I

INTRODUCTION

1. Background

Gastro-intestinal parasites are ranked among twenty most fatal infection in tropical countries of Asia, Africa and Latin America (Davis, 1980). The helminth parasites are Roundworm, Hookworm, Whipworm, Tapeworm where as protozoan parasites are *E. histolytica*, *G. lamblia*, *Cyclospora* and *Cryptosporidium.* There are 3200 varieties of parasites in the form of Protozoa, Nematoda, Trematoda and Cestoda. Roundworms infect about 1×10^8 people and kill 20,000 people per year. Hookworms infect 9×10^8 people and kill 60,000 people per year. *Amoeba* infect 4×10^8 people and kill 30,000 people per year. 2×10^8 people get infected by *Giardia* and 5×10^7 people from tapeworm and 50,000 die per year (WHO, 2008). Almost 4.8% of people died due to cholera and diarrhea in Nepal (CBS, 2007). Morbidity because of intestinal parasites has always been an important public health problem in tropical region (Scherchand, 1996).

Human behaviour may influence the prevalence and intensity of intestinal infections (WHO, 1981). So the human behaviours such as open air defecation and cultural practices such as growing vegetables in faecally polluted gardens are all found to be contributing factors in transmission of parasites. Polluted water, infected or raw meat, bare footed were also found to be contributing factors in transmission of parasites (Sherchand et al., 1997).

Intestinal parasites are common in underdeveloped and developing countries. Infact, wide-spread of intestinal infection is thought to be due to the insanitary practices. People are more susceptible to infection of parasite disease due to unhygienic management, malnutrition and ignorance about the complicated life cycle of the parasites. It is noted that when the diet improves,

the worms die off (www.emedicine.com. 2008). The sufficient stomach acid destroys parasites in the food eaten. Similarly a proper balance of alkaline food to acidic food helps to discharge parasites. The ideal ratio of alkaline to acidic is 4:1. Parasites don't like acid forming food and infact alcohol is acid forming so it may effect on intestinal parasites. But on the other hand alcohol tends to increase iron levels which also accounts more parasitic infections found in alcoholics (File: //c/mydocument/avoiding parasites.htm).

Similarly some vegetables and food improve the worms such as garlic is a natural anti-parasitic as well as onion, figs, pumpkin seeds also create an uninhabitable environment for worms. Parasites do like a diet hugh in meat, dairy and sugars. It has been observed that the non-vegetarian 12.3% had higher infection rat than vegetarian 6.3% with intestinal parasites i.e. *Gardia lamblia* (Planeta observatory.gov.np/publication/ sw3).

Alcohol or ethyl alcohol is commonly consumed. It is obtained through the fermentation of various food articles (e.g. potato, molasses, grains by organisms like yeast and some fungi). Alternative names of alcohol are beer wine, hard liquor consumption. Beer, wines and liquors all contain different amounts of alcohol. In general beer contains 3.8% alcohol, light or lower calorie beer is closer to 3% alcohol, white wines contain 12% alcohol and red wines contain 14% alcohol (Global Status Report on Alcohol, 2004).

Mushars are caucasoid people of lean frame and dark complexion. Their names derive from their propensity for mice meat (Gurung, 1999). Previously they were nomadic tribe, but today they are settle community (Gautam, 1994). Lack of proper sanitation proximity of livestock, mud dwelling with cracks and crevices clustered dwelling help to promote the conditions very much favourable for contamination and transmission of parasitic diseases. The tribe is also known for this food practices of eating rats and aquatic animals like fish, mollusks and crabs. They also eat flesh of goat, poultry and sometime pork too. As a drink most of the people of Mushar community consume alcohol.

Studies on intestinal parasites are extensively carried out through the world as well as in Nepal. But in tribal community of Terai is very limited and therefore most of the people are ignorant of this. As well as excessive use of alcohol harms our health but rare drinking of beer, wine or other also improve cardiovascular. But drinking alcohol during pregnancy is fatal to women. Thus to inform the people about the importance of health hygiene and sanitation, relation of food habit with parasitic disease this study was conducted. Hence, the present study is undertaken to assess if there is any relation with alcohol intake and the prevalence of intestinal parasites. No literature review regarding the effect of alcohol on intestinal parasites was found.

II

2. Introduction to Target Community 'Mushar'

Mushars are caucasoid people of lean frame and dark complexion. Their name derives from their propensity for mice meat (Gurung, 1999). Previously they were nomadic tribe but today they are settled community (Gautam, 1994).

Origin

They themselves prefer to be called Rishidev, claiming descent from sage Valmiki. Their term for clan or descent group refers them to be of Indian origin a they use Kanauja and Tirautia names for their clan klhich clearly relate their origin from 'Tiraut' a place of Indian state of Bihar and Kanar of Uttarpradesh state (Gurung, 1999)

It is said that seven centuries ago, there was large and extensive jungle in eastern Terai where food like tuber roots and fruits were easily available. So they might have migrated into these regions and settled down only 4 centuries ago in their present settlement (Gautam, 1994).

Settlements

The Mushars were nomads which can be provided by the types of houses or huts they construct for dwelling which are small and low in height and clustered together in 30-35 houses group in a single place. These houses are light and constructed from locally available materials such as bamboo straw khar etc. Mushar folks are found of living together in perfect harmony & due to this feeling, their huts are clustered together but separated from other communities (Gurung, 1999). Lack of proper sanitation proximity of live stock, mud dwelling help to promote the conditions very much favourable for contamination and transmission of parasitic diseases.

Food

Mushars claim to have begun to eat cereals and other food grains about two centuries. So they might have forgotten the taste of wild fruits and tubers. Since when they started agricultural practices they encountered rats and bandicoots as their agricultural pest. So they started to search and trap these rodents as curative measures. During this, they obtained not only proteinous flesh of rats and bandicoos but also large amounts of grains inside the burrows of rodents. But nowadays, they are avoiding rats as their food. The name 'Mushar' originated which could probably means those who eat rats for 'Musa' in Nepali. (Pokharel, 1998)

Apart from this, the tribe is also known for their food practices of eating aquatic animals like fish, mollusks, crabs etc. They also eat mutton, chicken and sometime pork too. The omnivorous food practices have carved way for zoontoic as well as food borne diseases in the community.

Statement of Problems as Socio-Cultural and Socio-Economic Status

Though the Mushars, the Terain tribes, resided here and cultivated the land in early times but now most of the Mushars are landless labourers. This landlessness is due to nomadic and simple life style what ever little amount they earn is far less than the amount sufficient for better life standard. Further more addiction to alcohol and gaja in Mushar community has worst their economic condition.

Not only this, their housing lacks facilities like safe drinking water, toilets. They defecate in open fields, near water streams contaminating the soil and water. Their eating practices also account for their endemic diseases as they consume a wide varieties of meat of different animals without proper cooking. Thus to inform the people about the importance of health hygiene and sanitation, relation of food habit with parasitic diseae, this study was conducted.

III

OBJECTIVE

3.1 General Objective

To determine prevalence of intestinal parasites in people consuming and non consuming alcohol of Mushar Community, Chandralalpur-6, Siraha.

3.2 Specific Objectives

i) To determine the prevalence of intestinal parasites in Mushar community people consuming and non-consuming alcohol.
ii) To find the prevalence of intestinal parasites in people consuming different amount of alcohol i.e. heavy, moderate and rare consuming alcohol.
iii) To bring awareness among the people consuming alcohol as well as provide suggestion and treatment for intestinal parasites.

IV

LITERATURE REVIEW

4.1 History of Parasitology

Up to the middle of seventeenth century knowledge of parasitology was limited to recognition of the existence of a few common external parasites such as lice, fleas and few internal parasites like tape worms. *Ascaris,* pinworms and guinea worms. However, they were considered as natural products of human bodies. Even Rudolphi and Bremser also supported this idea (Chandler and Read, 1961).

In Linnaeus time, people thought that internal parasite were originated from accidentally swallowed free living organism (Chandler and Read, 1961).

During the later half of 17^{th} century Francesco Redi, Grand father of parasitology stated that maggots developed from eggs of flies. At the same time, Leeuwenhoek perfected microscopes and discovered Giardia in his own stool and other protozoan in rain water, saliva etc. (Chandler and Read, 1961).

Human intestinal parasites have been studied by many workers. Some recent studies on human intestinal parasites are as follows:

No literature review regarding the effect of alcohol on intestinal parasites was found, hence related literature review regarding the prevalence of intestinal parasites have been mentioned.

4.2 Literature Review in the Context of Nepal

Sharma, (1965) reported that the round worm infection is very common in some parts of our country. He studied 976 stool samples and found 40% round worm infection in Bhaktapur area.

Gongal (1972) studied a case of roundworm infection in gall bladder.

Soulsa (1975) carried out a survey of the prevalence of intestinal parasites in Pokhara and found very high incidence. He observed that dirty finger nails might play an important role in the transmission of intestinal parasites.

Lynch and Party (1978) worked on prevalence of hookworm and other helminthes in British Gorkha recruits reported 89% of healthy appearing individuals were infested with hookworm, 49% with roundworm and 36% with whipworm.

Acharya (1979) reported that the intestinal infections like giardiasis amoebiasis, ascarasis, ancylostomaisis, fascioliasis and taeniasis were common in Nepal.

FPAN/IP project in (1979) studied the parasite infection rate in Paanchkhal village community and found 89% parasitic infection rate in 4056 sample size.

Nepal and Palfy (1980) reported about a study of prevalence of intestinal parasites in the Mahanchal Panchyat. Out of 225 examined stool samples, 95.3% were positive. The most common parasites were round worm (63.5%) followed by hookworm (34.2%), *E. histolytica* (28.8%) and *G. lamblia* (28.4%).

Khetan (1980) carried out the study of the incidence of parasitic infection in Narayani zone. Stool examinations of 2073 patients were done between the years 1977-1980. Out of the total samples 1522 stool samples had worm infection, of wich 458 samples had *Ascaris*, 591 had hook worm, 203 had *Trichuris*, 175 had *G. lamblia* and 83 had other infections.

Integrated Family Planning and Parasite Control Project, IFPPCP (1980), examined 11699 samples from June 1979 to 1980. Out of these 10385

(89%) cases showed positive results in Bhaktapur and Panchkhal area. The infection rate of the *Ascaris* (66.5%) was the highest followed by hookworm (38%), *T. trichiura* (20%). The infection by other types of parasites was around 2%.

Integrated Family Planning and Parasite Control Project (1981), examined 5532 stool samples in Panchkhal area in which 4148 (70%) were positive. The hook worm infection was highest followed by *T. trichiura* and *Ascaris*. In Bhaktapur, 586 stools were examined in which 525 (92%) were found positive.

Gurbacharya (1981) observed that the infection by soil transmitted helminthes in Bhaktapur and Panchkhal area were higher than any other type of parasite.

Bol and Roder (1981) reported the soil transmitted nematodes in Lalitpur district. They observed *A. lumbricoides, Nectar americanus, A. dudenale, T. trichiura and S. stercoralis* are the soil transmitted nematodes.

Integrated Family Planning and Parasite Control Project, IFPPCP (1982) examined 4696 stools samples in Panchkhal area, of which 3475 (74%) stools were positive. The infection rate of *Ascaris* was 37%, hookworm was 47% and *T. trichiura* was 7.3%.

James et al., (1983) published a medical from isolated communities in Baitadi district. On which the intestinal parasites were also reported. According to field lab of study area out of 37 samples collection from the patient complained of diarrhoea or worms only 20 samples i.e. 54.05% were found to be infected with intestinal parasites. In the field, among the 20 respondents 14 (i.e. 70%) with *Ascaris lumbricoides* i.e. 45% with *E. histolytica*, 5% with *T. trichiura* and 1 i.e. 5% with hookworm were found to be infective. Similarly 35 samples were collected from this study area and analyzed in Duke University Medical Center (DUMC) in Durham, Norh Carolina, USA. Study revealed 29

samples i.e. 87.9% positive for *A. lumbricoides,* 5 i.e. 15.2% for *E. histolytica,* 4 i.e. 12.1% for *G. lamblia,* 2 i.e. 6.1% for *T. trichiura,* 2 i.e. 6.1% for *S. stercoralis* and 3% for *E. vermicularis.*

Integrated Family Planning and Parasite Control Project (1983) examined 1772 stool samples of school children in Panchkhal area of which 704 (75%) samples were positive of *T. trichiura* followed by 259 (37%) of hookworm and 136 (19%) of *A. lumbricoides.* During the same period of total of 310 stool samples from Bhaktapur were examined out of which 786 (97%) had worm infections.

Shrestha, (1983) carried out a survey study in Bhaktapur district showed 99% stool were positive for the egg of soil –transmitted helminthes. Among them, 94% were *A. lumbricoides,* 42% were *T. trichiura* and 11% were hookworm. Similarly from panchkhal 41% of total stool examined were positive for the eggs of helminthes. 75% cases were of *T. trichiura,* 37% of hookworm and 19% of *Ascaris lumbricoides.*

IFPPCP (1984) examined 416 stool samples of school children of Panchkhal. Out of which 112 (27%) cases were positive. The common intestinal helminthes were *A. Lumbricoides* 22 (29%), hookworm 53 (47%) and *T. trichiura* (53 (47%). In Bhaktapur the project examine 412 stool samples of which 295 (72%) were positive.

IFPPCP (1985) examined 25260 stool samples of students from 46 schools of Kathmandu valley out of which 22626 (86%) were found positive. The infection by *A. lumbricoides* was 15423 (68.16%) followed by *T. trichiura* 8104 (35.8%), *Giardia,* 2491 (11%) hookworm (6.7%) and tapeworm 220 (0.97%).

Suguri et al., (1985) conducted to find the helminthes infections, in 737 Nepalese people living in the Gandaki, Dhaulagiri, Lumbini and Sagarmatha zone of Nepal and in 26 Japanese living in Kathmandu from February to April

in 1975 employing the so called thick smear method. The overall helminthes infection rate was found 36.8% including round worm (50.3%) hookworm (44.1%) whip worms (47.6%) pinworms (1.2%) and Taenia sp. (0.1). The positive rate was the lowest in Bhairahawa (53.8%) and the highest in Darbang (98.8%). In Namche Bazar, roundworm infection rate was the highest (70.3%) and that of hookworm was the lowest (0.2%).

