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## "PREVALENCE AND ASSOCIATED RISK FACTORS OF PARASITIC INFESTATION AMONG CHILDREN IN EASTERN PART OF NEPAL"

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### ABSTRACT

Intestinal worm infestation is one of the major childhood health problems in developing countries including Nepal. Report shows almost 35% people mostly children, in Nepal are taking medicine against worm infestation. In Nepal more than 70% morbidity and mortality are associated with infectious diseases and they are also top ten diseases of the country. The findings of the study show that 24% of the school going children was infected with the intestinal parasites and the most common types of worm were *Giardia lamblia*, *Ascaris lumbricoides*, and *Hymenolepis nana* respectively. It has been found that there is an association between prevalence of parasitic infestation and demographic variables like ethnicity, education of mother, and habit of disposing excreta.

#### Background

#### Methods

The experimental data were collected edited, organized and entered into MS Excel. Then data cleaning was done to increase accuracy. The data were analysed by using descriptive analysis (mean, median, mode and standard deviation) and Inferential Analysis

#### Results

The findings of the study showed that infestation among school children is 24%. The common types of the parasites detected were *G.lamblia*, *A. lumbricoides* and *H. nana*. The education level of mothers directly affects the prevalence of parasitic infestation in a community.

#### Conclusions

#### The major findings of the study are as follows

- 1) 24% of the respondents was infected with parasites.
- 2) *G.lamblia*, *A. lumbricoides* and *H. nana* were the common parasites.
- 3) Parasitic infestation is higher in Adhibashi Janjati
- 4) Education level of mothers directly affects the prevalence of parasitic infestation in a community
- 5) Habit of defaecating of excreta in open air affects the prevalence of parasite infestation

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### INTRODUCTION

Several types of parasites, their larva, cyst, trophozoite and ova exist as parasites in human body. They may dwell in gastrointestinal system, cardiovascular system, lymphatic system, hepatobiliary system, musculoskeletal system, reproductive, renal system, and most dangerously even in central nervous system also. Few wander around in-between the skin layers and some others even travel up to special sense like eyes causing blindness. Some of them exist as natural flora of intestines without causing any harm to the host. But many of them cause diseases and chronic illness if not treated. (1). Worm infestation may be acquired through feco-oral route or by being in contact with contaminated soil and water or by accidental ingestion of soil contaminated with worm's eggs (2)

Intestinal worm infestation is one of the major childhood problems in developing countries like Nepal (3). Prevalence in some areas appears very high while less elsewhere in the country (4+5). Developing countries in south East Asian region spent 3.76% of the annual budget for health in year 2016(6), but still the situation has not changed much. According to WHO in year 2008, 1100 M people defecated in open space, resulting in high levels of environmental contamination by worms (7). And it has been noted that open air defecation is one of the main reason why the parasite infestation is important in developing or under developed countries. As worm infestation appears one of this major economic burden to the country Government of Nepal has initiated National Deworming Program in recent years to control it. *Ascaris lumbricoides*, *Trichuris trichiura* and

hookworms, collectively referred to as soil transmitted helminthes as they need some periods of development in soil before they enter into human beings, are the most common intestinal parasites. Among the helminthes, *Ascaris lumbricoides* and among the protozoan parasites, *Giardia lamblia*, are the commonest intestinal parasites parasitizing human beings(8). Eggs and cysts of the parasites expelled from feces of infected person can live for several years in soil if environment is not so hoarse. The parasitic forms then enter human body through skin penetration in case of hookworms or by faeco-oral route in case of *A. lumbricoides*, *T. trichiura*, *H.nana*, *Enterobius vermicularis* (pinworm), *G. lamblia* and *Entamoeba histolytica* (9) Parasitic infestation of gastro intestinal system in school going children and tends to occur in high intensity in this age group. High prevalence is closely correlated to poverty, poor environmental hygiene and impoverished health services. Poverty, lack of awareness, failure to practice proper hand washing after defecation, unsafe drinking water and use of improper toilets are some of the reasons why parasitic infestation is not totally controlled in the most part of our country. The above causes contribute to the sufferings of school going children both mentally as well as physically. Socio-economic and cultural factors and lack of adequate basic sanitation facilities have made Nepal vulnerable to intestinal parasitic infestation.

