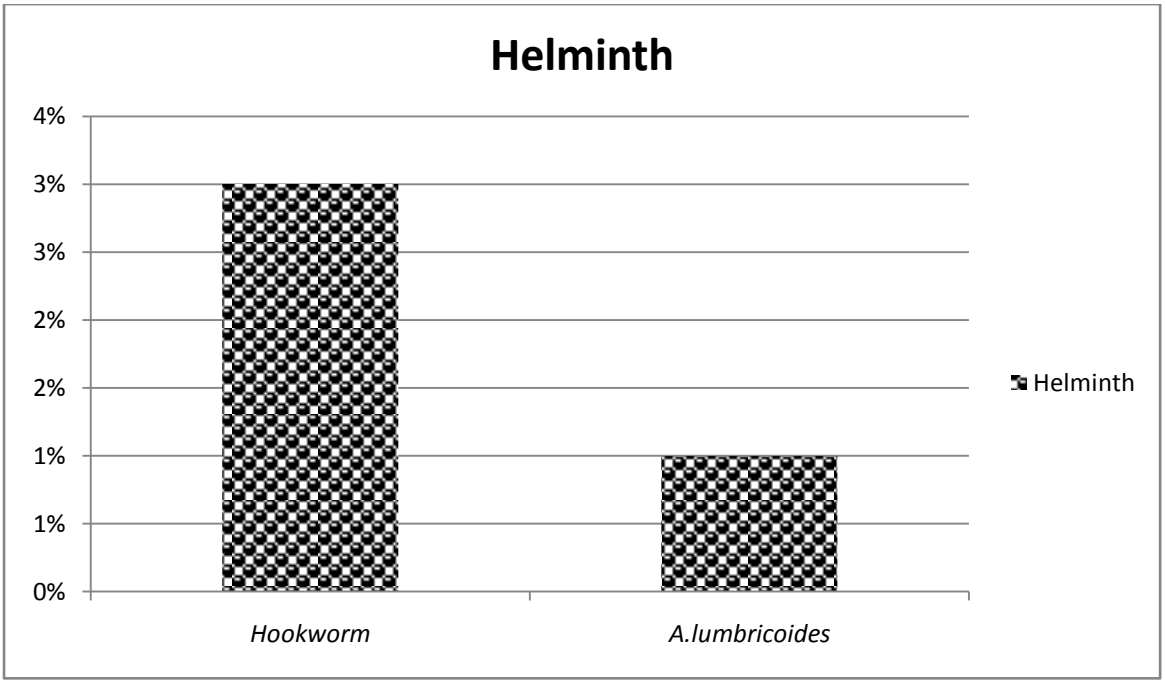
Microscopic examination of stool samples from people of Dom Community revealed two different groups of parasites i.e. Protozoa and Nematode. Trematoda and Cestoda were not observed during the study. In general, highest prevalence of *E.histolytica* (25%) was compared to others. While least prevalence of helminthes was reported. However the presence of protozoan parasite was shown maximum when compared to helminthes.

**Table 2 : Comparison of specific intestinal parasites in people of Dom Community**

| S.N. | Parasites | Male (%) | Female (%) |
|---|---|---|---|
| | **Protozoa** | | |
| 1 | *E.histolytica* | 13 | 12 |
| 2 | *G.lamblia* | 6 | 2 |
| | **Nematoda** | | |
| 3 | Hookworm | 2 | 1 |
| 4 | *A.lumbricoides* | 0 | 1 |




**Graph 3 Prevalence of Protozoan Parasites in people of Dom Community**




**Graph 4 Prevalence of Helminth parasites in people of Dom Community**

## 4.2 Knowledge, Attitude and Practices (KAP) of people of Dom Community in relation to parasitic infection

KAP survey was conducted in 210 people of Dom Community. The obtained data were assessed along with the result obtained through microscopic examination of stool samples. Association between KAP variables to that of people involved in this study was statistically analyzed.

Among the 210 people of Dom Community, who were obtained an education minimum upto primary level and who could read or write to some extent these people were categorized under literate group while those people who were unable to read and write were categorized under illiterate group. In this study, KAP survey revealed (91.42%) of illiterate and (8.57%) of literate people. The result of stool examination showed that, prevalence of intestinal parasites was high (33%) in literate than in illiterate (16.14%) people. Statistically, there was a significant difference ($P<0.05\%$) in the prevalence of intestinal parasites in illiterate than in literate people. However, the frequency of intestinal parasites observed in both groups belongs to protozoa compared to helminth infection.