Rai and Gurung (1986) collected 2000 stool samples and examined by direct smear technique over a period of 16 days. The incidence of roundworm was the highest (35%) followed by hookworm (147%) the overall infection rate was 69% and the result showed that the infection was most common in girls than the boys.

Gupta and Gupta (1998) collected 285 stool samples in Kirtipur. Among them 192 (67.36%) was found to be positive for intestinal parasite. Out of 192 positive stool samples, 49 (22.52%) cases were infected with protozoan parasite, 9.12% by *G. lamblia* and 9.47% by *E. histolytica* out of 192 stool samples, 155 (80.72%) were positive for helminthes parasite, *A. lumbricoides* (40%), *T. trichiura (*25.26%), *A. duodenale* (4.56%), *H. nana* (2.46%) and *T. solium* (0.55%).

Geollman (1988) carried out an extensive disease survey in Patan Hospital general out patient clinic from December 1986 through November 1987. A total of 79404 people were seen during the period an the incidences of the related infection disease were as follows: Amoebic disease 1.7%, Giardiasis 2.7%, Ascariasis 3.5% hookworm infection 0.85% and other parasites 0.7%.

Houston and Schwarz (1990) studied about helminthes infection among peace corps volunteers station in various rural regions of Nepal indicated 14% were positive for hookworm, 3% for whipworm and 87.2% for roundworm infection.

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 below 15 years then in adult more than 15 years. *A. lumbricoides* was the common parasite followed by hookworms *Taenia sp*. *E. vermicularis* and others. Among protozoan parasites, *G. lamblia* was the most common followed by *E. histolytica.*

Blangero et al., (1993) studied helminthes infection in Jiri, concluded that roundworm, whipworm and hookworm were endemic in Nepal and are the major health problem for the population.

Gianotti (1993) surveyed, in 1990, a total 137 causes from Kathmandu valley and 22 cases from Solukhumbu in children. He reported *Ascaris* 11.2%, *Trichuris* 9.8%, *Giardia lamblia* 5.9%, *E. histolytica* 5.3%, hookworm 3.3%, *H. nana* 0.5% and *T. solium* 0.5% in Kathmandu valley cases, but in Solukhumbu cases *Ascaris* 22%, *G. lamblia* 31.8% and *E. histolytica* 9.1%.

Rai et al., (1994) studied the status of soil transmitted helminthes infection in Nepal during 1985-1992. Averages of 6537 fecal samples were examined each year. The annual rate of the positivist for soil transmitted helminthes ranges from 18 (36.6%) *A. lumbricoides* has the most common prevalence than the hookworms and others.

Sherchand et al., (1996) carried out study on intestinal parasite from Kathmandu area of Nepal and reported 28.1% parasitic load among subjectively healthy children (HC) and 38.8% parasitic load among healthy adults whereas 62.7% total parasitic load was record among children with abdominal discomfort. H. nana was recorded as most common tapeworms associate with patient having abdominal discomfort. Among protozoan parasites prevalence of *Giardia* was highest among the sick children. In healthy children the prevalence of mixed parasite infection was 2.1% and 7% in

healthy adults, while 13.3% prevalence was found in sick children and 11.5% in sick adults.

Shrestha et al., (1997) carried out a study on, "Prevalence of Intestinal Parasite among the Primary School Children of Two Schools in Dharan". A total of 293 stool samples were examined for different intestinal parasite out of 293 samples. So samples i.e. 27.30% of stool samples were positive for intestinal parasites. Highest prevalence was recorded form that of *G. lamblia* 53.75% which was followed by 17.5% of *Entamoeba histolytica* 15% of *Ascaris lambricoides* and 5% of mixed infection.

Karki and Parija (1997) worked on hospital based study of intestinal parasitic infection in Dharan. A total of 62.30 stool specimens from patients attending B.P. Koirala Institute of Health Science, Dharan, Nepal during a period of 36 months (1994 July to June 1997) were examined for intestinal parasites. Among 6230 stool specimens only 943 i.e. 15.14% were found to be positive for intestinal parasites. Among 943 positive stool sample 876 (i.e. 92.9%) had single infection, rest 67 i.e. (71%) had multiple infection. The *E. histolytica* was recorded, as most frequently defected parasite i.e. 30.54% folloed by 24.45% of hookworm. Majority of parasites, except hookworm were recorded as more prevalent in children up to 9 years i.e. 5.4% of *E. histolytica*,% of G. intestinalis and 4.2% *Ascaris lumbricoides* where as hookworm infection was found to be higher among adults of 20-29 years. Taenia was demonstrated only in 1.6% of positive stool.

Chhetri et al., (1997) analyzed the parasite infection scenario of Nepal and concluded that 50% of people were infested by helminthes. And *Ascaris lumbrioides* was found to be top in the list of helminthes and *Giardia* in protozoa from 400000 stool samples report studied by different organization at difference places and period (from 1979 to 1995 i.e. 16 years).

Bhattarai et al., (1998) studied disease pattern of the patient attending medicine unit of free mobile specialist health camp in Taplejung and reported 6% of worm passing with stool and 1% of tape worm segment out of total 17315 study population.

Navisky et al., (1998) examined faecal specimens from 292 pregnant women (age 15-40 years) and 129 infants (age 70-140 days) for helminthes eggs by the Kato-Katz method. These stool specimens were collected from Sarlahi district in southern Nepal among pregnant women was found to be 78.8% hook worm, 52% *A. lumbricoides* and 7.9% *T. trichiura.*

Rai et al., (1999) studied Ascaris, Ascariasis and its recent scenario in Nepal and suggested Ascaris as leading human parasite and also reported as major causes of public health problem. The study reported that over 75% people were infested by A. lumbrcoides in rural area, whereas hospital based study in Kathmandu over a period of one decade also shown a static annual prevalence with mean of approximately 35%.

Rai et al., (2000) investigated the contamination of soil with helminthes eggs in Kathmandu valley and outside valley in Nepal. Out of 156 total samples, 122 were taken from Kathmandu valley and 34 samples from outside valley. The overall soil contamination rate was 36.5%. The prevalence was uniform in Kathmandu valley (36.3%) during wet season compared with the observed in dry season (33.3%) but with out significant different ($p<0.02$) altogether 5 species of nematodes were recorded (A. *lumbrcoides, Toxocara sp*). *T. trichiura, Capillaria sp.* and *Trichostrongylus* and 2 species of cestoda (*H. nana and H. diminuta*). *A. lumbicoides* was prominent in Kathmandu valley while *Trichostrongylus* was the commonest outside of valley.

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.

Shrestha (2001) studied on intestinal parasitic infections in healthy school children of Lalitpur district. Stool samples of 595 healthy urban and rural school children of 7-12 years age groups were collected. Among them 81.94% of children were found to be infected with parasites. Among them prevalence of *A. lumbricoides* was found to be highest (73.45%) in rural and (71.66%) in urban children but T. trichura was found to be higher among children of urban area 37.91% whereas that of rural was 27.27%, 78.36% and 84.07% male and 92.45% and 73.72% of female children from the urban surely respectively were found to be infested with the protozoan and helminthes parasites.

Tai-soon et al., (2001) investigated the state of intestinal infections in two rural villages in Chitwan district, Nepal, in 1999. Stool examination was performed with a total 300 specimens from school children by formalin-ether sedimentation technique. The prevalence rate of intestinal parasite infection in the surveyed areas was 44.0%. The prevalence rate in Jerona was slightly higher than male without statistically significant difference E. coli was the most commonly found protozoan parasite (21.0%) followed by *G. lamblia* (13.7%) and other (5.3%). Hookworm was the most prevalent intestinal helminthes (13%) followed by *T. trichiura* (3%) and other (5%) 43 specimens (14.3%) showed mixed infections.

Rai et al., (2002) studied intestinal parasites among school children in a rural hilly area of Dhading district, Nepal. A total of 423 school children were included and 254 (60%) of them were found to be positive for intestinal parasite. *A. lumbricoides* was the most common (69.6%) parasite detected followed by hookworm (19.2%) whipworm (5.9%) *G. lablia* was only protozoan parasite detected in this study (5.2%) whereas Dalit had significantly higher prevalence (74.1%).

Karki et al., (2004) conducted a study among Magars in Barangdi VDC of Palpa from July 2002 o June 2003. A total of 157 samples were examine and

to total prevalence was 66.88%. The highest prevalence rate was found to be due to *A. lumbricoides* (50.32%) followed by hookworm (24.2%), *T. trichiura* (17.2%), *Taenia sp.* (8.28%), *H. nana* (6.37%) and *S. stercoralis* (1.91%).

Parajuli (2004) studied on the prevalence rate of intestinal parasite in Mushar community in Chitwan district. A total of 183 stool samples were examined of which (77.05%) were positive. Female had higher prevalence (79.2%) than male (74.4%). *A. lumbricoides* had higher prevalence (48.08%) followed by *A. duodenale* (34.94%), *T. trichiura* (22.4%), *E. histolytica* (15.3%), *S. stercoralis* (8.19%), *G. lamblia* (7.65%), *H. diminuta* (4.37%), *H. nana* (2.73%) and *Taenia sp.* (1.63%).

Rai et al., (2006) studied on the prevalence rate of intestinal parasites in school children of Dolkha district, Nepal. A total 157 samples were examined and the total prevalence, was 67.60%. The highest prevalence rate was found to be *A. lumbricoides* (52.8%) followed by hookworm (21.2%) *T. trichiura* (16.2%), *Taenia sp.* (8.96%), *Giardia lamblia* (6.3%) and *S. stercoralis* (1.63%).

Destuata et al., (2006) investigated the states of intestinal parasites infection in rural village of Rukum district, Nepal. Stool examination was performed with a total 270 specimens from the people by formalin ether sedimentation technique. The prevalence rate of *A. lumbricoides* was found to be highest. The prevalence rate of intestinal parasitic infection in surveyed areas was 80.94%. Among them prevalence of *A. lumbricoides* was 7.14% followed by hookworm (22%), whipworm (7.9%), *T. trichiura* (16.9%), *Taenia sp.* (10.68%), *H. nana* (6.37%) and *S. stercoralis* (2.3%).

Raghav et al., (2008) investigated the states of intestinal parasitic infections in rural village in Siraha district, Nepal in 2007. They examined 430 stool samples. The total prevalence rate of intestinal parasite infection in surveyed areas was 63.20%. Female had higher prevalence (77.04%) than male

(62.12%). *A. lumbricoides* had higher prevalence (41.23%) followed by *A. duodenale* (33.92%), *T. trichura* (22.3%), *E. histolytica (*15.3%), *S. stercoralis* (6.12%), *G. lambia* (18.2%), *H. nana* (3.23%), *H. diminuta* (3.25%) and *Taenia sp.* (2.3%).

Rosino et al., 2009 published the 'Socio-Economic Status of Nepal'. They experimentally proved the different issues and condition of Nepalese. They showed that most of the people of rural areas were suffering from different types of parasitic infections as well as very low economic status. They examined 1500 stool samples from Terai region and got 84.2% of the samples were positive.

4.3 Literature Review in Global Context

Virk et al., (1994) worked on prevalence of intestinal parasites in rural are of district and Shahjahanpur Uttar Pradesh. Out of 381 individuals examined 111 i.e. 29.2% were found positive for one or the other intestinal parasite *A. lumbricoides* superseded all the parasite by showing positivity of 17.85% followed by hookworm 7.87%, tapework 3.41%, *H. nana* 3.15%, *E. vermicularis* 0.52%, *T. trichiura* 1.05%, *E. histolytica* 2.36% and *G. lamblia* 0.26%.

Saha et al., (1995) worked on intestinal parasitism. A childhood problem in Rural Bengal, a total of 221 faucal samples were obtained from rural community children below 4 years of age suffering from gastrointestinal complaints during November 1992 to April 1994. G. lamblia 17.2%, E. histolytica 8.1%, E. vermicularis 12.2%, A. limbricoides 8.1% were found to be common amongst intestinal parasites. A significantly lower infection rate was observed in children below one year 24.4% as compared to older age group 66.4%.

Sugunan et al., (1996) worked on intestinal parasitic infection among different population groups of Andaman and Nicobar Islands. A total of 1384

stool samples collected from preschool aged children and adult of rural as well as urban settlements of two tribal groups (viz. Nicobarese and Onges) were examined. The microscopic examination result revealed 47% of overall prevalence of intestinal parasite. The specific prevalence rate was 40% of *A. lumbricoides*, 10.8% of *T. trichiura*, 0.4% of hookworm, 2.5% of *G. lamblia* and 0.8% of *E. histolytica* in urban settings. While, out of 490 stool samples from rural setting 24.3% of *A. lumbricoides*, 5.9% of *T. trichiura*, 1.2% of hookworm, 12.4% of *G. lamblia* and 2.7% of *E. histolytica*. In Nicobar, out of 41 stool samples *A. lumbricoides* had highest prevalence followed by 24.4% of *T. trichiura* and 2.4% of hookworm and *E. histolytica.*

Dorea et al., (1996) carried out a program for control of parasitic infection among school children in the peri-urban area of Botecatu, Sao and Paulo, Brazil. A total of 219 (school children) stool samples of 7-18 years age a group were collected. The study of result revealed that 123 i.e. 5.61% was found to be infected with one or more parasitic species. 84 children carrying pathogenic parasitic were submitted to various antiparasitic treatment schedules, 89% students were reevaluated next time after 4-6 months as post chemotherapy. The results indicated that the combination of treatment with prophylactic measures has been successful in the control of parasitic infection. Since reinfection rates were generally low (<0=5.3%) except for G. lamblia infection 18.6% and a marked reduction on the prevalence rates was observed with a significant percentage of cure (i.e.> or = 73.1%) in children infected with most parasitic species.

Torres et al., (1997) worked on infection by intestinal protozoa and helminthes in school children form riverside sectors, with different fecal contamination levels of valdivia river Chile. During 1993, the prevalence of infection by intestinal protozoa and helminthes in the riverside school children population of two sectors of valdivia river, with different level of fecal contamination, were compared in relation to their contact with river water (swimming, bathing) and basic sanitation elements of their house (i.e. faeces,

garbage disposal and water supply). 418 from sector A and 400 from sector B stool samples were collected and examined. The study of result revealed 74.8% overall prevalence in sector A and 72.5% in sector B. The most prevalent parasites were *E. histolytica* and *H. nana*, *T. trichiura* and *A. lumbricoides*.