Intestinal parasite infestation is the major cause for visiting health care centers in the country. It was the number one cause of morbidity for the health care visit in the year 2008/2009. Small children below 5 years of age are particularly prone to intestinal parasite infestation because of their habit of playing with soil, sucking fingernails, eating mud, nature of not washing hands after touching dirty things and lack of knowledge regarding toilet hygiene. In addition to the above mentioned factors, rural community mothers, who are the sole care takers oh their children in many cases, lack basic knowledge of preventing parasitic infestation of their kids which makes the situation even more alarming(10).According to WHO, infection with *Ascaris lumbricoides*, *Trichuris trichiura* and hookworms, affect approximately 250m, 46 m and 151m people respectively. About half the population in South India and 50% of school children in tribal areas of central India, are infected with *Ascaris lumbricoides*, *Trichuris trichiura* and hookworms. The ov4erall prevalence of helminthes infection in children in India is about 50% in urban areas and 68% in rural areas. They constitute 12% of total disease burden in children (11). Worms are parasitic, soft bodied organisms that can infect human beings as well as animals. Parasites fall into several different classes including protozoans, flukes, round worms, tapeworms etc. The parasitic infestation is acquired through ingestion, inhalation or by shin penetration by infective forms of the parasites (12). The parasitic infestation is a major health problem in developing countries. It is estimated that at least one fourth of the world population is clinically infected with intestinal parasites (13). It is also calculated that soil transmitted helminthes alone infect over one billion people. Many of these people are infected with more than one species f the parasites. It is estimated that 65,000, 60,000 and 70,000 deaths occur annually due to *Ascaris lumbricoides*, *Trichuris trichiura* and hookworms respectively (14). Similar type of study conducted in rural part of India concluded that 31.8% of participants were infected with one or more intestinal parasites. The study revealed that the parasitic infestation was higher among those

whose mother had less than primary school education. The author had concluded that intervention including health education on personal hygiene should be provided especially to mothers of under -five in order to prevent parasitic infestation in them (15).Parasitic infestation of gastrointestinal system is one of the most common public health problems in Nepal (16). Similar to above study, Pradhan Prasil *et al* (2014) from Patan Academy of Health Sciences, Lalitpur, Nepal, conducted a study to assess the prevalence of worm infestation among public school children in rural village of the Kathmandu Valley and found that 24% of 194 participants were infected with intestinal parasites (17).Helminthes infestation contributes to the global burden of diseases in children especially in tropical and sub tropical regions (18). Studies on human parasites have demonstrated that there is a common relationship between parasitic infection and lower socio-economic status of the region. Some of the parasites not only cause nutritional deficiencies and anaemia but also can lead to intestinal obstruction whose remedy is surgical intervention (19).

**Table no 1** Demographic profile of the respondents

Demographic variables	Frequency(No)	Percentage (%)
<b>Age</b>		
3 Years	15	30%
4 Years	<b>19</b>	<b>38%</b>
5 Years	16	32%
<b>Sex</b>		
Male	<b>30</b>	<b>60%</b>
Female	20	40%
<b>Religions</b>		
Hindu	<b>33</b>	<b>66%</b>
Buddhist	10	20%
Muslim	5	10%
Christian	2	4%
<b>Ethnicity</b>		
Brahmine/Cheetri	11	22%
Dalit	1	2%
Adhibashi/Janajati	3	6%
Madeshi	<b>35</b>	<b>70%</b>
<b>Education of Mother</b>		
No Schooling	13	26%
Primary Level	<b>20</b>	<b>40%</b>
Secondary & Above	17	34%
<b>Education of Father</b>		
No Schooling	6	12%
Primary Level	11	22%
Secondary	<b>22</b>	<b>44%</b>
Above 11 Class	11	22%
<b>Occupation of mother</b>		
Agriculture	14	28%
Housewife	<b>26</b>	<b>52%</b>
Services	5	10%
Self Employed	5	10%
<b>Occupation of Father</b>		
Agriculture	<b>17</b>	<b>34%</b>
Services	7	14%
Abroad	13	26%
Self Employed	12	24%
Unemployed	1	2%
<b>Family Income(Per month in NPR)</b>		
Less than 10000	18	36%
10000 to 15000	<b>21</b>	<b>42%</b>
More than 15000	11	22%