**Table 3: Intestinal parasites in relation to literacy of people of Dom Community**

| Group / Literacy | N | Protozoa | Helminth |
|---|---|---|---|
| Literate | 18 | 5(27.77%) | 1(5.55%) |
| Illiterate | 192 | 28(14.58%) | 3(1.56%) |
| Total | 210 | 33(42.35%) | 4(7.11%) |

Regarding knowledge of mode of transmission of parasite, the people who had got either knowledge about parasites or could understand the mode of transmission to some extent were kept under aware group. Whereas those people who were unknown to parasites and its mode of transmission were kept under not aware group. Of the 210 people interviewed, only (10.95%) were awared and (89.04%) were unawared. The result of stool examination showed that there is least parasitic infection rate in awared (13.04%) and highest in unaware (18.18%) people of Dom Community. Statistically there was no significant difference ($P < 0.05$). However protozoa parasites were high in the people of Dom Community irrespective of knowledge of mode of transmission of parasites compared to intestinal helminthes.

**Table 4: Intestinal Parasites in relation to knowledge of mode of transmission of parasites in people of Dom Community**

| Group / Knowledge | N | Protozoa | Helminth |
|---|---|---|---|
| Awared | 23 | 2(8.69%) | 1(4.34%) |
| Unawared | 187 | 31(16.57%) | 3(1.60%) |
| Total | 210 | 33(25.26%) | 4(5.94%) |

The KAP survey indicated that, practice of sanitary disposal of faecal matter adopted by people of Dom Community. People who were using toilet for sanitary disposal are kept under close toilet and those who used to defecate in the open field are kept under

open toilet. The prevalence of intestinal parasites in the interviewed people with respect to their sanitary condition revealed high infection with (46.66%) in toilet use and (15.38%) in not-toilet user. Statically there was significant difference (P<0.05) between toilet user and non-user with respect to parasitic infection. However the infection rate of protozoan parasites is high among people of Dom Community while comparing with helminth infection.

**Table 5:- Intestinal parasites in relation to sanitary condition of people of Dom Community.**

| Group / Sanitation | N | Protozoa | Helminth |
|---|---|---|---|
| Closed Toilet | 15 | 6(40%) | 1(6.66%) |
| Open Toilet | 195 | 27(13.84%) | 3(1.5%) |
| Total | 210 | 33(53.84%) | 4(8.16%) |

People of Dom community were interviewed for their occupation indicated that maximum people were involved in agriculture (40.47%), which is similar to those of housewife (26.19%), while least involved in service (1.42%). However, the result of stool examination showed that intestinal parasitic infection were observed to be little difference in people involved in different occupation. Statically there was no significant difference (P<0.05) in the prevalence of intestinal parasites with respect to different occupation adopted by them. However the frequency of protozoan parasites was observed to be high in people irrespective of their occupation when compared to helminth infection.

**Table 6: Intestinal parasites in people of Dom community involved in different occupation**

| Group / Occupation | N | Protozoa | Helminth |
|---|---|---|---|
| Agriculture | 85 | 7(8.23%) | 2(2.35%) |
| Business | 5 | 3(60%) | 0(0%) |
| Service | 3 | 0(0%) | 0(0%) |
| Labour | 53 | 10(18.86%) | 1(1.88%) |
| Housewife | 50 | 8(16%) | 0(0%) |
| Unemployed | 14 | 5(35.71%) | 1(7.14%) |
| Total | 210 | 33(15.71%) | 4(1.90%) |

**Table 7: Intestinal parasites in people of Dom community in relation to use of water source**

| Group / Water Supply | N | Protozoa | Helminth |
|---|---|---|---|
| Tap Water | 15 | 5(33.33%) | 0(0%) |
| Tube well water | 195 | 28(14.35%) | 4(2.05%) |
| Total | 210 | 33(47.68%) | 4(2.05%) |

The result of stool examination shown that overall presence of intestinal parasitic infection in tap water user was high (33.33%) than in tube well water user (18.4%). Statically, there was significant difference ($p < 0.05$) in the prevalence of intestinal parasites in tap water user than tube well water user.

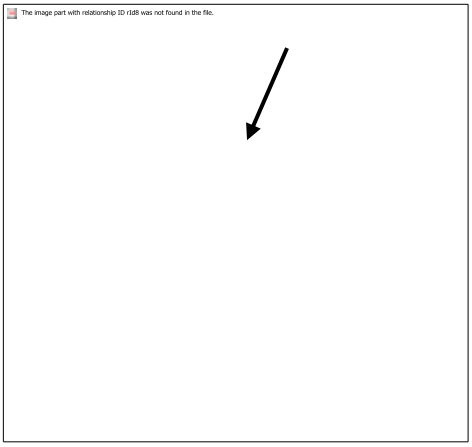
**Table 8: Percentage of intestinal parasites in relation to food habit consumed by these people**

| Group / Food Habit | N | Protozoa | Helminth |
|---|---|---|---|
| Vegetarian | 5 | 3(60%) | 0(0%) |
| Non-vegeterian | 205 | 30(14.63%) | 4(1.95%) |