Suarez et al., (1998) carried out an epidemiological study on *H. nana* infection in Ciego de Avila province, Cuba. A total of 3108422 stool sample were collected during 1981 to 1995. The microscopic examination of 3108422 stools revealed 250 (i.e. 0.008%) eggs of *H. nana*. There were more cases in children than in adults, with male prevailing over females.

Toma et al., (1999) carried out questionnaire survey and studied prevalence of intestinal helminthes infections in Barru, Sulawesi, Indonesia. A total of 654 fecal samples were collected and examined. The most common enteroparasite were *A. lumbricoides, T. trichiura,* hookworm and *S. stercorais, H. nana* infection was also confirmed. *T. trichiura* was most common followed by hookworm and *A. lumbricoides* in both 4-14 and over 15 years age group. The prevalence of hookworm infection was significantly higher in males than in females of older age. The inhabitant with higher education background had significantly lower infection rates of *Ascaris lumbricoides* and *Trichuris trichiura*. The prevalence of hookworm infection was not significantly different between in inhabitant owning latrine and without it, but prevalence of *Ascaris* and *Trichuris*, differed significantly.

Lee et al., (2000) examined stool and cello tapenal swab carried out in August 1997 on handicapped people at an institution located in Chorwongun, Kangwon-do, Korea. A total of 112 stool samples (78 males and 34 females) revealed 3 cases of *T. trichiura* 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 were as follows: E. coli (25%), *E. histolytica* (1.8%), *Endoilimax nana* (21.4%), *I. butschilii* (1.8%) and *G. lamblia* (0.9%). In cello

tape and anal swab examination (165 samples), the prevalence ration of *E. vermicularis* was 20.6%.

Toma et al., (2001) studied on *strongyloides* infection conducted by faecal examination and subsequent treatment of the 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 examination each year. The positive rate in 1993 was found to be 9.7%.

Fernandez et al., (2002) carried out a comparative study of the intestinal parasites prevalent among children living in rural and urban setting in and around Chennai. A total of 324 stool samples were collected and examined. Out of 125 specimens tested from the rural location, the overall prevalence of intestinal parasite was 91%. *A lumbricoides* was the most common helminthes parasite detected 52.8% followed by *T. trichiura* 45.6%, *A. dudenale* 37.6% where as *G. lamblia* (16%) was the most common protozoan parasite detected followed by *E. histolytica* 4.0% in contrast under urban setting out the 199 stool sample tested the positivity rate was 33%, *G. lambia* was the most common parasite detected 22.69% followed by *E. histolytica* 10.6%. Other intestinal parasites, such as *T. trichiura* 2.01%, *H. nana* 1.01%, 0.5% of *E. vercmicularis* and *A. lumbricoides* 0.5% were found to have much lower prevalence in comparison to the rural area.

Alakpa et al., (2002) conducted a cross sectional laboratory based sudy in Lagos Metropolis state in South Western Nigeria during March 1999 to April 2000. In total 1109 stool samples were collected during the period of study 11 (0.95%) were confirmed to be positive to *cyclospora cayetanensis* occysts. Other parasites were also detected including *cryptosporidium, Entamoeba, Ascaris, Trichuris, strongyloides sp.* and hookworm.

Buchy (2003) worked on intestinal parasites in the Mahajanga region west coast of Madgascar. A total of 401 stool and 112 area samples were collected from OPD patients of Mahajang's Hospital during November 1996 to January 1997. The examination of school specimens revealed 67.6% prevalence. The frequency of protozoa was higher 47.7% than helminthes 23.4%. The specific prevalence was *H. nana* 2.5% and *taenia saginaal Taenia solium* 0.57%. Out of 112 sera examined 50% of sera constrained antibodies (anti *A. lumbricoides* and anti *S. stercoralis*).

Miller et al., (2003) examined the presence of intestinal protozoan and helminthes infections and their association with clinical signs and symptoms in children in Trujillo, venezvela. The point prevalence of protozoan infection was 21% for *G. lamblia,* 1.0% for *E. histolytica*/disper, 4% for *E. coli,* 16% for *Blastocystis hominis* and 89% for *cryptosporidium*. Prevalence of helminthes infections was 11% for *Ascaris* 11% for *T. trichiura* 0.0% for *S. stercoralis* and 2% for *H. nana*.

Adnan et al., (2005) conducted a study among the children in Gaza. In this study 92 stool specimens were collected and analyzed by wet mount iron haemotoxylin staining, antigen detection of *Entamoeba histolytica*. The total number *E. histolytica* identified by PCR was 64 (69.6%) that of E. dispae was 21 (22.8%). Mixed infection with both *E. histolytica* and *E. dispar* was evident in 7 species (7.6%). In this result approximately 30% of suspected clinical amoebiasis case were –ve for *E. histolytica*.

Rivera et al., (2006) worked on prevalence and genetic diversity of *E. histolytica* in an institution for the mentally retarded in Philippines. A total of 113 mentally retarded patients were screened for the presence of *E. histolytica* based on microscopy and PCR. Anti *E. histolytica* antibodies were also collected, screened in 97 serum samples using IFA test. Parasitological examination showed *E. histolytica/E. dispar* in 43 cases (38.05%) While PCR detected 74 cases (65.48%) positive for *E. histolytica* and 6 case (5.30%)

positive for *E. dispar*. IFA test revealed 80.41% (78/97) of respondents possessed significant antibody titers of intestinal infection of *E. histolytica.* This result indicate high prevalence of *E. hisolytica* for mentally retarded.

Rivera et al., (2006) worked on prevalence and genetic diversity of *E. histolytica* in an institution for the mentally retarded in the Philippines. A total of 113 mentally retarded patients residing in a mental institution in Metropolitan Manila. Parasitological examination showed *E. histolytica/E.dispar* in 43 cases (38.05%) while PCR detected 74 cases (65.48%) positive for *E. histolytica* 6 cases (5.30%) positive for *E. dispar* interestingly, these 6 samples were coinfected with *E. histolytica.* IFA test revealed that 80.41% (78/97) of the respondents possessed significant antibody titers for intestinal infection of E. histolytica. This result indicate that the high prevalence of E. histolytica in an institution for the mentally retarded in Philippines.

Celik et al., (2006) studied on intestinal parasites among primary school children in Malasiya. During observation parasite infection was observed in 415 (22.5%) out of 1838 students and the highest rate of (10.6%) was that of *Enteroblus vermicularis, E. coli, Blastocystis hominis, Ascaris lumbricoides* and *Iodamoeba Butschilii* were found to be 8.5%, 1.9%, 1.4%, 0.3%, 0.1%, 0.05 respectively.

Fan-ping et al., (2006) studied on prevalence of *Taenia saginata* infection in people consuming pig meat (pork). The epidemiology of I. *saginata* in some part of Asia is confusing in that beef does not appear to be the source of infection. After the experiment, it was found that strains of pig seem to be favorable animal models for experimental studies of *I. saginata* like tapework with SEM pig the most favourable.

Soroek et al., (2007) studied on alcohol drinking history and fatal injury in older adults. This case control study determined the association between

drinking history and fatal injuries from falls, motor vehicles. They performed a case control study using 1,735 cases national mortality. Case and controls were restricted to ages 55 years and older. Having 12 or more in the year before death or interview for the control was used to assess alcohol drinking history. Drinking increased the risk of suicide were for women than men. Drinking history in older is associated equally 1.09 obese (hazard rate ratio 0.09, 95% confidence interval 0.90 had similar rates recovery, even after adjustment for other factors.

Irikov et al., 2007 examined the presence of intestinal protozoan contamination of Moscow children's collective bodies. The author revealed, on the basis of an analysis of the contamination with intestinal protozoa in 373 Moscow children comparison of the date of a randomnized protozoological study of matched group of 543 children from there towns of the Russian federation in past 15 years. A reduction in the detectable protozoan types upto a single sype both among parasitic amoebas (*E. coli*) and flagellates intestinalis. The incidence of giardiasis among the children's collective bodies averaged.

Regel et al., (2008) studied on the prevalence and intensity of *A. lumbricoides* in 602 children from five rural village in southern area of Pakistan, the overall prevalence of *A. lumbricoides* was 87.3%. The most intense of *A. lumbricoides* infections were found in children aged 4-9 years.

Robert et al., (2008) carried out as study to determine the prevalence of intensity of intestinal helminthes infections in the peri-urban area of Botecatu. A children were between 7 to 13 years of age and belonged to lower socio-economic status. Stool samples collected were processed by modified formalin ethyl acetate sedimentation technique. 187 children were infected out of 280 children with one or more of the intestinal parasites viz. *A. lumbricoides, T. trichiura* and Hookworm. The overall prevalence of infection was 66.7%. *A lumbricoides* was the most common infection with a prevalence of 7.5% followed by *T. trichura* of 61% and hookworm of 4%.

Cristanol et al., (2008) studied on profile of intestinal helminthes in school aged children in the city of Abidjan. A total of 1021 fecal samples from school children aged from 4-15 years were collected and examined. The overall prevalent species were *T. trichiura* 28.3%, *A. lumbricoides* 20.3%, hookworm 5.9%, *S.stercoralis* 2.3%, *H.nana* 1.1% and *E. vermicularis* 0.2%. The males were more infected than females. Most infected group was 12-13 years while least infected group was 3-5 years age group.

Brucel et al., (2009) carried out an epidemiological study on *H. nana* in ciego re desuta, Cuba. A total of 3500000 stool samples were collected during 2006 to 2007. The microscopic examination of 3500000 stools revealed 250 (i.e. 0.008%) eggs of *H. nana.* There were more cases in children than in adults, with male prevailing over females.

Prodeus et al., (2009) studied on intestinal parasitic infections in the University campus of Aagra. Foecal samples of 2069 persons complaining for abdominal discomfort were examined. Out of total samples 1520 samples (73.4%) were found to be positive for *E. histolytica, A. lumbricoides, G. lamblia*. Among them, *E. histolytica*, showed highest prevalence rate (37.55%) followed by *G. lamblia* (13.6%), while *A. lumbricoides* showed the least infections rate (4.96%).

Lim et al., (2009) studied on the prevalence of intestinal parasites amongst Organ Asli (Indigenous) in Malasia. Studies reported that the infection rate of intestinal parasitic infections in Orang Asli communities has reduced from 91.1% in 1978 to 64.1% in subsequent years. Although the result was encouraging. It has to be integrated with caution with nearly 80% of studies carried out after 1978 still reported Asli communities, prior to 1978 hookworm infection is the most predominant STS but today trichuriasis is the most common STH infection.

Mumtaz et al., (2009) studied the frequency and risk factors for intestinal parasitic infection in children under five years of age at tertiary care hospital. A cross sectional survey of 269 children and 185 were found positive case i.e. 68.8% children. Majority of children were of 4-5 years of age. Less than one third (20.4%) showed moderate malnutrition P = 0.05 while 44.6% were found to have mild anaemia $p<0.01$. *Giardia lamblia* was most common 2.53% identified.

Chang et al., (2010) studied on the prevalence of intensity intestinal helminthes infections in Okinawa, Japan. The children were between 5 to 15 years of age and belonged to lower socio-economic status. Stool sample collected were processed by modified formalin ethyl acetate sedimentation technique. 209 children were infected with one or more of intestinal parasites viz. *A. lumbricoides, T. trichiura*, hookworm. The overall prevalence of infection was 78.32%. *Ascaris lumbricoides* was the most common infection with a prevalence of 68.32% followed by *T. trichiura* 13.6% and hookworm of 9.16%.

Stebursal et al., (2010) worked on epidemiology of *Hymenolepis nana* infection in primary school children in west Bengal. 516 stool samples were collected. The result of study revealed 18% of children infected with *H. nana*. The above results suggested that, the prevalence of *H. nana* was not in large scale.

V

MATERIALS AND METHODS

5.1 Study Area and Population

Siraha district is located in eastern region of Nepal. Nepal is situated in the central part of Asia in between $28^0$22' to $30^0$27' north latitude and $80^0$4' to $88^0$12' East longitude (Pandey, 1998). Nepal has a total area of 147181 sq.km. This area is 0.03% of world and 0.3% of Asia (Gurung, 2056)

There are 106 VDC in Siraha district and has two municipality. For the study, Chandralalpu VD was selected. It occupies 1000 sq.km. The total population of Mushar community was 600 in Chandralalpur -6 (Choherwa). It is situated at the side of Mahendra highway.

5.2 Study Duration

Baseline health survey was conducted in the study area with prepared questionnaire during 9th April 2009 to 15th September 2009.

5.3 Sample Size

Stool samples were randomly collected and examined from 300 people of Mushar community of different age groups of Chandralalpur-6 (Choherwa). The collected stool samples were kept in 2.5% Potassium dichromate.

5.4 Survey Study

The study area was visited and the sanitation measure, hygienic, poverty, education condition and the activity of Mushar community were noticed. Meetings with various persons were done to get different information about the study area as well as the various activity and traditions of Mushar community. The amount of alcohol consuming, sources of water supply and the

condition of latrine were observed very carefully. The questionnaire was translated in 'Maithili' language to get proper information.

5.5 Stool Sample Collection

For stool sample collection, just after interview, orientation about the proper methods of collection of stool was provided to ensure good condition of stool sample. They were oriented to collect 5 gm of stool from initial, middle and end portion of stool early in the morning with the help of clean stick provided with cleanvial. They were also instructed to avoid conaminatio of stool with urine and stool. To ensure good condition of stool sample following precautions were taken.

i) The sampling vials were properly cleaned with detergent and dried but no antiseptic was used.
ii) Each sampling vials were distributed without preservations after interviewing individually in previous day and collected next day early in the morning.
iii) Immediately after collection, 2.5% Potassium Dichromate solution was added in the vials containing stool for the preservation of the parasites present in the stool.
iv) Vials were then kept in the ice box of pathological lab for further processing i.e. slide preparation and identification.

5.6 Materials

5.6.1 Equipments

i) Electric compound microscope
ii) Ii) Hot air oven
iii) Refrigerator
iv) Sample vials
v) Gloves
vi) Trays

vii) Applicator sticks
viii) Glass slides
ix) Cover slips
x) Forceps
xi) Cotton
xii) Dustbin

5.6.2 Chemicals

a) 2.5% potassium dichromate
b) Normal saline
c) Iodine solution
d) Soap
e) 10% formaline

5.6.3 Preparation of Potassium Dichromate

2.5 gm of potassium dichromate was weighted accurately by the help of electric balance and dissolved in 100 ml of distilled water & dissolved well. This solution was used for the preservation of parasite found in the stool.