## METHODS

The study was conducted from 16th April 2015 to 16th June 2015. Permission was taken from the Institutional review Committee of Nobel Medical College Teaching Hospital to conduct the study. Permission was obtained from the Hospital Director, Nobel Medical College Teaching Hospital and

principal, Gurukul Madhyamik Vidhyalaya, Biratnagar, Nepal. Informed verbal consent was taken from the participants and their parents and confidentiality was maintained. School children in between 3-5 years of age who had not taken any anti-helminthics in the past 6 months were included in the study. A self developed interview schedule was used to collect socio-demographic data from parents. Stool samples were collected brought to the hospital laboratory and microscopic examination was done within 2 hrs of passage of the stool. The collected data were edited, organized and entered into MS Excel. Then data cleaning was done to increase accuracy. The data were analyzed by using descriptive analysis (mean, median, mode and standard deviation) and Inferential Analysis

## RESULTS

The above mention table shows that majority of the respondents were 4 years old and 60% of them were male. Regarding religion, majority of them Hindus (66%) And regarding Ethnicity majority of them were Madeshi (70%). Regarding education of mother, 26% were illiterate, 40% had primary level and 40% of them had secondary level education. Regarding occupation (52%) of mother were housewives. The majority of the respondent's parents were farmers and monthly incomes of most of them were in-between Rs. 10,000-15,000/month.

**Table no 2** Distributions of Pre-School Children with Their Risk Factors

Risk factors	n=50	
	Frequency(No)	Percentage (%)
<b>Use of water resources at home</b>		
Tape	0	
Tube well	50	100%
River	0	
Well	0	
<b>Use of water resources at School</b>		
Tape	0	0%
Tube well	41	82%
Filter water	4	8%
Boiled water	5	10%
<b>Treating water at home before use</b>		
Yes	6	12%
No	44	88%
<b>Habits of hand washing after defecation</b>		
Water	2	4%
Soap	45	90%
Mud	3	6%
Ash	1	0%
<b>Child habit of nail biting</b>		
Yes	6	12%
No	44	88%
<b>Child habit of thumb sucking</b>		
Yes	6	12%
No	44	88%
<b>Habits of defecation</b>		
Open field	8	16%
Sanitary latrine	15	30%
pit latrine	27	54%
Others	0	0%
<b>Habit of child wearing shoes while walking</b>		
Yes	5	10%
No	45	90%

The table shows that the only sources of drinking water were tube well. 82% of the respondents drink tube well water in school too, and 88% of them drink water without any treatment. Regarding use of latrines 55% of them used pit latrines and 16% of them go for open field defecation, 12% of them had the habit of nail biting and thumb sucking and only 10% of them wear shoes while walking.