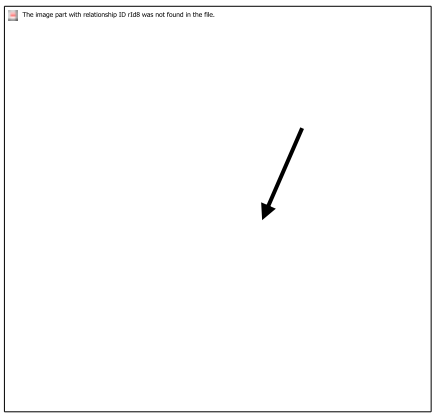
| | | | |
|---|---|---|---|
| Total | 210 | 33(74.63%) | 4(1.95%) |

The result of stool examination shows that parasitic infection was high (60%) than in non-vegetarian people (16.57%). Statically, there was significant difference ($P<0.05$) in the prevalence of intestinal parasite in vegetarian and non-vegetarian people.

## Protozoan Parasites

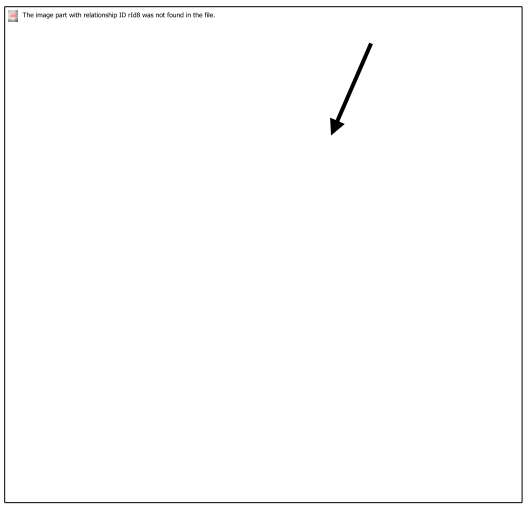


*10. Cyst of Giardia Lamblia (10x × 40x)*

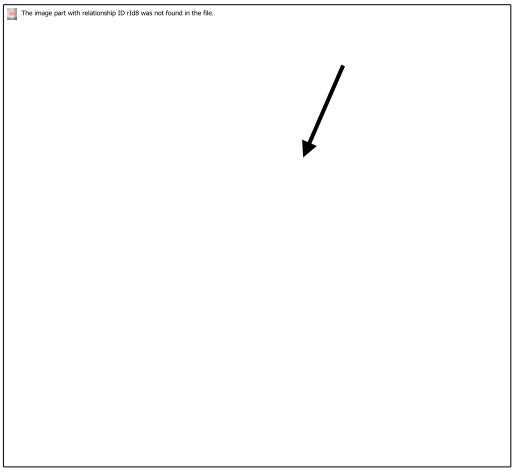


*11. Cyst of Entamoebahistolytica (10x × 40x)*

## Ova of Helminth Parasites



*12. Egg of AscarisLumbricoides (10x × 40x)*



*13. Ova of Hookworm (10x × 40x)*

# 5. DISCUSSION

This is the first study carried out in this community to find out the health status particularly intestinal parasitic infection. Among the 210 stool samples of the Dom community collected, 17.61% of them were prevalent with at least one kind of intestinal parasite. Dom community had got slightly high prevalence of intestinal parasite than the community people other than Dom community in Janakpur. It may because of the poor sanitation, low-grade personal hygiene, cultural compulsions, illiteracy and poor economic condition that favour the transmission of parasites. It is mentionable here is that whole of the Dom community involved partly or fully in agricultural works or they go for some labour works and they live in such a congested but that it was hard to adjust the 4 or more members of the family. When we took the samples of stools from Janakpur Zonal Hospital that of the people having the profession of agriculture only, the group had the most prevalence of intestinal parasites.

In case of Janakpur Zonal Hospital, it is important to note that stool samples were examined that of the people to whom the doctor suggested checking the stool samples. In such angle, the prevalence rate of intestinal parasite of the Dom community obtained was very high in comparison to the rate of Janakpur Zonal Hospital.

Among Dom community 26% of elderly people of the age group of 41-60 years were positive with intestinal parasites. While 66% of the people of 5-20 years were found the largest group to be infected with intestinal parasites. The finding is similar with the report given by Rai et al. (1991), according to which intestinal parasites are more common among children (<5 years). Virk (1994) also reported the highest prevalence of parasites from the age-group 6-14years the adults who have the profession of agriculture are commonly infected with the intestinal parasites. Thus, the higher prevalence among younger children and the adults were appeared to be associated with their less hygienic habit having less knowledge about personal cleanliness.

In the Dom community, 16.15% of the samples of the male and 20% of the females were found to be infected with intestinal parasite. The result indicates that the parasitic infection in male (16.5%) which is slightly lower than female (20%).