5.6.4 Preparation of Normal Saline

This is useful for observing the characteristic movement of the parasites. This solution was prepared by dissolving 8.5gm of sodium chloride in 100 ml distilled water. Normal saline was used in unstained preparation.

5.6.5 Preparation of Iodine Solution

For studying the internal characters of identification of the species of protozoan parasites as well as helminthes egg, a stained preparation is required. For this purpose iodine solution was used. The solution used in the present study was prepared by dissolving 10 gm of potassium iodide in 100 ml of distilled water & slowly adding 5 gm iodide crystals in it. The solution was

then filtered and kept in a stoppered bottle of ambercalour. As the lugol's iodine solution is too strong. It was diluted about five times with distilled water before putting on a slide to mix with the stool materials.

5.7 Laboratory Work

5.7.1 Microscopic Examination

Immediately after collection before adding preservative, the microscopic examination of stool sample was done. Microscopic examination was performed to observe following.

- Colour of stool
- Odour of stool
- Solidity or consisting of stool
- Presence of mucus blood in stool
- Presence of gravid segment, larvae, worms in stool.

5.7.2 Microscopic Examination

All the necessary equipments and material were collected in working table with safety precautions. Both unstained and stained preparation was used in the study.

5.7.2.1 Unstained Smear Preparation of Stool

A portion of stool sample was picked up with a wooden applicator and emulsified with freshly prepared normal saline on a clean glass-slide. A clear cover slip was placed over it excess of fluid was removed with the help of filter paper. The resulting smear should not be thick and its consistency should be such as to allow newsprint to read through it.

5.7.2.2 Stained Smear Preparation of Stool

Stained preparation was required for identification and the study of nuclear characters of protozoan cyst and trophozoites. The iodine stained preparation was used for this purpose.

Stained smear was prepared in the similar manner as prepared in unstained smear preparation. Here lugols iodine solution was kept instead of normal saline solution.

5.8 Examination

Both of the preparation were first examined under the low power (10×) objective and ocular starting from one corner of the cover slip to another corner. The whole slide was examined and any suspicious object was subjected for detailed diagnosis. During the identification of egg of helminthes and cyst of protozoa an attention was paid on shape, size and colour marking on the surface of the egg shell. The presence and absence of yolk granules, ovum or differentiated embryos, the existence of operculum, polar filament or knob and in specific case of cestodes, the 3 pairs of embryonic hooklets and their arrangement. In case of protozoan cyst, remains of flagella, nudeus characters and position of nudeolus were considered.

5.8.1 Indirect Method

Beside the direct stool smear preparation and examination method, indirect methods were also applied for some of the samples which gave doubtful results.

5.8.1.1 Concentration Method

In this method of few grams of stool sample wax mixed with chemical and cysts and eggs of parasites were concentrated, collected and observed. Two methods were applied for these purposes.

VI

RESULTS

The present study was conducted in Mushar community of Chandralalpur-6 (Choherwa). Survey study and stool sample collection were done from 300 people of this community.

The result of the present study is divided into two categories:

i) Result of stool examination
ii) Result of questionnaire

The study and collection of stool samples were performed on the basis of their habit of consuming alcohol or not consuming alcohol. It is locally made and called as 'Local Daru'.

The alcoholic consumers were categorized into:

i) Heavy drunker or abusers
ii) Moderate drunker
iii) Rare or occasional drunker

- The term 'Heavy drunker' means people who drink 3 to 4 quarter of alcohol daily.
- The term 'Moderate drunker' means people who drink 2 to 3 quarter of alcohol once or twice in a week.
- The term 'Rare drunker' means people who drink 2 to 3 quarter of alcohol rarely or on some occasion or once in a month.
- Non-alcoholic means the people who never drink alcohol.

6.1 Result of Stool Examination

) General Prevalence of Intestinal Parasites

Out of 300 samples examined, 113 (37.66%) samples were found to be positive for one or more type of intestinal parasites in people who consumed alcohol or not. Regarding the prevalence percentage of intestinal parasites in people consuming alcohol were found to be nil in heavy drunker where as highest in non-alcoholic persons. The prevalence percentages of intestinal parasites in people consuming different amount of alcohol or not were as, 0% in heavy drunker, 31.66% in moderate drunker, 70% in rare drunker and 88.88% in non alcoholic. The total samples of heavy drunker, moderate drunker, rare drunker and non-alcoholic were as 85, 120, 50 and 45 respectively and out of these all the total positive samples were as 0, 38, 35 and 40 respectively.

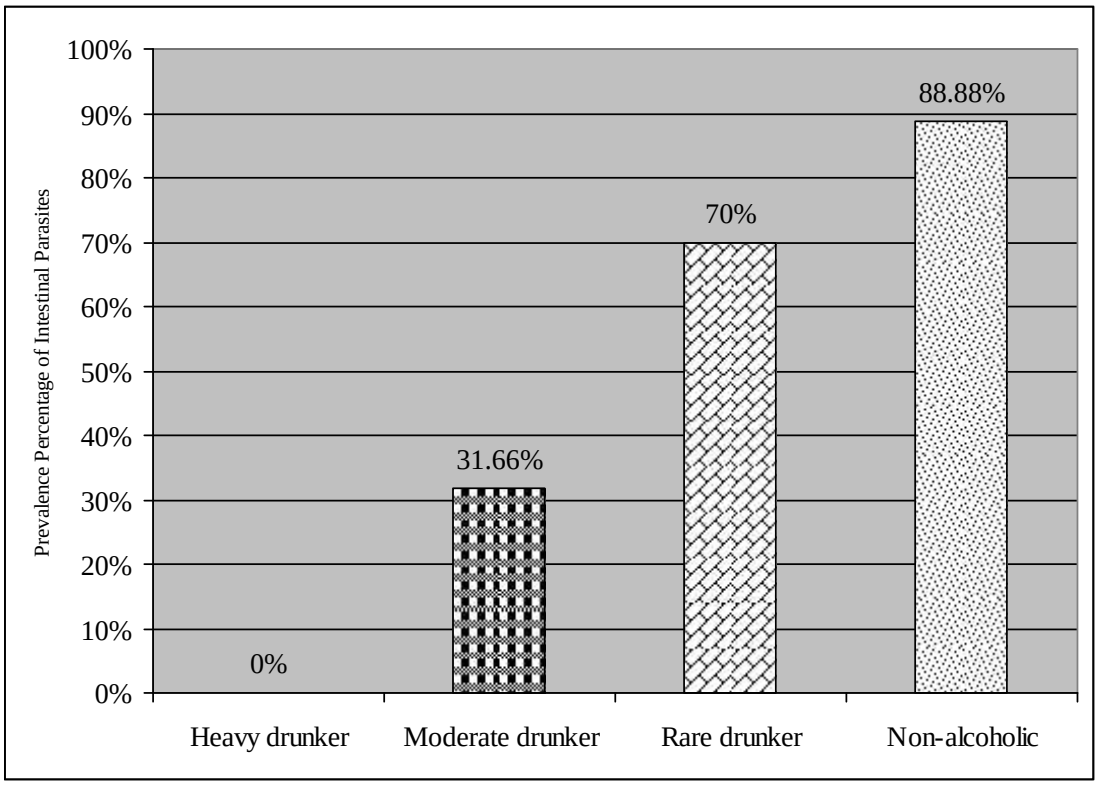

Figure No. 1

Prevalence Percentage of Intestinal Parasites in People Consuming Alcohol or Not

) Sex-wise Prevalence of Intestinal Parasites in People Consuming Alcohol or Not

Regarding the sex wise, prevalence of intestinal parasites was found to be nil in heavy drunker. The prevalence percentages of intestinal parasites on the basis of sex-wise, was as 12.5% in male and 19.16% in female who consumed moderate alcohol, 16% in males and 54% in females who consumed rare alcohol and 71.11% in females and 17.77% in males who were non-alcoholic. The total positive case was 82 in females whereas the total positive case was 31 in males. The total prevalence percentage of intestinal parasites in females was 72.56% and in males was 27.43%. As a whole, prevalence rate of intestinal parasites was found to be more in females than the males.

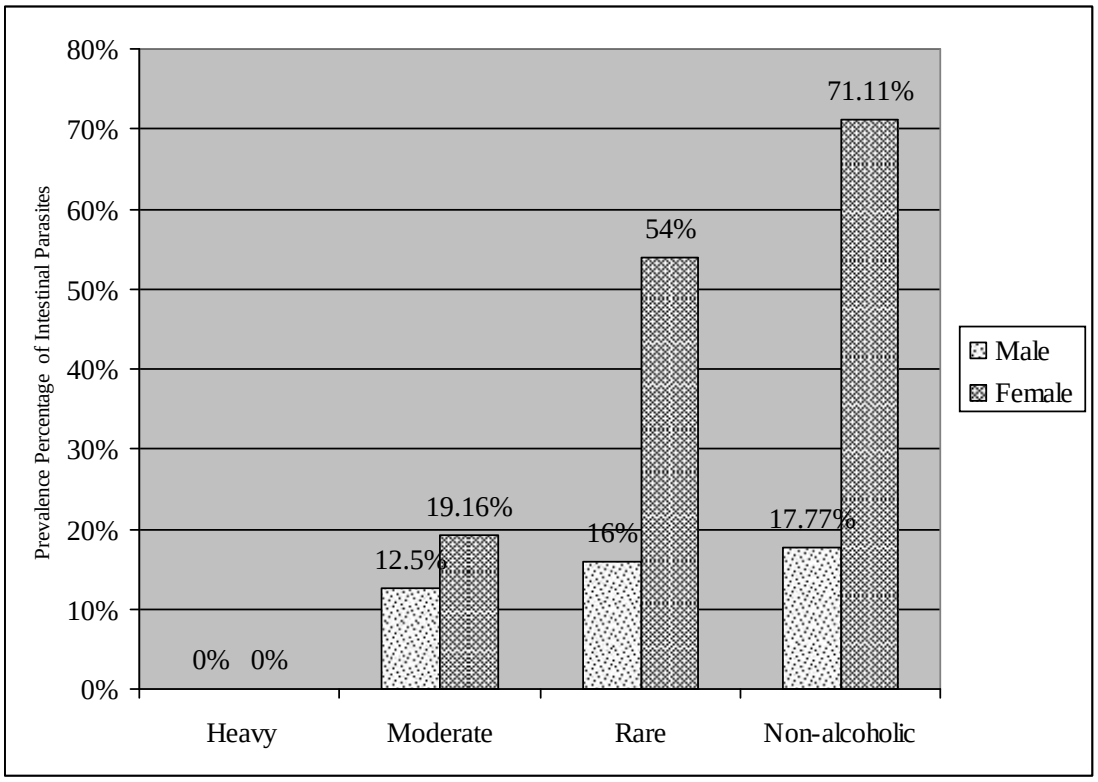

Figure No. 2

Prevalence Percentage of Intestinal Parasites on the Basis of Sex-wise in People Consuming Alcohol or Not Consuming Alcohol

) Prevalence of Protozoan Infections in People Consuming and Non-Consuming Alcohol

Prevalence rate of intestinal parasites was found nil in heavy drunker. The prevalence percentage of *Giardia lamblia* (cysts) was comparatively more than the cysts of *Entamoeba histolytica*. The maximum prevalence of *Giardia lamblia* was found in non-alcoholic persons i.e. 77.5%. whereas the maximum prevalence of *Entamoeba histolytica* was found in moderate consumers i.e. 31.75%. Comparatively the infection rate of *Giardia lamblia* was more than the *Entamoeba histolytica*.

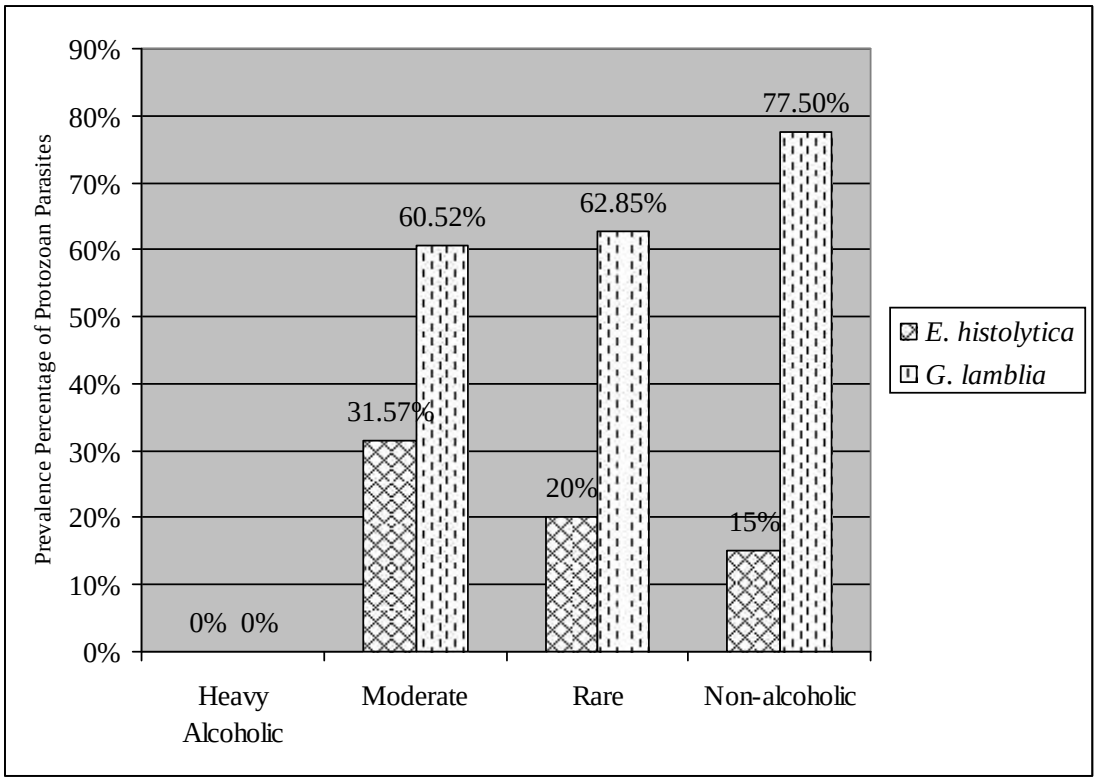

Figure No. 3
Overall Prevalence Percentage of Protozoan Infections in People Consuming and Non-Consuming Alcohol

) Prevalence of Helminth Infections in Mushar Community

Six different types of common helminth parasites were found in the faecal samples of 113 people which were recorded as positive. Among six different helminth parasites, prevalence rate of *T.trichura* was found to be minimum i.e. (1.76%) while prevalence rate of *T. solium* was recorded as maximum i.e. (12.38%) followed by *A. lumbricoides* (10.61%), *A. duodenale* (7.96%), S. *stercoralis* (7.07%), *H. nana* (5.30%) and *T. trichura* (1.76%) respectively in Mushar community.