**Table No 03** Association Between Prevalence of Worm Infestation & Selected Demographic Variable (n=50)

Demographic Variables	Prevalence of worm infestation				Chi Total square value	P value
	Yes	%	No	%		
<b>Age Of Children</b>						
3 years	2	13.3	13	86.7	15	1.45
4 years	5	26.3	14	73.7	19	df=2
5 years	5	31.2	11	68.8	16	
<b>Religions of Children</b>						
Hindu	10	30	23	69.7	33	4.11
Buddhist	1	10	9	90	10	df=3
Muslim	0	0	5	100	5	
Christian	1	50	1	50	2	
<b>Ethnicity of Children</b>						
Brahmine/Cheetri	1	9.1	10	90.9	11	10.77
Dalit	0	0	1	100	1	df=3
Adhibashi/janajati	3	100	0	0	3	Significant
Madeshi	8	22.9	27	77.1	35	
<b>Education Of Mother's</b>						
No Schooling	3	23.1	10	76.9	13	5
Primary	2	10	18	90	20	df=2
Secondary & Above	7	41.2	10	58.8	17	
<b>Education Of Father's</b>						
No Schooling	0	0	6	100	6	6.6
Primary	3	27.3	8	72.7	11	df=3
Secondary	8	36.4	14	63.5	22	
Above 11 class	1	9.1	10	90.9	11	
<b>Occupation Of Mother</b>						
Agriculture	3	21.4	11	78.6	14	3.5
Housewife	7	26.9	19	73.1	26	df=3
Services	0	0	5	100	5	
Self Employed	2	40	3	60	5	
<b>Occupation of Father</b>						
Agriculture	5	29.4	12	70.6	17	4.9
Services	0	0	7	100	7	df=4
Abroad	4	30.8	9	69.2	13	
Self Employed	3	25	9	75	12	
Unemployed	0	0	1	100	1	
<b>Family Income(Per Month in NPR)</b>						
Less than 10000	4	22.2	14	77.8	18	0.4
10000-15000	6	28.6	15	71.4	21	df=2
More than 15000	2	18.2	9	81.8	11	

The above table shows that the association between the parasitic infestation with demographic variables. The obtained chi-square values shows that there is significant association between the ethnicity (10.77, df=3) i.e. chi square is 0.01<0.05 and education level of mother (9.66, df=3) i.e. chi square is 0.04<0.05. Other age, sex, religion, education of father, occupation of mother, occupation of father, family income are not significant.

The obtained chi-square values show that there is a significant association between the ethnicity (10.77, df=3) ie chi-square is 0.01<0.05 and education level of mother (9.66, df =3). The other demographic values like age, sex, religion, education of father and occupation of parents are not significant. And there

is significant association between place for defecating excreta and prevalence of parasite infestation ie chi-square value is  $0.01 < 0.05$ .

**Table no 4** Association between prevalence and risk factors of worm infestation

Risk factors	Prevalence of worm infestation				Total	P Value
	Yes	%	No	%		
Place for defecating excreta						
Open field defecation	6	75	2	25	8	<b>0.01&lt;0.05 significant</b>
Sanitary Latrine	2	13.3	13	86.7	15	
Pit latrine	4	14.8	23	85.2	27	

## DISCUSSION

The findings of the study showed that infestation among school children is 24%. The common types of the parasites detected were *G.lambliia*, *A. lumbricoides* and *H. nana*. The results from the Chi-square analysis showed that the prevalence of parasitic infestation is higher in Adhibashi Janjati are all of them under study were infected. Out of 35 Madheshi respondents 8 (22.9%) were infected and finally out of 11 Brahmin/Chhetri respondents only 1(9.1%) was infected. The education level of mothers directly affects the prevalence of parasitic infestation in a community. It has been found that if mother is uneducated 53.8% of her children would suffer from parasitic infestation. The remaining other demographic values like age, sex, religion, education of father, occupation of father, occupation of mother and family income have not shown any significant association with prevalence of parasitic infestation. The result from the Chi-square analysis showed that habit of defaecating of excreta affects the prevalence of parasite infestation, out of 8 respondents who defecated in open space, 6 (75%) were infected with parasites

### The major findings of the study are as follows

- ❖ 24% of the respondents were infected with parasites.
- ❖ *G.lambliia*, *A. lumbricoides* and *H. nana* were the common parasites.
- ❖ Parasitic infestation is higher in Adhibashi Janjati
- ❖ Education level of mothers directly affects the prevalence of parasitic infestation in a community
- ❖ Habit of defaecating of excreta in open air affects the prevalence of parasite infestation

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