Prevalence were significantly related to economic status, education, housing conditions, drinking water and their personal hygiene which is supported by De Silva et al. (1996). Among the Dom community, poorer in economic condition had more prevalence of intestinal parasites. The poorest people had the maximum prevalence intestinal parasites. People with low economic status spend less money for food and drinking that may lead to malnutrition with respective increase of parasitic infections which are supported by Lenenson et al. (1986) and cutting (1988). In the Dom community, there was seen significant difference in prevalence of intestinal parasite in between literate and illiterate people because in the literate group of people studied, there was maximum number of people who are under 15years of age, 52% of them were found to be infected with intestinal parasites.

# 6. CONCLUSION AND RECOMMENDATIONS

## 6.1 Conclusion

Poor sanitary condition, lack of knowledge of parasitic diseases and its transmission, poor economic status and compulsions of the culture enhanced the percentage of parasitic infection in the Dom community of Janakpur.

Most of the people neither filter nor boil the drinking water. Some of them were so poor that they cannot afford soap to take bath. Most of the people cannot afford the medicine when they become ill. The degradable waste products, hay of wheat is collected in their ground floor and that may lead to contamination of food and drinking water.

From the study, the rates of parasitic infections were found proportional with the occupation. The people involved in business were found the highest prevalent among studied population.It may be because of contamination of theirs hands and nails while selling the materials prepared from bamboo by wandering. They may have either habit of eating raw and unwashed vegetables like carrot, cucumber, radish etc or drinking polluted water of difference places.

According to the result of the study, the harbor of intestinal parasites in Dom community is due to overcrowd of the population and congested housings and poor sanitary condition may be the causes.

## 6.2 Recommendation

- Public health education should be included in the school curriculum as compulsory.
- Awareness programmes should be run so that they could know about the parasitic infections or mode of transmissions, among the Dom community which is literally and economically backward community.
- The municipality should encourage the local health workers to make people aware.
- The communities should be made known including personal hygiene and proper disposal of home product wastage.

- Regular health checkups and stool checkup should be done free of cost and medicine should be given with subsidized price.
- Consumption of unwashed fruits and raw vegetables or washing with contaminated water should be prevented.
- Walking bare foot should be avoided with possible modification in their culture.
- Fresh human and animal faeces should not be used as vegetable manure and if used, vegetables should be cooked properly before use.
- Advertising as to prevention of parasitic infections, should be introduced through hand-outs, billboards, leaflets, papers, etc.

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# APPEDIX-I

## QUESTIONNAIRE

## COMMUNITY BASED BASELINE SURVEY

## Dom Community in Janakpur Sub-Metropolitan City

1. Name: …….
   Age: ……..
   Sex: …….
   Area: …….
2. Profession: ……
3. Family Type:
   Joint ( ) Separate ( )
   Number of family members: ……..
4. Sanitary System: Toilet ( ) Open ( ) Others ( )
   Type of Toilet: Disposal ( ) Safety Tank ( ) Drain ( ) Others ( )
5. Education:
   Literate ( ) Illiterate ( ) Under SLC ( ) SLC ( ) Intermediate ( )
6. Type of water supply:
   Tap water ( ) Tube well ( ) Well ( ) River water ( ) Others ( )
7. Use of water filter: Yes ( ) No ( )
8. Do you boil water to drink? Yeas ( ) No ( )
9. Food habit: Vegetarian ( ) Non-Vegetarian ( )
10. How frequently do you take meat?
    Daily ( ) Once a week ( ) Twice a week ( ) Once a month ( )
11. Which meat do you take frequently?
    Pork ( ) Chicken ( ) Mutton ( ) Fish ( ) All ( )
12. From where do you bring meat?

Meat shop ( ) Self-made ( ) Group Sharing ( )

13. How do you prepare your meat to eat?

Well cooked ( ) Half cooked/boiled ( ) Raw meat preparation ( ) Barbeque Sekuwa ( )

14. Do you use soap after using toilet? Yes ( ) No ( )
15. How often do you cut your nail?
    Once a week ( ) Twice a week ( ) Once a month ( ) Once a quarter ( )
16. How often do you take bath?
    Once a week ( ) Twice a week ( ) Once a month ( ) Once a quarter ( )
17. Have you ever checked your sickness before?
    Yes ( ) No ( ) Don't know ( )
18. Have you ever checked your stool before? Yes ( ) No ( )
    If yes did you take any medicine? Yes ( ) No ( )
    If yes what type of parasite was found? Amoebasis ( ) Tapeworm ( )
    Ascariasis ( ) Hook Worm ( ) Pinworm ( ) don't know ( )
19. Do you know about worms, bacteria, virus or protozoa?
    Yes ( ) No ( )
20. Where do you go for treatment?
    Private clinic ( ) Health center ( ) Hospital ( )