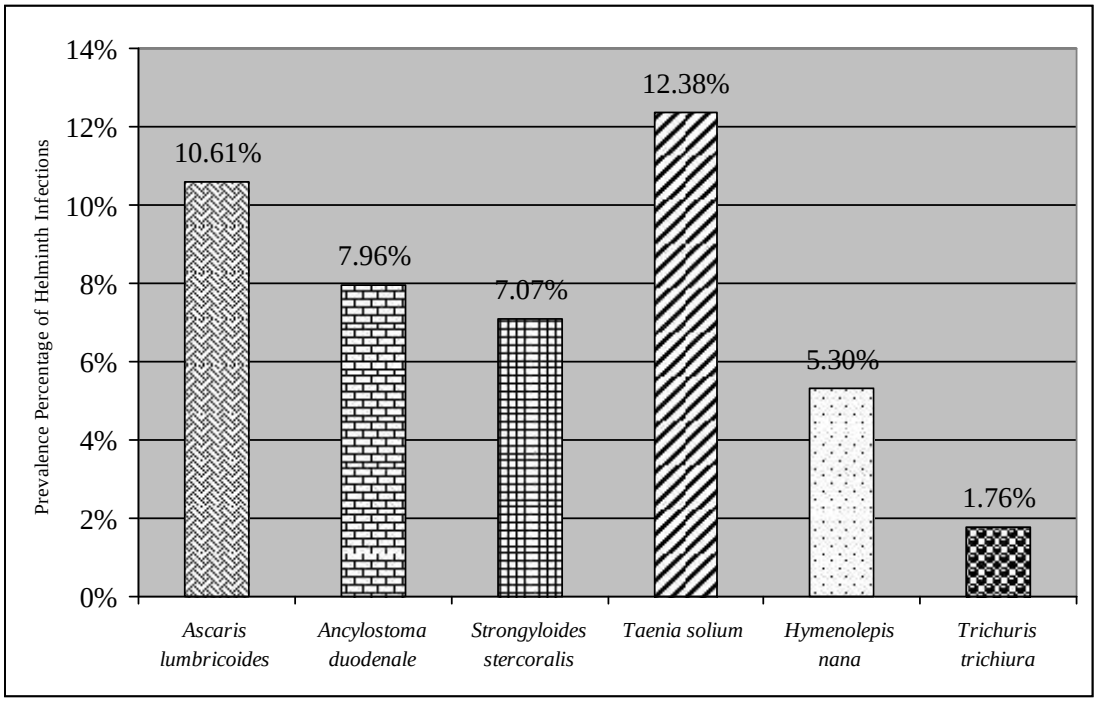

Figure No. 4

Prevalence Percentage of Helminth Infections in Mushar Community

) Age Wise Infection of Intestinal Parasites in Mushar Community

The entire study population was categorized into five age groups. Among five age groups, prevalence rate of intestinal parasites was found to be higher i.e. 64.44% in age group 21-30 followed by 57.89% in age group 10-20, 30% in age group 41-50, 27.50% in age group 31-40 and 27.02% in age group 51-60. Infection rate of intestinal parasites varied in people of different age groups. Age group 0-10 years was not included because they belong to children's group who are not consuming alcohol.

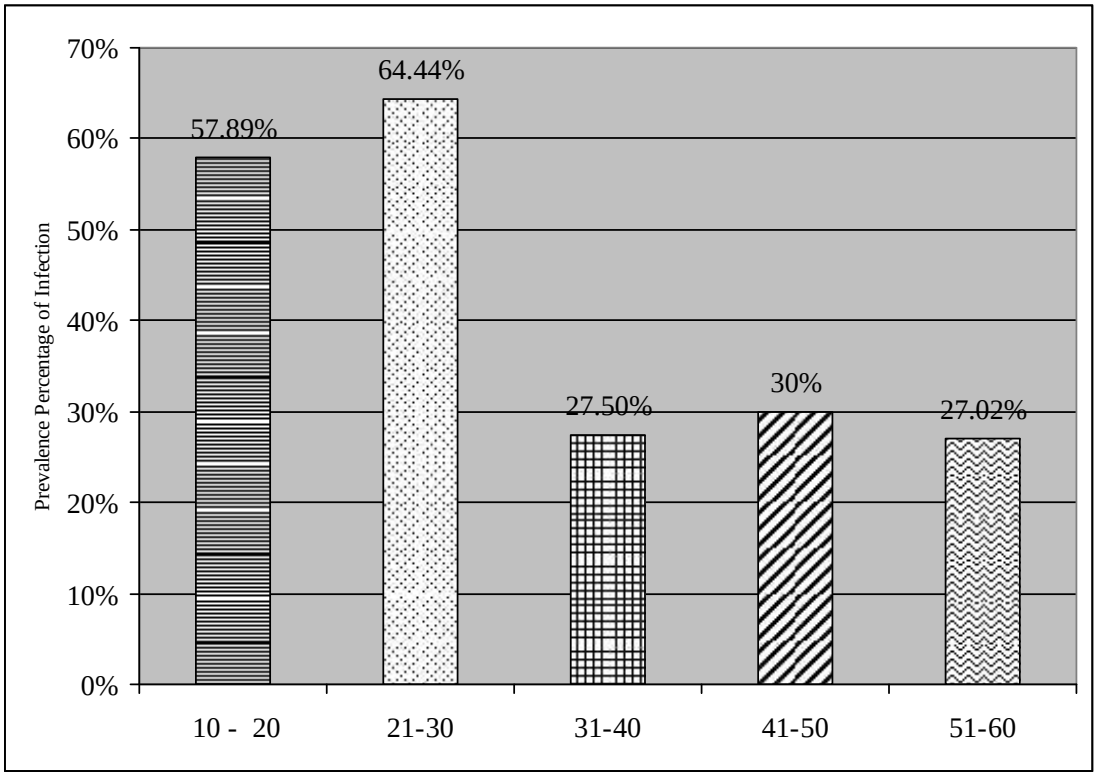

Figure No. 5

Age Wise Prevalence Percentage of Intestinal Parasites in Mushar Community

) Intensity of Parasitic Infections in the People of Mushar Community

Out of 300 samples examined, 113 samples were positive. Out of 113 samples, 40 (35.39%) samples showed single infection whereas 59 (52.21%) 14 (12.38%) number of samples showed double and triple infection respectively. The infections of protozoan and helminthes were as 89.38% and 51% respectively.

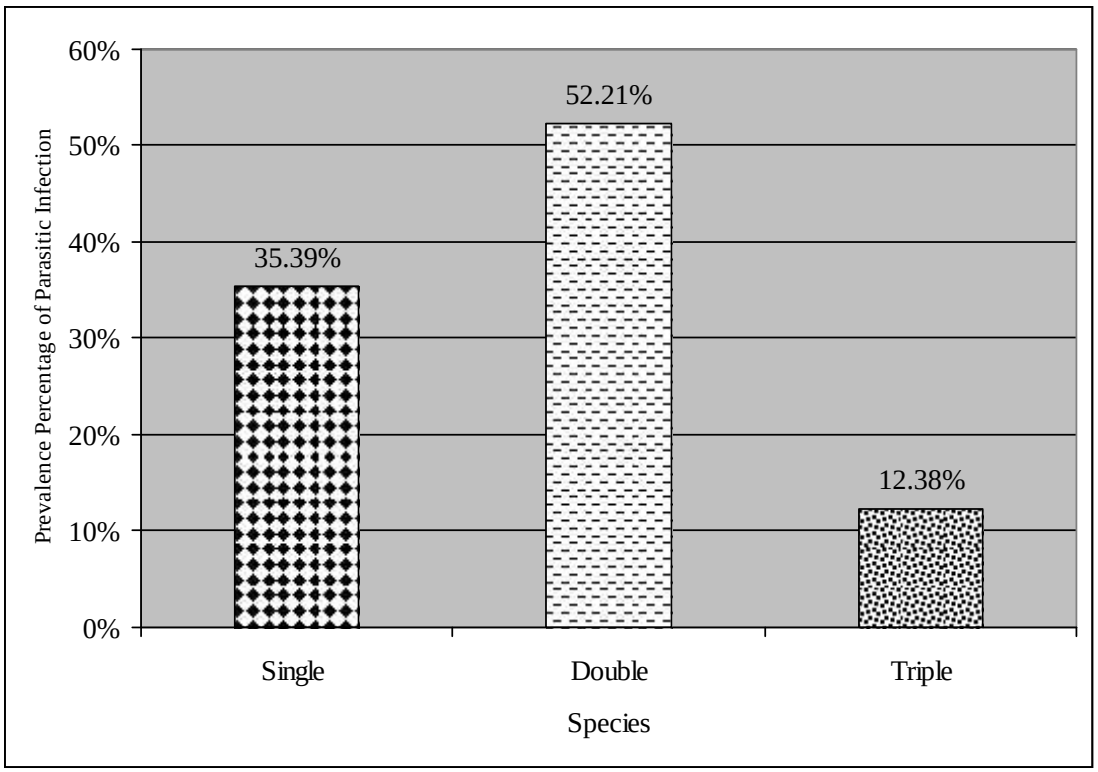

Figure No. 6

Prevalence Percentage of Intensity of Parasitic Infections in the People of Mushar Community

) Sex Wise Illiteracy/Literacy Respondents in Mushar Community

Out of 300 respondents, the total numbers of males and females were as 191 and 109 respectively. Out of 191 respondents, only 4 (1.33%) respondents were literate (upto lower secondary) and all the female respondents i.e. 109 (36.33%) were illiterate (having no any knowledge about education). Literacy (able to read and write) situation was very poor.

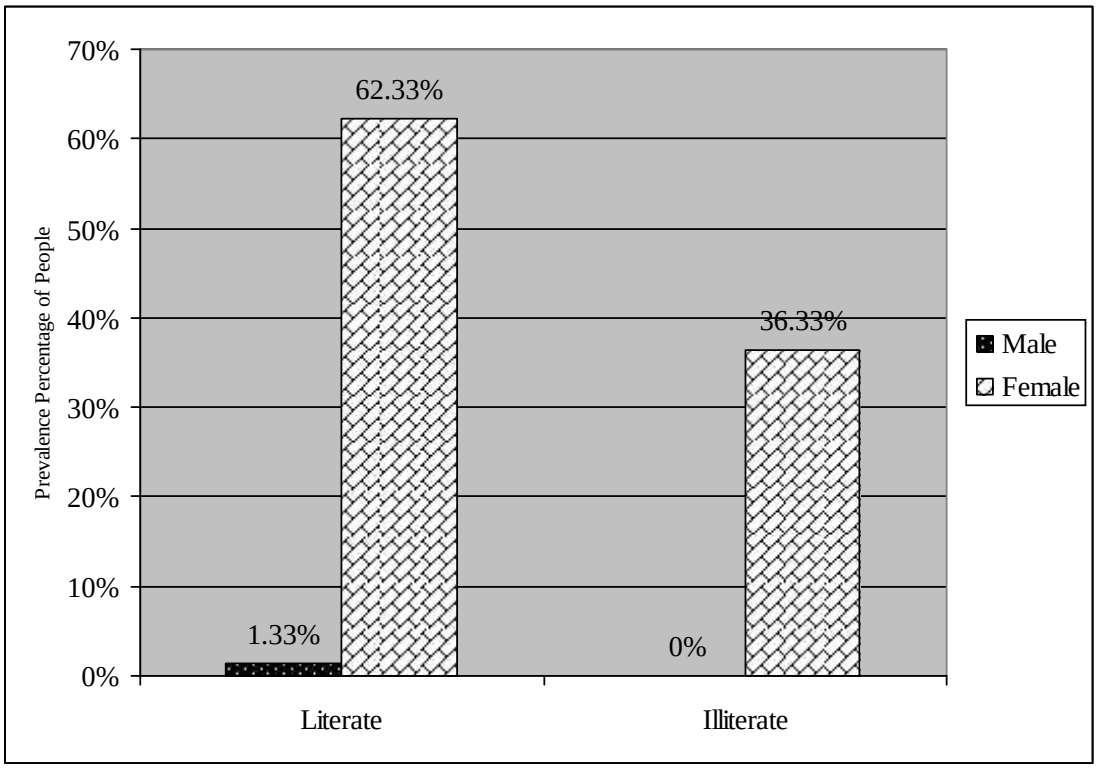

Figure No. 7

Sex Wise and Illiteracy/Literacy Respondents in Mushar Community

) Consumption of Local Alcohol by Mushar Community

On the basis of amount of local alcohol consumed by the people, the Mushar community were categorized into heavy alcoholic, moderate, rare and non-alcoholic. The total prevalence percentage of heavy alcoholic, moderate, rare and non-alcoholic was 28.33%, 40%, 16.67% and 15% respectively. All the people of Mushar community consumed only local alcohol made by the local people.

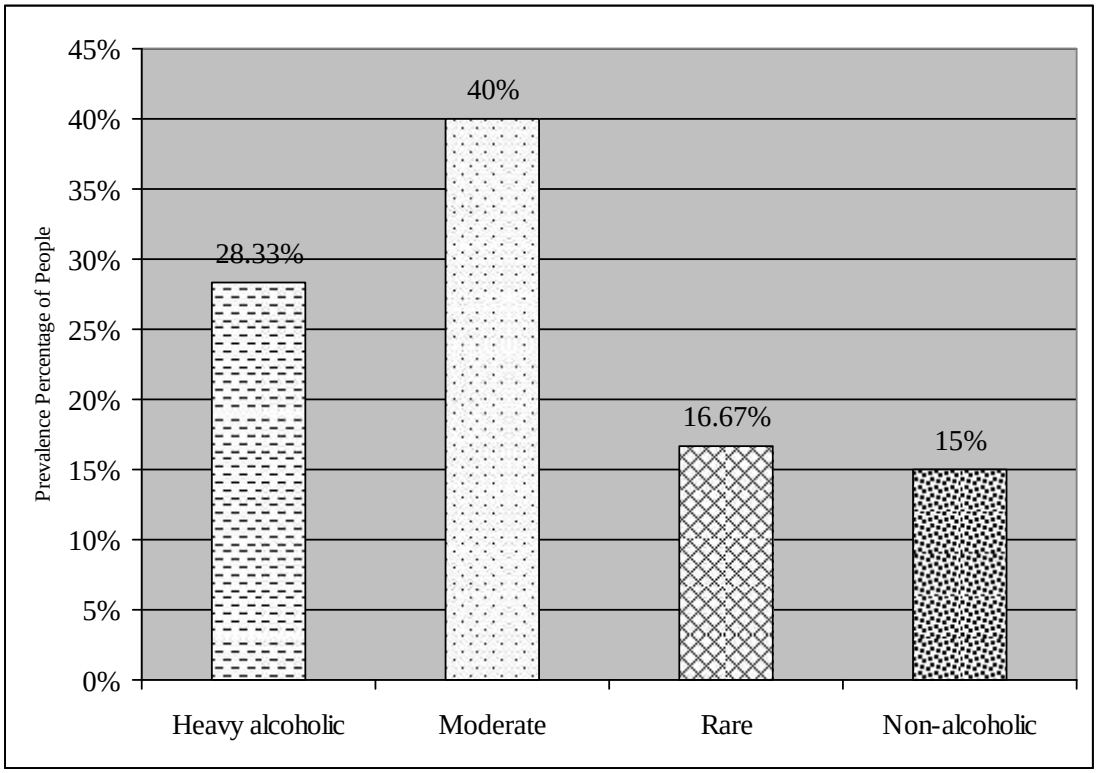

Figure No. 8

Percentage of Mushar Community consuming Local Alcohol

) Water Consuming Practice in Mushar Community

Out of 300 respondents, all the respondents i.e. (100%) utilized tubewell water for drinking purpose.

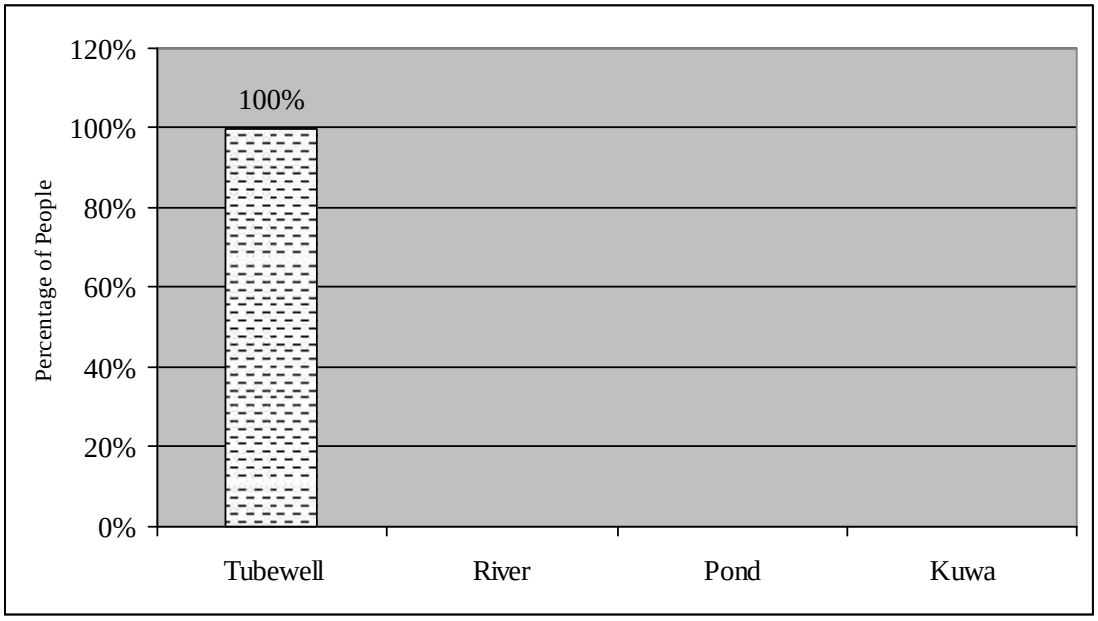

Figure No. 9

Water Consuming Practice in Mushar Community

) Way of Defecation in Mushar Community

The table shows that people of Mushar community did not use toilet at all for defecation. So there was more chance of contamination of soil and vegetables with parasites. So different types of intestinal parasites were found in people by Mushar community. The positive percentage of infection was 113 (37.66%) out of 300 samples.

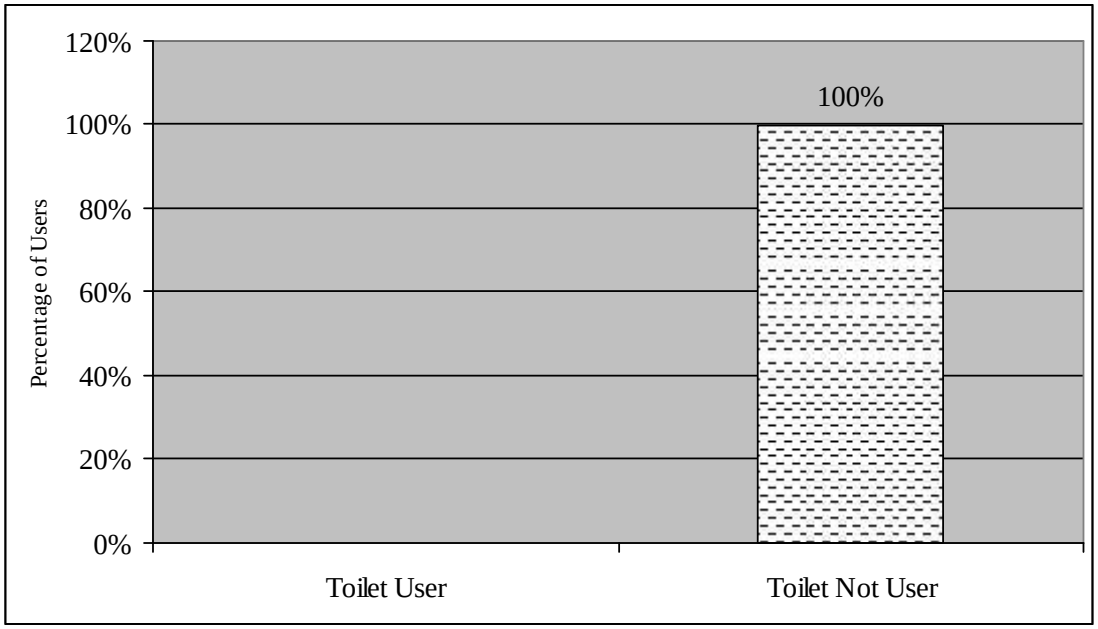

Figure No. 10

Way of Defecation in Mushar Community

) Feeding Behaviour of Mushar Community

Out of 300 respondents, 32 (10.66%) respondents were vegetarians whereas 268 (89.33%) respondents were non-vegetarians. As a whole, non-vegetarian respondents were higher in Mushar community. So one major factor of helminth infections in Mushar community may be due to non-vegetarian habit and also used uncooked meat.

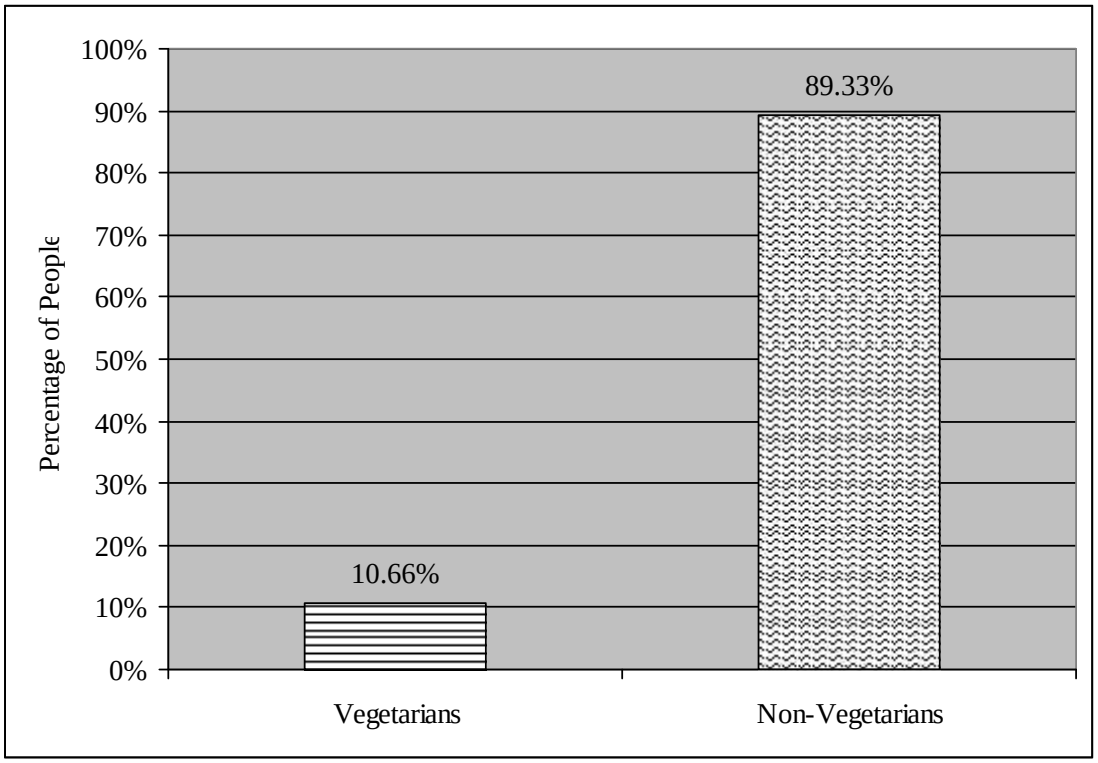

Figure No. 11

Feeding Behaviour of Mushar Community

) Prevalence of Parasitic Infection in Vegetarian and Non-Vegetarian of Mushar Community

The result showed that, out of 300 respondents, 32 (10.66%) respondents were vegetarians and 268 (89.33%) respondents were non-vegetarians. The rate of infections of intestinal parasites were found more in non-vegetarian than the vegetarian. The prevalence percentage of infection was 28.31% in vegetarians whereas 71.68% in non-vegetarians. Mushar community did not cook meat properly. Mushar community used mostly pork, fish, snail, chicken, rat, mutton as their diet.

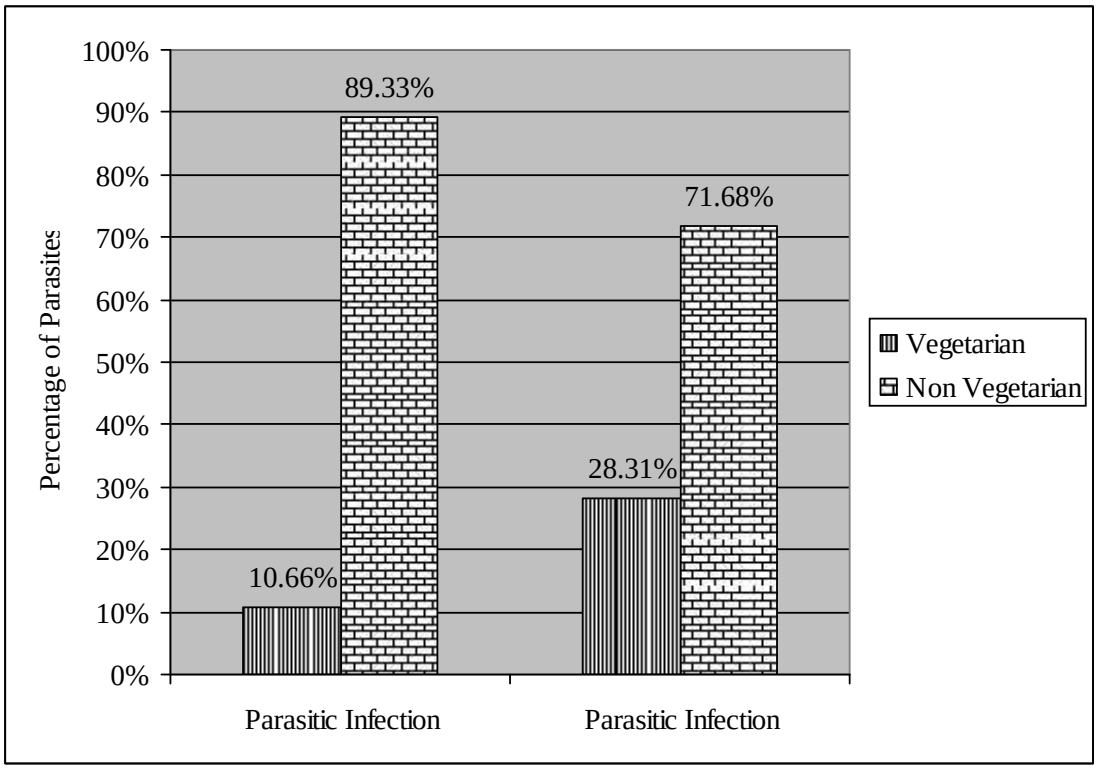

Figure No. 12

Prevalence Percentage of Parasitic Infections in Vegetarian and Non-Vegetarian Mushar Community

) Hygienic Awareness Situation in Mushar Community

The result showed that the people of Mushar community were less aware of the hygiene, sanitation and transmission of parasitic diseases. The table reveals that only 9 (3%) people were aware about the hygiene, sanitation and transmission of parasitic diseases for their health. Remaining 291 (97%) people were non-aware of the hygiene, sanitation and transmission of parasitic diseases.

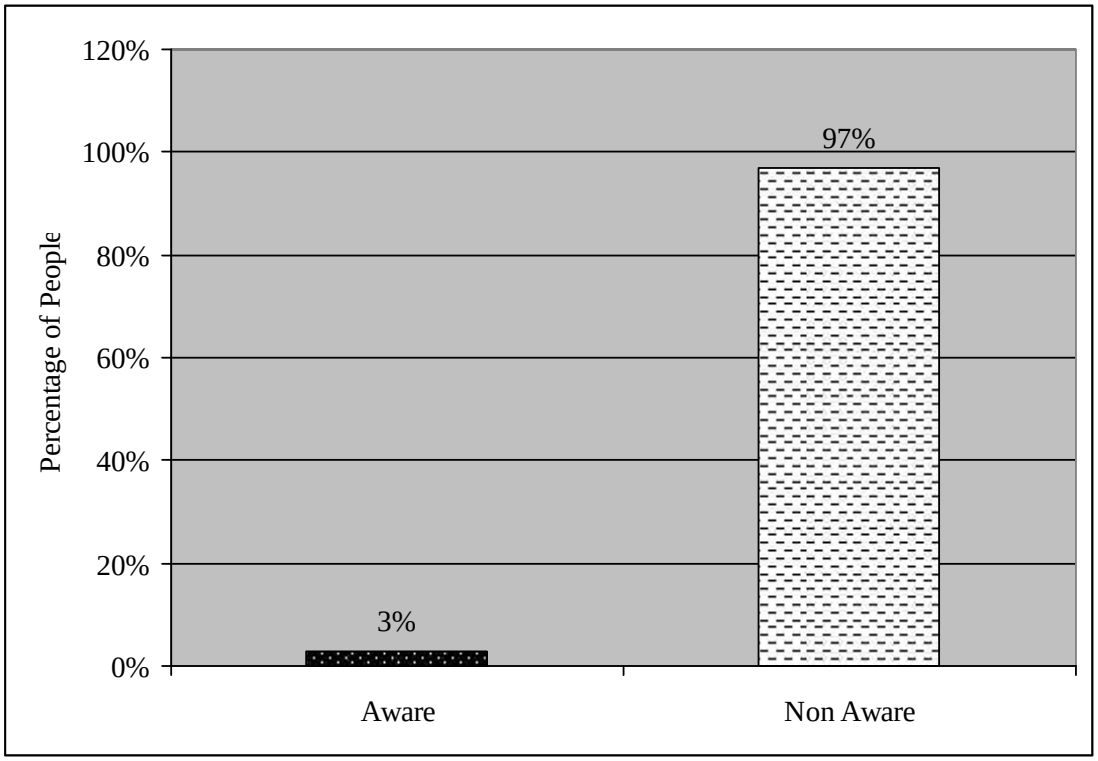

Figure No. 13

Parasite Awareness Situation in Mushar Community

VII

DISCUSSION AND CONCLUSION

Alcohol (Arabic al-kuhu), term applied to members of a group of chemical compounds and in popular usage to the specific compound ethyl alcohol or ethanol. Alcohols are a class of organic compounds containing the hydroxyl group 'OH' attached to a carbon atom. Alcohols are the normal byproducts of digestion and chemical processes within cells and are found in the tissue and fluids of animals and plants (Ramchandani et al., 2008).

WHO estimates that about 76 million people worldwide suffer from alcohol-related disorders. The prevalence of the illness varies in different countries. In the United States about 15% of the people of the population experiences problem related to their use of alcohol (Abuse Report, 2009). Men are three times more likely than women to become alcoholic, while people aged 65 and older have lowest rates of alcohol dependence.

Ethyl alcohol or ethanol is present in varying amounts in beers and wines as well as in distilled liquors. When person consumes alcohol, the stomach and intestine rapidly absorb it. From there alcohol travels in the blood throughout the entire body affecting nearly every tissue. Moderate and high doses of alcohol depress the function of the central nervous system including the different layers of the intestine as well as other living parasites of intestine. Higher the alcohol level in the blood is one of the major reasons for discomfort. (Alcoholic beverage – Wikipedia, 2009-2010)

This study revealed that the prevalence of intestinal parasites in people consuming heavy alcohol was nil and the most in non-alcoholic. The prevalence percentage of intestinal parasites was 0% in heavy alcoholic, 38 (31.66%) in moderate alcoholic, 35 (70%) in rare alcoholic and 40 (88.88%) in non-alcoholic people of Mushar community. Regarding the sex-wise the total prevalence percentage of intestinal parasites in males was 31 (27.43%) and in

females 82 (72.56%). The males were less infected by intestinal parasites in comparison to females. The prevalence percentage of intestinal parasites was 12.5% in males and 19.16% in females of moderate alcoholic, 16% in males and 54% in females of rare alcoholic and 17.77% in males and 71.11% in females of non-alcoholic respectively.

Among the protozoan infections, *Entamoeba histolytica* and *Giardia lamblia* were found in the people of Mushar community. The prevalence percentage of *Entamoeba histolytica* was 0% in heavy alcoholic, 12 (31.57%) in moderate, 7 (20%) in rare and 6 (15%) in non-alcoholic. The prevalence percentage of *Giardia lamblia* was 0% in heavy alcoholic, 23 (31.57%) in moderate, 22 (62.85%) in rare and 31 (77.5%) in non-alcoholic respectively. The prevalence percentage of helminth infections was 9 (7.96%) *Ancylostoma duodenale*, 12 (10.61%) *Ascaris lumbricoides* 8 (7.07%), *S. stercoralis*, 14 (12.38%) *T. solium*, 6 (5.30%) *H. nana* and 2 (1.76%) *T. trichiura* respectively. The prevalence percentage of *T. solium* was found to be high because of heavy eating of uncooked pork.

The present study showed that females were more infected by the intestinal parasites than the males. The high prevalence rate of intestinal parasites in female might be due to consuming low amount (doses) of alcohol in comparison to male.

The present study exposed the consuming behaviour of alcohol by Mushar community. The feeding behaviour was also exposed. Now a days, mice eating practice is rare in Mushar community. Mostly they were consuming pork, chicken, fish, snail and mutton. Due to having the different kinds of meat as their food large number of helminth parasites were found in the people of Mushar community. Large number of protozoan infections were found due to unhygienic behaviour.

The literacy (able to read and write) rate of Mushar community was minimum i.e. 4 (1.33%). Due to low literacy condition of Mushar community, concern towards sanitation was very poor. Regarding sanitary condition of study area, Mushar community did not use toilet at all. The mode of defecation was responsible for contamination in soil, vegetables as well as nearby water stream. This contamination of soil, vegetables and water contribute greatly for the parasitic infection. Due to open field defecation practice, the Mushar community revealed high prevalence of intestinal parasites.

At last, simple, tribe and nomadic life style of Mushar community as well as the lack of education related to course and health education governed towards poverty. Poverty and social discrimination result high illiteracy which in turn is responsible for lack of awareness in health and hygiene. Poor sanitary condition and unhygienic food habit were found to be contributing factors for being these parasite to be endemic with high prevalence.

Though the prevalence rate of intestinal parasites was nil in heavy alcoholic but more than that alcohol effects the human body by disturbing the system as well as other organs of the body.

The awareness programme regarding the hygiene and sanitation was conduced but due to poverty they can't maintain their life style of living and slowly again they return to the previous situation of living.

VIII

RECOMMENDATIONS

- Although the heavy use of alcohol effects the intestinal parasites but much more than that it affects the body system causing a wide range of health problems.
- Mass awareness should be developed regarding the affects of consuming alcohol.
- People should be encouraged for sanitary improvements including personally hygiene and environment sanitation.
- Mass awareness should be developed regarding alcohol consuming sanitation, personal hygiene and safe drinking water.
- Mushars as well as farmers should be inspired to use boots and gloves during working in field.
- Habit of defecation in open field, on the bank of river etc. should be prevented and human night soil should be managed properly.
- Nation should establish sanitary toilet to the Mushar community.
- Pure and safe drinking water facility should be made easily accessible for the tribal community.
- Consuming alcohol, walking barefoot, swimming in polluted water and use of polluted water for cleaning and washing purpose should be discouraged.
- The further research on the prevalence of intestinal parasites in people consuming different grades/types of alcohol should be encouraged.

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ANNEX -1

INTRODUCTION TO INTESTINAL PARASITES

Parasite is an organism that lives on or in other organism from which it obtains nutrients to live and causes harm in the process. Parastitism is defined as an intimate and obligatory relationship between two heterospecific orgaism during which parasites are metabolically dependent on host (Chang, 1999).

The word parasite has been derived from the Greek word para means beside & sitos means food. The host provides food and shelter for parasite without compensation (Craig and faust, 1943). There are 3200 varieties of parasites in the form of protozoa, Nematoda, Trematoda and Cestoda.

Protozoan parasite consists of a single cell like unit which is morphologically and functionally complete (Chatterjee, 2001). They cause serious health problems for human. Some common intestinal protozoan parasites are: *Entamoeba histolytica, Giardia lamblia, Iodomeba butshchilli, Endolimax nana, Chilomastix mesnili, Entermonas hominis, Entamoeba coli, Isospora belli, Trichomonas Hominis, Balantidium coli, Cyclospora, Cryposporidium* etc.

Entamoeba and Amoebiasis

Amoebiasis is second leading cause of death from parasitic disease world wide (Stanley, 2003). In developing world, amoebiasis causes some 450 million infections per annum abut 50 million incidents and about 100,000 deaths (Smyth, 1996). *Entamoeba histolytica* is a potent pathogen secreting proteinasses that dissolve host tissues; killing host cells on contact and engulfing RBCs *Entamoeba histolytica* lives in the mucous and sub-mucous layers of the large intestine of human. It has 3 stages in its life-cycle i.e. Trophozoites, Precystic and Cystic stage. Trophozoite is irregular and not fix in shape and size ranges 18-40 ll m in diameter. It is feeding stage. Precystic stage

is small in size varying from 10-20 ㎛ in diameter. It is round or slightly ovoid in shape. It is transitory stage cystic stage is round and surrounded by highly retractile membrance, systic wall. Size varies from 5 to 20 ㎛. initially the cyst is a nucleate but the mature cyst is quardrinucleate, which is infective stage. The transmission of the parasite is through faecal oral route. Infection of *E.histolytica* commonly results into amoebasis characterized by abdominal pain, mucus in stool weakness, dehydration, along in the malaise loss of appetite etc.

Giardia and Giardiasis

Giardia lamblia has world-wide distribution with an incidence of 1-30%. In the USA, it is now considered to be the most common intestinal parasite of man and the leading cause of diarrhea due to protozoan infection inhuman (Smyth, 1996). It is confined in its distribution to the small intestine particularly the deudenum and upper part of jejunum occasionally invading the bile ducts. It exists in two forms, trophozoite and cyst. Trophorzoite is rounded anteriorly and pointed posterioly. The dorsal surface is convex and the ventral surface is concave with a sucking disc. The ventral surface possesses to depression called adhesive discs while make contact with the intestinal cell of the host. It is a feeding phase. The size of the trohozoite is 14 ㎛ long by 7 ㎛ broad. Cyst is an oval in shape with thick wall and measures 12 ㎛ broad. It is an infective phase. No intermediate host is required to complete it life cycle. The transmission is through faecal oral rout. Giardiasis is characterized by disturbance in intestinal function, leading to malabsorption fats, persistent looseness of bowels and mild steatorrhoea.

Cyclospora and Cyclosporiasis

Cyclospora cayetanensis is a coccidian parasite measuring 8-10 ㎛ in diameter. It is faecally contaminated water and foods are potential source of infection. Human excreta unsporulated cysts or oocysts into the environment.

During sporulation the sporant divides into two sporocysts and each contain two sporozites. Sporocysts excyst in the gastro-intestinal tract and invade small intestinal epithelial cells. The epidemiology and biology of the parasite are poorly understood and numerous out breaks of cyclosporiasis have been recorded from around the world since 1990. *Cyclospora* infects the small intestine (bowel) and usually causes watery diarrhea with frequent (sometimes explosive) bowel movements. Other symptoms can include loss of appetite, substantial loss of weight, bloating, increased gas, stomach cramps, nausea, vomiting, muscle aches, low-grade fever and fatigue. Some people who are infected with *cyclospora* do not have any symptoms.

Cryptosporidium and Cryptosporidiosis

Crystosporidium is a coccidian parasite. It causes cryptosporidiosis. Morphological, the cryptosporidium shows six distinct forms during its life cycle. These are sporozoite, trophozoite, merozite, microgamont, macrogamont and oocyst. The sporozoite in slender, crescent shaped and measures 1.5 to 7.5 µm in diameter. The anterior end is pointed out the posterior and which contains a prominent nucleus is rounded. Trophozoite is intracellular transitional form of the parasite. It measure 2-2.5µm in diameter. Trophozoite gives rise to schizonts or gamonts. The schizoints are crescent-shaped and measures 1 to 5 µm in diameter showing rounded anterior and posterior ends. Microgament are the male sexual forms. These are wedge-shaped, 0.2 to 0.7 µm in length. Macrogamonts are the female sexual forms. These are spherical, measure 3 to 5µm and are covered by a double layer membrane. Each macrogamont consist of a single large nucleus and endoplasmic reticulum. Oocyst is the infective form of parasite. It is colourless spherical to oval and measure 4.5 to 6 µm in diameter. Each oocyst contains up to four slender bow-shaped sporozoites. There are two types of oocyst thin walled and thick walled, thin walled oocyst can reinfect the host but the thick walled oocyst excrete out & infect new host. Infection is acquired by ingestion of mature oocysts, which

releases, sporozoites by partial digestion. The parasite is obligate intracellular parasite. The symptoms can persist and become fatal in the case of congential, acquired or therapy induced immunodeficiency. The illness is characterized by profuse watery diarrhea with abdominal cramp. It can also cause vomiting, weight loss, loss of appetite and low grade fever.

Intestinal Helminthes Parasites

The World Health Organization (WHO) estimated that more than one billion people are chronically infected with intestinal helminthes (WHO, 1998).

The helminthes parasites are multicellular, bilaterally symmetrica, triplobloastic animals. They belong to the phyla platyhelminthes and Nemahelminthes. They are endoparasites of intestine and blood of human body and cause different diseases. Most helmintes parasites come under the heading of intestinal infection. Many parasitic helminthes require one or more intermediate hosts.

The relative importance of the major groups of helminthes may be roughly judged by Stoll's, (1947) estimated that there exist in the world today among some 2200 million people, 72 million nematode infections (Chandler; 1961). These numbers have decreased in the successive decades as a mater of fact they are probably too low now.

The aim of present study is to record the prevalence of *Hymenolepis nana, Ascaris lumbricoides, Trichuris trichiura*, Ancylostoma duodenale, *strongyloides stercoralis, Taenia solium, Taenia saginata* in the study area.

***Ascaris* and Ascariasis**

Ascaris is caused by *Ascaris lumbricoides*. It often occurs in population living under poor hygienic condition (Smyth, 1996). The adult worm lives in the small intestine of human beings. It is elongated, cylindrical nematodes, tapering at the anterior end and some what more attenuated at the posterior end.

Lateral lines can easily be seen. The kead is provided with conspicuous lips. Sexes are separate. The size of the male is 15 to 25 cm in lengthy with a maximum diameter of 3 to 4 mm and female in 25 to 40 cm in length with diameter of 5mm. These parasite complete life cycle in one host. The transmission of the parasite is through faecal-oral route. Fertilized eggs are round and oval in shape and 60× 40 to 50 ㎛ in size, surrounded by thick smooth transculent shell with an outer albuminous coat. When the infection is heavy symptoms like fever, coughing, blood-tinged sputum etc. become evident. Abdominal discomforts, vitamin A deficiency, allergic manifestation and intestinal obstruction, ulcers, appendicitis, jaundice, liver abscess are the symptoms, which become evident in long terms.

Ancyclostoma and Ancyclostomiasis

Ancyclostomiasis is caused by *Ancylostoma duodenale*, commonly called the hookworm. Hook worm must be classified as one of the most destructive human helminthes parasites with estimates of some 900 million cases world wide (Crompton, 1989). The adult worm lives in the intestine of man, particularly in the jejunum less often in the duodenum and rarely in the ileum. The adult worms are some what cylindrical in shape, are slightly constricted interiorly and have a cervical curvature. The cervical curvature gave its name hookworm. The large conspicuous buccal capsule is lined with a hard substance provided with six teeth, four hooks on ventral side and two knobw like a dorsol side the male measure 8-11×0.4mm while female is 10- 12× 6mm (Criag and Faust 1943). The male bears copulatory bursa at posterior end. Fertilized eggs when discharged are usually unsegmented and ovoidal or elliptical, with bluntly rounded ends, and have an average measurement of 60 by 40 microns. A single female worm can lay 25,000 to 30,000 eggs per day. Adult worm in the human intestine particularly in the jejunum, less often in the duodenum and rarely in the ileum has been estimated to be about 3-4 years. They suck blood lymph, bites of mucous membrane and tissues fluid from the lining of the intestinal wall. The characteristic symptoms of Ancyclostomiasis

are gastrointestinal disturbances, anemia and nervous disorders. Patients appear weal they complain of dizziness, ringing in the ears and headache. Nausea and vomiting are frequent.

Trichuris and Trichuriasis

This disease is cased by *Trichuris trichuria*, commonly called whipworm. This species is a much more common human parasite than in generally appreciated and it is reported to infect up to 800 millions people throughout the tropical and temperate areas (Smyth, 1996). The adult worm lives in the large intestine particularly the caccum and also found in the vermiform appendix. They are also called whip worm, a term derived from the whip like body. The anterior three-fifth of body is very thin and hair like and the posterior two-fifth is thick and stout. The male measures 3-4 cm in length and has its caudal extremity called through 360 degrees or more. The female measures 4-5 cm in length and is bluntly rounded at the posterior end. The eggs are characteristically brown and barrel-shaped with mucous plug at each pole. No intermediate host is required to complete its, life cycle. Human being is infected by swallowing embryonated eggs with food or water.

Most whip worm infection is mild and a little more than a nuisance. But they retard growth in small children. The patient suffering from whip worm disease complains of nausea, diarrhea, appendicitis and prolepsis of rectum. *Trichuris* dysentery, rectal prolepses, anaemia, poor growth and clubbing of the fingers constitute an important public health problem (Stephenson et al, 2000).

Hymenolepis and Hymenolepiasis

Hymenolepiasis is caused by the dwarf tape worm, the adult worm lives in the small intestine of man. The entire worm is small, measuring up to 25 mm to 40 mm in length by a maximum of 1 mm diameter. Scolex is rhomboidal with four hemispherical suckers and a short rostellum armed with 20-30 spines in one ring proglottids are 200 in numbers. Eggs are oval or spherical in shape

with two district membranes. The outer membrane is thin and colourless and inner embryophore encloses an oncosphere with three pairs of lancet shaped hooklets. The infection occurs through ingestion of food contaminated with eggs of *Hymenolepis nana*.

This disease is particularly common among children. The first infection occurs through ingestion of food contaminated with eggs liberated along with the faeces of an infected man. Afterwards, auto infection increases the number of parasites. There are usually no symptoms but with heavy infection, there is abdominal pain and diarrhea.

Strongyloides **and Strongyloidiosis**

Strongyloides stercoralis is the fourth most important intestinal nematode infection, but its impact is much less widely appreciated than those of *Ascaris, Trichuris* or hook worm infections. *Stronglyoides stercoralis* is symptomatic is around 50% of cases, with diarrhea, abdominal pain, nausea and vomiting being the common gastrointestinal symptoms (Milder et al., 1981, Monaka et al., 1998).

The adult worms are largely localized in the duodeno-jejunal region. The parasitic female measures 2.5 mm in length and 40-50 μm in diameter. Males are shorter and boarder than females. In the parasitic phase, the females are readily discovered but not the male. Eggs are thin shelled, transparent and oval measures 50μm × 30μm. Infection occurs by the entry of filariform larvae which penetrate directly through skin, when coming in contact with soil. *Strongloides* can undergo 'autoinfection'; the infection has been reported to last more than 30 years in untreated human. The infection with these parasites can also be transmitted via breast milk (Stephension et al., 2000). If the parasite invade lung it produces symptoms like pneumonia i.e., fever, cough, blood in sputum etc. While establishment inside intestine produce symptoms like

nausea, vomiting, anorexsia, abdominal pain, diarrhea with mucous, blood and emaciation.

Taenia and Taeniasis

This disease is caused by the species belonging to the genus Taenia, which includes mainly *Taenia solium* (pork tapeworm) and *Taenia saginata* (beef tape warm). The *Taenia solium* is generally found in Hindu community but *Taenia saginata* is generally found in Muslim community. The adult worm lives in the small intestine (upper jejunum) of man and moves against the peristaltic movement in the host's intestine.

The adult *Taenia solium* lives attached to the wall of the small intestine, its body wound back and forth in the lumen of the small bowel. It measures 2 to 7 meters length. The scolex is roughly quadrate, with a diameter of about 1mm, possesses 4 large, deeply cupped suckers (0.5 mm diameter) and a conspicuous rounded rostellum armed with a double raw of large and small hooklets, numbering 22 to 32 and measuring 160 to 180 microns and 110 to 140 microns, respectively in length. The neck is short measuring from 5 to 10mm in length. Immature proglottids are broader than length, mature ones are nearly square and gravid ones are longer than breadth the total number of district proglottids is under 1000.

The adult Taenia saginata living with their heads embedded in the mucosa of the small bowel, are considerably longer than Taenia solium, due to the greater number of proglottids developed and to the greater length of the gravid proglottids. They do not have rosetllium and rostellar hooks. Under favorable conditions they may attain a length of 25m or more but usually they measure not over 12 to 15 feet and have 1000 to 2000 proglottids at one time. The head is quadrate in cross section with a maximum diameter of 1.5 to 2mm, and is provided with 4 hemispherical suckers of 0.7 to 0.8mm diameter, situated at the four angles of the head and serving as the sole organs of

attachment. The mature proglottids are some what broader than long (maximum breath, 12 mm), and the gravid ones considerably narrower and longer (5 to 7 mm broad, 20 mm long.) The eggs of both Taenia solium and Taenia saginata are identical. They are spherical and brown in colour and measure 31 to 43 micro meter in diameter with 3 pairs and hooklets. Human get infected after ingesting under cooked meat cysticerous then develop into adult in side human body. Generally adult worm in intestine do not cause serious effect but intestinal disorder like abdominal pain, irregular bowel habit, anaemia, nausea, vomiting, anorexia, emaciation etc can occur. But server symptoms are produced if accidental ingestion of eggs by man happens, occur causing development of cysticerous in the human body known as cysticerous cellulose. If in eye this establishment takes place then blindness may occur, if in brain then epilepsy can be evident.

ANNEX – II

Alcohol is an organic compound in which the hydroxyl group 'OH' is bound to carbon atom of an alkyl group or substituted alkyl group. General formula of cyclic alcohol is $CnH_2n+1'OH'$. Alcohol can be obtained by the fermentation process from the different components such as starches, sugars which is also known as alcoholic beverage. The alcoholic beverage is a drink that contains ethanol commonly called alcohol (http://en.wikipedia.org/wiki Alcoholic beverage, 2009)

Alcoholic beverages are divided into three general classes, beers, wines and spirits. Alcohol is a psychoactive drug hat has a depressant effect. A high blood alcohol content is usually considered to be legal drunkenes because it reduces attention and slow reaction speed. Alcoholic beverages can be addicted the state of addiction to alcohol is known as alcoholism. Alcoholic beverages that have a lower alcohol content (beer and wine) are produced by fermentation of sugar or starch containing plant materials beverages of higher alcohol content (spirits) are produced by fermentation followed by distillation. Beer is the world's oldest and most widely consumed alcoholic beverage and third most popular drink overall after water and tea. Wine involves alohger fermentation process and along aging process that results in an alcoholic content of 9%-10% ABV. Sparkling wine can be made by adding a small amount f sugar before botting.

Spirits are unsweetened, distilled alcoholic beverages that have an alcohol content of at least 20% ABV are called spirits which are produced by distillation of a fermented product. As a whole, alcohol effects human body seriously. If the people are addicted towards the alcohol. The effect of alcohol is classified into.

a) Short-term effects of alcohol
b) Long-term effects of alcohol

Short term effects of alcohol consumption include intoxication dehydration and ultimately alcohol poisoning. Alcohol intoxication affects the brain causing slurred speech, clumsiness and delayed reflexes. Alcohol stimulates insulin production which speeds up the glucose causing irritability and possibly death for diabetes. Long term effects of alcohol include changes to metabolism in the liver and brain and possible addiction (alcoholism). A 2001 report estimates that medium and high consumption of alcohol lead to 75,754 death in USA. Low consumption has some beneficial effects, so a net 59,180 death were attributed to alcohol. (Abuse report on alcohol 2001)

As the production of alcoholic beverages requires a license and alcohol production is taxed. The different types of ingradients are used for alcoholic beverages. (http://en.wikipedia.org/wiki/alcoholic/beverages)

Sources	Name of Fermented Beverage
Barley	beer, wine
Corn	beer
Wheat	vodka, whisky, beer
Rice	sonti (India), thwon (Nepal)
Millet	Tongba (Nepal)
Juice of grapes	wine
Juice of apples	apple wine
Potato, grain	vodka, potato beer
Juice of sugarcane or molasses	rum

ANNEX – III

METHOD OF MAKING RUM (LOCAL ALCOHOL)

Alcoholic beverages that have a lower alcohol (beer and wine) are produced by fermentation of sugar or starch containing plant materials, beverages of higher alcohol (spirits) are produced by fermentation followed by distillation. Due to poor economic status of Mushar community they were consuming only the run (local alcohol) made by the people of surrounding. In Teria, the rum (local alcohol) is known as 'Local daru'.

The materials required for the formation of local daru (rum) are:

- Sugar molasses
- Metal pot
- Mud pot
- A big pipe
- Container
- Few gram of urea

Process

Sugar molasses obtained from the sugarcane should be kept in a container for 4 to 5 days. The different types of grinded grains should be kept such as maize, wheat, rice etc. for making hard alcoholic beverage, few grams of urea should be kept. After mixing all these substance, mixture should be kept in most and shady area. Upto 3-4 days for the decomposition of the mixture.

After 4 to 5 days, the mixture should be kept into another metal pot which should be heated in a heavy stove. Other two pots should be kept one above other and each and every pot should be sealed tightly with mud or with other sticky substance. The top placed pot should be of metal in which cold

water should be kept. As heating process starts, the vapour from the mixture goes upward from the mouth of the first pot into second pot. Near to the side of second pot, a long pipe is fixed, through which the liquid of mixture goes into another container as a alcoholic beverage.

The collected liquids acts as the rum (local alcohol) which is very hard for drinking purpose. So the water should be added for drinking purpose.

ANNEX – IV

QUESTIONNAIRE FOR BASELINE HEALTH SURVEY IN CHANDRALALPUR-6 OF SIRAHA DISTRICT

1) Name:

   Age: ……. Sex: …….. Locality: ……..

2) Occupation: ……..

3) Sanitation:

   System Toilet [ ] Open [ ] Other [ ]

   Types Disposal [ ] Safety Tank [ ] Drain [ ] Other [ ]

4) Are you literate?

   Yes [ ] No [ ]

5) If literate,

   Primary Level [ ] Lower Secondary Level [ ] Literate [ ]

6) The type of alcohol consumed

   Local [ ] Branded whisky [ ] Beer [ ] Vodka [ ]

7) Do you know the effect of alcohol?

   Yes [ ] No [ ]

8) The amount of alcohol consumed,

   1 quarter [ ] 2 quarter [ ] 3-4 quarter [ ] Others [ ]

9) Are you consuming alcohol daily, moderately or rarely?

   [ ] [ ] [ ]

10) The types of water supply,

   Tape water [ ] Tube-well [ ] River water [ ]

   Kuwa [ ] Other [ ]

11) Do you use separate water supply for drinking, washing, cooking and other purpose?

   Yes [ ] No [ ]

12) What type of food habit do you have?

Vegetarian [ ] Non-vegetarian [ ] Both [ ]

13) If non-vegetarian, the types of meat, frequently you eat?

Pork [ ] Chicken [ ] Rat [ ]

Buff [ ] Fish [ ]

14) How do you prepare meat to eat?

Raw meat preparation [ ]

Sekuwa [ ]

Well cooked [ ]

Half cooked [ ]

Boiled [ ]

All [ ]

15) Did you use any medicine (anthelminthes) ?

Yes [ ] No [ ]

16) Do you know any idea about the following disease?

Taemsaic Yes [ ] No [ ]

Giardiasis Yes [ ] No [ ]

Ascariasis Yes [ ] No [ ]

Diarrhoea Yes [ ] No [ ]